

GLOBAL FINANCIAL SHOCKS, CAPITAL FLOWS, AND EXCHANGE RATE FLUCTUATIONS: EVIDENCE FROM NIGERIA

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ABSTRACT

This study examined the relationship between global financial shocks, capital flows and exchange-rate fluctuations in Nigeria. Specifically, it investigated how external reserve growth, economic growth, inflation, institutional quality, oil prices, net portfolio inflows, Treasury bill rates and the US Federal Funds Rate influence Nigeria's real effective exchange rate (REER). The study employed the Autoregressive Distributed Lag (ARDL) bounds-testing approach to examine both the short-run and long-run dynamics among the variables. The results established the existence of a long-run equilibrium relationship among the variables. The findings further revealed that the US Federal Funds Rate exerted a significant negative effect on REER in both the short and long run, indicating that tightening of US monetary policy generates depreciation pressures in Nigeria. External reserve growth had significant but opposing contemporaneous and lagged short-run effects, while oil prices exerted significant negative short-run effects. Inflation and net portfolio inflows also demonstrated significant short-run effects, although most variables were statistically insignificant in the long run. The error-correction coefficient was negative and significant at -0.380565, indicating that approximately 38.1% of short-run disequilibrium is corrected within one period. The study concludes that Nigeria's exchange-rate dynamics are significantly influenced by global financial conditions, particularly international monetary policy, while capital flows and commodity-price movements constitute important short-run transmission channels. The study recommends proactive external-sector management, adequate reserve accumulation, measures to moderate volatile capital flows, economic diversification, improved monetary-fiscal policy coordination and stronger institutional and macroprudential frameworks to enhance Nigeria's resilience to global financial shocks.

Keywords: Financial Shocks, Capital Flows, Exchange Rate.

INTRODUCTION

The increasing integration of global financial markets has fundamentally altered the way financial and macroeconomic disturbances are transmitted across economies. While financial integration provides emerging and developing economies with access to international capital, liquidity and investment opportunities, it also exposes them to external shocks originating from major financial centres and global commodity markets. Global financial shocks, including changes in international interest rates, shifts in global liquidity, variations in investor risk appetite, financial-market uncertainty and commodity-price volatility, can generate substantial movements in cross-border capital flows and exchange rates. These effects are particularly pronounced in emerging and frontier economies where relatively shallow

financial markets, limited external buffers and structural dependence on foreign capital increase sensitivity to changes in global financial conditions. The international finance literature generally distinguishes between global “push factors”, such as U.S. monetary policy, global risk aversion and international liquidity conditions, and domestic “pull factors”, including interest-rate differentials, economic growth, institutional quality and macroeconomic stability, which jointly determine the direction and magnitude of international capital flows (Reinhart & Sbrancia, 2020; Klein & Shambaugh, 2022).

Capital flows constitute an important transmission mechanism through which global financial shocks affect emerging economies. When global liquidity is abundant and international interest rates are relatively low, investors tend to search for higher returns in emerging and frontier markets, resulting in increased portfolio and other capital inflows. Such inflows can strengthen foreign-exchange liquidity, support external reserves and place appreciation pressure on domestic currencies. However, the process can operate in reverse when global financial conditions tighten. Increases in interest rates in major economies, heightened global uncertainty or deterioration in investor risk appetite can induce investors to rebalance their portfolios towards safer and more liquid assets. The resulting capital outflows can reduce foreign-exchange supply, increase demand for foreign currency and intensify depreciation pressures in recipient economies. The exchange rate therefore represents an important channel through which global financial conditions are transmitted to domestic macroeconomic and financial systems. Moreover, capital-flow reversals can amplify existing domestic vulnerabilities, particularly where economies have high external financing requirements and limited capacity to absorb sudden changes in international liquidity.

Nigeria provides an important setting for examining these dynamics because of its substantial integration into international financial and commodity markets and its dependence on foreign-exchange earnings from the oil sector. The Nigerian exchange-rate market has historically been exposed to both external shocks and domestic structural constraints. During periods of favourable global financial conditions, portfolio inflows and other forms of foreign capital can provide foreign-exchange liquidity, support the balance of payments and temporarily moderate exchange-rate pressures. Conversely, sudden reversals in capital flows arising from global monetary tightening, changes in investor risk perception or adverse commodity-price developments can place considerable pressure on the naira. These pressures can subsequently affect inflation, external reserves, asset prices and broader financial-market conditions. The empirical evidence reviewed in the study similarly indicates that exchange-rate instability and capital-flow movements are closely interconnected, with portfolio flows being particularly sensitive to currency risk and changes in global financial conditions (Ogbonna & Ebong, 2021; Ezeaku et al., 2023).

The vulnerability of Nigeria to global financial shocks has become particularly evident in recent years. The monetary tightening cycle initiated by the U.S. Federal Reserve during 2022–2023 altered global interest-rate differentials and contributed to a reassessment of investment positions in emerging and frontier markets. For economies such as Nigeria, tighter global financial conditions can increase the relative attractiveness of U.S. dollar assets, encourage capital reallocation and consequently intensify foreign-exchange pressures. At the same time, fluctuations in

international oil prices remain important because oil exports constitute a major source of Nigeria's foreign-exchange earnings. Changes in oil prices can therefore influence export receipts, external liquidity, fiscal revenues and exchange-rate conditions. These external developments interact with domestic factors, including inflationary pressures, institutional conditions, monetary policy and the adequacy of external reserves, thereby producing complex exchange-rate responses.

Nigeria has consequently undertaken several policy measures aimed at improving foreign-exchange market functioning and strengthening macroeconomic resilience. These include foreign-exchange market reforms and liberalisation, monetary policy tightening and measures designed to strengthen external reserves and restore investor confidence. The reforms, particularly those associated with the foreign-exchange market in 2023–2024, were intended to reduce distortions, improve price discovery and enhance the functioning of the foreign-exchange market. However, persistent exchange-rate pressures demonstrate that domestic policy interventions operate within a broader international financial environment. The effectiveness of such interventions may therefore depend partly on the magnitude and persistence of global financial shocks, the behaviour of international investors and Nigeria's capacity to absorb capital-flow reversals.

The theoretical literature provides several perspectives for understanding this relationship. The Mundell–Fleming framework highlights the importance of international interest rates, capital mobility and exchange-rate adjustments in an open economy. International Capital Flow Theory explains how differences in expected returns and risks influence investors' allocation of funds across countries. The Global Liquidity and Spillover Hypothesis emphasises the transmission of monetary and financial conditions from major economies to emerging markets, while the Currency Crisis and Capital Flow Volatility perspectives explain how sudden reversals, expectations and investor sentiment can amplify exchange-rate pressures. Taken together, these perspectives suggest that global financial shocks can affect Nigeria not only directly but also indirectly through changes in capital flows, with the resulting foreign-exchange pressures influencing exchange-rate dynamics. The integrated theoretical framework therefore positions capital flows as an important channel linking global financial shocks to exchange-rate fluctuations in Nigeria.

Despite the growing literature on global financial spillovers, capital flows and exchange-rate behaviour, important empirical issues remain unresolved in the Nigerian context. Existing studies have frequently examined individual relationships, such as the effect of exchange-rate volatility on foreign portfolio investment, the influence of oil prices on exchange rates, or the determinants of capital inflows. Consequently, less attention has been devoted to examining global financial shocks, capital flows and exchange-rate fluctuations within an integrated framework. Furthermore, the effects of global shocks may differ according to their source, direction and persistence, while the response of exchange rates may vary between the short and long run. The present study therefore investigates the dynamic relationship among global financial shocks, capital flows and exchange-rate fluctuations in Nigeria, with particular attention to the channels through which external financial conditions are transmitted into the Nigerian economy.

Statement of the Problem

Nigeria continues to face persistent exchange-rate instability despite repeated monetary, foreign-exchange and macroeconomic policy interventions. The problem

is particularly important because exchange-rate movements have implications for inflation, external-sector stability, investment decisions, financial-market performance and overall macroeconomic stability. While exchange-rate fluctuations may arise from domestic fundamentals, Nigeria's high degree of exposure to international capital and commodity markets means that external financial shocks can substantially influence domestic currency conditions. Changes in international interest rates, global liquidity, and investor risk appetite and oil prices can alter the volume and direction of capital flows into and out of Nigeria, thereby affecting foreign-exchange availability and exerting appreciation or depreciation pressures on the naira.

The transmission of global financial shocks through capital flows is particularly problematic because capital inflows can be highly sensitive to changing international financial conditions. During periods of global liquidity expansion, foreign investors may increase their exposure to Nigerian financial assets in search of higher returns. Although such inflows can temporarily improve foreign-exchange liquidity and support exchange-rate conditions, they can also create vulnerability when global conditions change. A rise in international interest rates or an increase in global risk aversion can trigger rapid capital-flow reversals, reducing foreign-exchange liquidity and intensifying exchange-rate depreciation. The 2022–2023 global monetary tightening episodes illustrates the significance of this vulnerability, as tighter international financial conditions coincided with increased pressure on capital flows and the Nigerian foreign-exchange market. This problem is compounded by Nigeria's dependence on oil-related foreign-exchange earnings, making the economy simultaneously vulnerable to global financial and commodity-price shocks.

The persistence of exchange-rate pressures despite foreign-exchange reforms and monetary policy interventions raises an important policy question: to what extent are Nigeria's exchange-rate fluctuations driven by global financial shocks and transmitted through capital flows, and how persistent are these effects? Existing policy responses have often focused on domestic instruments, including foreign-exchange market interventions, monetary-policy adjustments and reserve management. However, if exchange-rate instability is significantly influenced by external monetary and financial conditions, domestic interventions alone may have limited effectiveness. A failure to account adequately for global financial transmission mechanisms could therefore result in policies that address the symptoms of exchange-rate instability without sufficiently addressing the underlying sources of vulnerability.

Moreover, the existing empirical literature does not provide a sufficiently integrated explanation of the relationship among global financial shocks, capital flows and exchange-rate fluctuations in Nigeria. Much of the existing evidence focuses on bilateral relationships, such as exchange-rate volatility and portfolio investment or oil prices and exchange rates, rather than examining how global shocks propagate through capital movements and subsequently influence exchange-rate dynamics. There is also limited evidence on whether these effects differ between the short and long run. The study's empirical review further indicates that the composition and volatility of capital flows matter, with portfolio and short-term flows generally more sensitive to changes in global risk conditions than relatively stable forms of foreign investment.

This gap is consequential for policy because the absence of clear evidence on

the magnitude, direction and persistence of these relationships makes it difficult for policymakers to design appropriate responses to external shocks. In particular, inadequate understanding of the role of global monetary conditions may lead to underestimation of the effects of international interest-rate changes on Nigeria's exchange-rate market. Similarly, failure to distinguish between short-run and long-run effects may encourage policy responses that are either excessive or poorly timed. The present study therefore addresses this gap by empirically examining the interconnected relationship between global financial shocks, capital flows and exchange-rate fluctuations in Nigeria. By integrating external financial conditions with capital-flow and domestic macroeconomic variables, the study seeks to provide evidence capable of informing more effective exchange-rate management, capital-flow policies and strategies for strengthening Nigeria's resilience to global financial shocks.

THEORETICAL FOUNDATIONS

The relationship between global financial shocks, capital flows, and exchange-rate fluctuations is best understood through a blend of international macroeconomic and financial theories.

Mundell–Fleming Model

The Mundell–Fleming model, developed independently by Robert Mundell (1963) and J. Marcus Fleming (1962), extends the Keynesian IS–LM framework to an open economy by incorporating exchange rates, international capital flows and the balance of payments. The model explains how monetary and fiscal policies interact with exchange-rate movements under different exchange-rate regimes and degrees of international capital mobility.

The model suggests that changes in interest rates, money supply, capital flows and external-sector conditions can influence the exchange rate. For example, under a flexible exchange-rate regime, an increase in the domestic interest rate may attract capital inflows, increasing demand for the domestic currency and creating appreciation pressure. Conversely, an increase in foreign interest rates, such as the US Federal Funds Rate, can encourage capital outflows from emerging economies and place downward pressure on their currencies.

The model is also relevant to the Nigerian context because changes in oil prices, external reserves, inflation and economic activity can affect the country's external balance and exchange-rate conditions. Higher oil prices, for example, may increase foreign-exchange earnings and influence the supply of foreign currency, while changes in external reserves may affect the capacity of monetary authorities to intervene in the foreign-exchange market.

The Mundell–Fleming model (Fleming, 1962; Mundell, 1963) therefore provides a theoretical basis for examining Nigeria's REER by linking domestic macroeconomic conditions, international interest rates, capital flows and external-sector shocks to exchange-rate behaviour. Its relevance to the present study lies particularly in explaining how international monetary conditions and external shocks can transmit into Nigeria's exchange-rate dynamics.

International Capital Flow Theory

The International Capital Flow Theory is associated with the classical contributions of Ohlin (1933) and later developments in international capital movement theory, particularly the portfolio-balance approach of Branson (1977). The

theory explains the movement of financial resources across countries in response to differences in expected returns, interest rates, risk and macroeconomic conditions. It suggests that investors allocate capital towards countries where the expected risk-adjusted returns are relatively attractive.

The theory has important implications for the real effective exchange rate (REER) because international capital movements affect the demand and supply of foreign currency. Capital inflows increase demand for domestic financial assets and may generate appreciation pressure on the domestic currency, whereas capital outflows can increase demand for foreign currency and exert depreciation pressure. Thus, changes in domestic and international interest rates can influence exchange-rate movements through their effects on cross-border capital allocation.

The theory is particularly relevant to Nigeria because changes in global interest rates, inflation, economic growth and institutional quality can alter investors' perceptions of risk and expected returns. For example, an increase in the US Federal Funds Rate may make US assets more attractive relative to Nigerian assets, encouraging capital outflows and creating depreciation pressure on the naira. Conversely, stronger institutional quality, improved economic performance and greater investor confidence may encourage capital inflows and support currency appreciation.

Consequently, International Capital Flow Theory provides a theoretical basis for examining how US monetary policy, economic growth, inflation and institutional quality can influence Nigeria's REER through international capital movements. It complements the Mundell–Fleming model by emphasising the role of investor decisions, portfolio allocation and international risk-return differentials in determining exchange-rate dynamics.

Global Liquidity and Spillover Hypothesis

The Global Liquidity and Spillover Hypothesis is rooted in the international monetary transmission literature, particularly the work of Rey (2013), who argues that global financial conditions, rather than domestic monetary policy alone, significantly influence capital flows, credit conditions and asset prices across countries. The hypothesis suggests that changes in liquidity supplied by major global financial centres, especially through the monetary policies of systemically important central banks, can generate financial spillovers to other economies.

According to the hypothesis, expansionary monetary policy in major economies increases global liquidity and encourages investors to search for higher returns in emerging markets. This can increase capital inflows and place appreciation pressure on domestic currencies. Conversely, monetary tightening in major economies can reduce global liquidity, encourage capital repatriation and generate capital outflows and depreciation pressure in emerging-market currencies.

The hypothesis is particularly relevant to Nigeria because changes in the US Federal Funds Rate can affect international capital flows, investor sentiment and exchange-rate conditions. Similarly, changes in oil prices and global financial conditions can transmit external shocks into the Nigerian economy. Thus, the theory provides a basis for explaining why Nigeria's REER may respond to developments originating outside the domestic economy.

The Global Liquidity and Spillover Hypothesis (Rey, 2013) therefore provides a theoretical foundation for examining the influence of US monetary policy, international financial conditions and external shocks on Nigeria's exchange-rate

dynamics. It complements the Mundell–Fleming model by emphasising that global liquidity conditions and cross-border financial spillovers can substantially shape domestic exchange-rate outcomes.

Currency Crisis and Capital Flow Volatility Theories

The Currency Crisis Theory is principally associated with Krugman (1979) and was subsequently developed by Obstfeld (1994). Krugman's first-generation model explains currency crises as arising from inconsistent macroeconomic policies, particularly situations where expansionary domestic policies are incompatible with maintaining a fixed exchange rate. Later, Obstfeld's second-generation model emphasised the role of expectations, investor confidence and self-fulfilling speculation in generating exchange-rate crises. These perspectives suggest that pressures on a currency can intensify when investors anticipate depreciation and respond by withdrawing capital, thereby creating further depreciation pressure.

The Capital Flow Volatility perspective emphasises that sudden reversals in international capital flow can generate substantial exchange-rate instability. This is closely related to the sudden-stop literature of Calvo (1998), which explains how abrupt reductions in external financing can trigger capital outflows, currency depreciation and broader macroeconomic instability, particularly in emerging economies.

These theories are relevant to Nigeria because changes in global interest rates, oil prices, inflation, institutional conditions and investor confidence can influence capital flows and exchange-rate pressures. For example, an increase in the US Federal Funds Rate may encourage investors to shift funds away from emerging markets, potentially leading to capital outflows and depreciation pressures. Similarly, adverse movements in oil prices can reduce foreign-exchange earnings and weaken external liquidity, thereby increasing vulnerability to exchange-rate pressures.

Synthesis of the Theoretical Perspectives

The four theoretical perspectives reviewed provide complementary explanations of exchange-rate fluctuations rather than competing explanations.

The Mundell–Fleming model of Fleming (1962) and Mundell (1963) provides the broad open-economy foundation. It explains how changes in interest rates, capital mobility, monetary conditions and external-sector developments affect exchange rates. Its central contribution to the present study is the proposition that changes in international interest rates can induce capital movements and consequently affect the exchange rate.

The International Capital Flow Theory, associated with Ohlin (1933) and subsequently developed through portfolio-balance approaches such as Branson (1977), provides a more direct explanation of the capital-flow channel. It proposes that investors move funds across countries in response to differences in expected returns, interest rates and risk. Consequently, favourable global financial conditions may stimulate capital inflows into emerging economies, whereas tighter global financial conditions may trigger capital outflows and exchange-rate depreciation.

The Global Liquidity and Spillover Hypothesis, particularly associated with Rey (2013), extends this argument by emphasising that monetary and financial conditions in major financial centres can generate international spillovers. Expansionary monetary conditions in major economies can increase global liquidity and encourage capital flows towards emerging markets, while monetary tightening

can reverse these flows. This theory is particularly relevant to the study's focus on global financial shocks because it explains how shocks originating outside Nigeria can be transmitted into the Nigerian financial and foreign-exchange markets.

The study is anchored primarily on the Mundell–Fleming model developed by Fleming (1962) and Mundell (1963), and complemented by the Global Liquidity and Spillover Hypothesis of Rey (2013), International Capital Flow Theory and the Currency Crisis and Capital Flow Volatility perspectives. The integrated framework posits that global financial shocks, particularly changes in international interest rates and global liquidity, affect investors' risk-return assessments and consequently induce changes in cross-border capital flows. Changes in capital inflows and outflows subsequently alter the demand for and supply of foreign exchange, generating appreciation or depreciation pressures and, ultimately, fluctuations in the real effective exchange rate. The Global Liquidity and Spillover Hypothesis explain the international transmission of financial shocks, while International Capital Flow Theory provides the investor-based explanation for capital movements. The Currency Crisis and Capital Flow Volatility perspectives further suggest that sudden reversals in capital flows and changes in expectations can amplify exchange-rate pressures. Domestic conditions, including economic growth, inflation, institutional quality and external reserves, may influence the extent to which global financial shocks are transmitted to Nigeria's exchange rate. The framework therefore conceptualises capital flows as the principal transmission channel through which global financial shocks affect exchange-rate fluctuations in Nigeria.

Empirical Review

Ahmad et al. (2025) examined the effect of exchange rate volatility on cross-border capital flows in 15 emerging economies over 2010–2023. Using GARCH-based measures of exchange rate volatility, fixed-effects estimation, and system-GMM, the study found that exchange rate volatility significantly reduced portfolio inflows, while its negative effect on FDI was comparatively weaker. Remittance inflows, however, were largely unaffected. The findings demonstrate that exchange rate instability affects different forms of capital flows differently, with portfolio flows being particularly sensitive to currency risk. The study therefore highlighted the importance of exchange rate management and appropriate capital-flow policies in maintaining macroeconomic stability.

Adegbe and Kummer (2025) examined the effect of exchange rate volatility on foreign portfolio investment in emerging and developing economies. The study argued that currency instability increases uncertainty, discourages portfolio investment, and may trigger capital flight or sudden reversals, particularly among short-term investors. It further highlighted the role of weak institutions and limited monetary policy effectiveness in amplifying these effects. The study recommended sound exchange rate management, stronger financial-market resilience, and macro prudential policies to mitigate currency-related risks and promote stable portfolio inflows.

Odionye et al. (2024) examined the asymmetric effects of exchange rate shocks on stock prices in six sub-Saharan African countries from 2013 to 2023 using the Multiple Threshold Nonlinear ARDL (MTNARDL) model. The study found that stock-price responses varied according to the direction and magnitude of exchange rate shocks, with extreme appreciation and depreciation adversely affecting stock values. The relationship was also sensitive to global shocks, while causality results

supported the flow-oriented model in most countries. The study highlighted the importance of considering the size, direction, and external origin of exchange rate shocks when formulating policies for financial-market stability.

Odionye et al. (2023) examined the effects of interest rate differentials, exchange rate changes, and political stability on foreign capital inflows into Nigeria over 1981–2021 using a discrete threshold regression model. The study identified an interest rate differential threshold of 3.68%, above which the differential significantly encouraged foreign capital inflows. The findings also showed that exchange rate movements and political stability significantly influenced capital inflows, suggesting that investors consider interest rate differentials alongside political and macroeconomic risks when making investment decisions. The study therefore underscores the importance of maintaining attractive interest rate differentials and a stable political and macroeconomic environment to promote foreign capital inflows into Nigeria.

Karimo (2020) examined the effects of interest rate differentials and exchange rate movements on Nigeria's international private capital flows using quarterly data from 2010Q1 to 2019Q4. Based on interest rate parity theory and the Markov-Switching Time-Varying Transition Probability model, the study found that interest rate differentials significantly explained foreign portfolio investment (FPI) but not aggregate capital or FDI flows. Exchange rate movements significantly influenced FPI inflows and outflows as well as FDI inflows, while having no significant effect on aggregate capital flows. The study therefore recommended exchange rate stabilisation measures to reduce FPI reversals and encourage FDI inflows.

Ijirshar et al. (2022) examined the effect of exchange rate movements on Nigeria's trade flows over 1986–2021 using linear and nonlinear ARDL models to test the J-Curve hypothesis and Marshall-Lerner condition. The findings showed that exchange rate depreciation negatively affected trade balance and exports in the short run but improved trade balance in the long run, supporting the J-Curve effect. The study also confirmed the Marshall-Lerner condition, indicating potential for long-run trade improvement. The authors recommended investment incentives to strengthen domestic production and reduce import dependence.

Ebire et al. (2021) examined the effects of different forms of capital flows on financial stability in 121 middle-income countries over 2010–2017 using a panel spatial correlation consistent approach. The findings revealed that capital flows were positive and significant predictors of financial stability, although financial systems in advanced economies remained more stable than those in emerging and developing economies. Outward FDI had the strongest potential to enhance financial stability. The study emphasised that while global financial integration facilitates capital movements across economies, effective management of these flows is necessary to minimise potential financial instability.

Oyadeyi (2026) examined the determinants and macroeconomic effects of exchange rate volatility in Nigeria using quarterly data from 1986Q1 to 2023Q4. Employing ARCH, nonlinear GARCH, and dynamic ARDL techniques, the study found that monetary policy rate, lending rate, oil prices, government expenditure, and financial development significantly influenced exchange rate volatility. The findings further showed that exchange rate volatility had significant effects on Nigeria's macroeconomic performance. The study recommended policies that promote exchange rate stability and predictability to improve macroeconomic management in

Nigeria's import-dependent economy.

Ben-Obi et al. (2025) investigated the asymmetric effects of exchange rate volatility on foreign direct investment, inflation, and balance of trade in Nigeria using quarterly data from 1995–2022 and the NARDL approach. The findings showed that exchange rate volatility had a positive but insignificant long-run effect on FDI, indicating no significant asymmetric relationship between the two variables. However, exchange rate depreciation significantly increased inflation in both the short and long run, while appreciation reduced inflation significantly. The study recommended improving the business environment and security conditions to attract FDI, contain inflation, and promote greater macroeconomic stability in Nigeria.

Olayeni et al. examined the dynamic relationship among oil prices, the Nigeria–US exchange rate, stock market activity, global economic activity, and global oil production using a single-equation error-correction model. The findings showed that the exchange rate bears the primary burden of short-run adjustment and is influenced by the other variables in the model. The study also identified significant long-run asymmetry, indicating that positive and negative changes have different effects on exchange rate dynamics. The authors therefore emphasised the need to incorporate asymmetric effects into policy formulation to promote exchange rate stability in Nigeria.

Hashmi et al. (2021) examined the asymmetric effect of exchange rate volatility on India's cross-border trade with Japan, Germany, the United States, and China. Using NARDL and Multiple Threshold NARDL (MTNARDL) models, the study found that the global financial crisis altered the asymmetric relationship between exchange rate volatility and trade flows. While exchange rate volatility had symmetric effects on trade in the short run, its effects became asymmetric in the long run. The findings highlight the importance of considering the magnitude and direction of exchange rate volatility in analysing international trade and formulating exchange rate policies.

Sheikh et al. (2020) examined the asymmetric relationship between macroeconomic fluctuations and stock market indices before and after the 2008 global financial crisis using monthly data from 2004–2018 and the NARDL approach. The findings showed that investors responded differently to positive and negative shocks in gold prices, oil prices, exchange rates, and interest rates, particularly after the financial crisis. The study therefore established that the relationship between macroeconomic fluctuations and stock prices is asymmetric rather than purely linear, highlighting the need to account for the direction of shocks in investment and economic policy decisions.

Diaz and Collin (2025) examined the determinants and macroeconomic consequences of sudden stops in different forms of gross capital inflows in emerging markets. Using a complementary log-log hazard model, the study found that global factors, particularly changes in risk sentiment, uncertainty, and contagion, were the dominant drivers of capital-flow interruptions, although domestic fundamentals such as exchange rate regimes, reserve adequacy, and fiscal conditions also mattered. The study further showed that heavy reliance on short-term capital increased vulnerability to sudden stops, while strong institutional quality mitigated this risk. Debt-financed capital-flow reversals produced more severe effects on output, current-account adjustment, and asset prices than reversals in equity or FDI flows. The findings underscore the importance of macroprudential buffers, institutional

resilience, and prudent management of short-term capital flows for economic stability.

Okere et al. (2021) examined the linear and nonlinear effects of oil prices and exchange rates on Nigerian stock market performance using monthly data from 1995–2019 and the ARDL and NARDL approaches. The linear results showed a positive short- and long-run relationship between oil prices and stock market performance, while exchange rate movements had a significant positive short-run effect but an insignificant long-run effect. The NARDL results further revealed asymmetric responses of the stock market to positive and negative oil price shocks, with negative oil price changes producing stronger effects. However, exchange rate shocks remained insignificant under the asymmetric specification. The study highlighted the importance of oil-price monitoring and international portfolio diversification in managing stock market risk in Nigeria.

Živkov et al. (2021) examined multiscale bidirectional volatility spillovers between stock and foreign exchange markets in Nigeria, South Africa, Egypt, and Morocco using wavelet transformation, MS-GARCH, and quantile regression techniques. The findings confirmed bidirectional volatility spillovers across the markets, although exchange rate-to-stock market transmission was generally stronger, except in Nigeria. The study also showed that the strength and timing of spillovers varied across countries and investment horizons, reflecting differences in market development and financial structure. For Nigeria, the relatively weaker exchange rate-to-stock market spillover suggests that exchange rate risk may have less influence on stock market volatility than in the other African markets.

Alabdulwahab and Abou-Zaid (2024) investigated the sources of real exchange rate fluctuations in Egypt over 1980–2016 using a Structural Vector Autoregression (SVAR) model. The study employed impulse response functions and forecast error variance decomposition to assess the effects of supply, demand, and monetary shocks on the real exchange rate. The findings revealed that demand shocks exerted a stronger and more persistent influence on real exchange rate movements than supply and monetary shocks, while monetary shocks had only limited short-run effects. The study highlights the importance of identifying the underlying sources of exchange rate fluctuations when designing macroeconomic and exchange rate policies.

Korley and Giouvris (2022) examined the joint effects of oil prices and oil price volatility (OVX) on exchange rates across oil-importing and oil-exporting countries. Using quantile regression and Markov-switching models, the study found that OVX shocks significantly affected exchange rates across all countries, with rising volatility associated with currency depreciation and declining volatility with appreciation. Oil price shocks, however, affected mainly oil-importing countries. The effects were stronger at lower exchange-rate quantiles, indicating greater investor sensitivity during bearish market conditions, while responses were weaker at higher quantiles. The findings highlight the importance of oil-market volatility and prevailing market conditions in understanding exchange-rate dynamics.

Synthesis of Empirical Literature

The reviewed empirical literature establishes that global financial shocks, capital flows, and exchange-rate fluctuations are closely interconnected, particularly in emerging economies such as Nigeria. Existing studies generally show that external shocks are transmitted through international capital movements, commodity

prices, interest-rate differentials, investor risk perceptions, and financial-market channels, with exchange rates often serving as a major adjustment mechanism.

A significant strand of the literature demonstrates that global financial shocks influence capital flows through changes in risk, returns, and investor expectations. Ahmad et al. (2025) found that exchange-rate volatility significantly reduced portfolio inflows across emerging economies, while its effect on FDI was comparatively weaker. Adegbe and Kummer (2025) similarly argued that currency uncertainty discourages foreign portfolio investment because exchange-rate fluctuations can erode foreign-currency returns and increase perceived investment risk. In Nigeria, Karimo (2020) found that interest-rate differentials significantly explained FPI flows, while exchange-rate movements significantly influenced FPI inflows and outflows. Odionye et al. (2023) further demonstrated that interest-rate differentials above a threshold of 3.68% encouraged foreign capital inflows, while exchange-rate movements and political stability also affected capital inflows. Collectively, these findings suggest that capital flows, particularly portfolio flows, respond strongly to changes in domestic and international financial conditions.

The literature also demonstrates that exchange-rate fluctuations constitute an important transmission mechanism for global and domestic shocks. Olayeni et al. (2020) established that oil prices, global economic activity, and global oil production influence Nigeria's exchange-rate dynamics, with evidence of long-run asymmetry. Korley and Giouvris (2022) similarly found that oil-price volatility significantly affects exchange rates, with increased volatility generally associated with currency depreciation. In Nigeria, Oyadeyi (2026) found that oil prices, monetary policy rates, lending rates, government expenditure, and financial development significantly determine exchange-rate volatility. These findings are particularly relevant to Nigeria given the country's exposure to global oil-market developments and international financial conditions.

Another important finding is that the relationship between exchange rates and financial variables is not necessarily linear or symmetric. Ben-Obi et al. (2025) found that exchange-rate volatility had an insignificant long-run effect on FDI, but depreciation significantly increased inflation while appreciation reduced inflation. Odionye et al. (2024) demonstrated that the effects of exchange-rate shocks on stock prices in sub-Saharan Africa depend on the direction and magnitude of the shocks, with extreme appreciation and depreciation producing adverse effects. Hashmi et al. (2021) similarly found that exchange-rate volatility exerted symmetric short-run but asymmetric long-run effects on cross-border trade. These studies indicate that the direction, magnitude, and persistence of global financial shocks matter for their transmission into domestic exchange-rate and capital-flow dynamics.

The role of oil-market shocks as a major source of global financial disturbances is also prominent in the literature. Okere et al. (2021) found that oil prices had significant short- and long-run effects on Nigerian stock-market performance, with evidence of asymmetric responses to positive and negative oil-price shocks. Rashid et al. (2023) identified oil-price and commodity-price shocks as major external sources of macroeconomic fluctuations in Pakistan, while Dagher and Hasanov (2023) demonstrated that the financial consequences of oil-price shocks depend on whether they originate from supply or demand disturbances. These findings are particularly relevant to Nigeria because oil-price movements affect foreign-exchange earnings, reserve accumulation, investor confidence, capital flows,

and ultimately exchange-rate stability.

The literature further highlights the importance of financial contagion and international market integration in transmitting global shocks. Anyikwa and Le Roux (2020) found limited long-term integration between African and developed stock markets but substantial increases in conditional correlations during global financial crises, suggesting that crisis-period co-movements were largely attributable to contagion. Yadav et al. (2023) found short-run volatility transmission from developed stock markets to India, while Živkov et al. (2021) documented bidirectional volatility spillovers between stock and foreign-exchange markets across selected African economies, although the pattern differed across countries. Boubaker et al. (2023) similarly showed that interconnectedness across financial and commodity markets intensify during extreme volatility episodes. This evidence indicates that greater integration can facilitate both the transmission of beneficial financial resources and the propagation of adverse global shocks.

This dual effect is reinforced by Devereux and Yu (2020), who showed theoretically and empirically that international financial integration increases global leverage, crisis probability, and cross-country contagion; although it can reduce the severity of individual crises once they occur. Ebire et al. (2021), however, found that capital flows were positively associated with financial stability in middle-income economies. Jamal and Malik (2025) provide a useful reconciliation of these apparently conflicting findings by demonstrating that moderate financial integration can improve stability through better capital allocation and risk diversification, whereas excessive or volatile integration can increase vulnerability to external shocks. Thus, the effect of capital flows on exchange-rate and macroeconomic stability depends substantially on the composition, magnitude, and volatility of those flows.

More recent evidence on sudden stops and capital-flow reversals further strengthens this argument. Diaz and Collin (2025) found that global risk sentiment, uncertainty, and contagion from peer economies were major determinants of sudden stops in emerging markets, although domestic factors such as exchange-rate regimes, reserve adequacy, fiscal conditions, and institutional quality also mattered. Importantly, short-term and debt-driven capital flows were associated with more severe declines in output, asset prices, and external balances than equity and FDI reversals. This suggests that the composition of capital flows is crucial in determining the extent to which global financial shocks translate into exchange-rate and macroeconomic instability.

Critical Assessment and Research Gap

Despite the substantial empirical evidence, three important gaps emerge. First, existing studies frequently examine isolated relationships—such as exchange-rate volatility and FPI, oil prices and exchange rates, or capital flows and financial stability—rather than examining the three-way interaction among global financial shocks, capital flows, and exchange-rate fluctuations.

Second, the Nigerian literature has largely concentrated on domestic determinants of exchange-rate movements and capital flows, with comparatively less attention to the role of identifiable global financial shocks and their transmission through different categories of capital flows. This is important because portfolio flows, FDI, and other capital movements differ considerably in their sensitivity to global risk, interest rates, exchange-rate expectations, and investor sentiment.

Third, although several studies employ nonlinear and volatility-based approaches, the empirical literature has not sufficiently established whether global financial shocks generate symmetric or asymmetric effects on Nigeria's capital flows and exchange-rate fluctuations. The evidence from Ben-Obi et al. (2025), Odionye et al. (2024), Hashmi et al. (2021), Okere et al. (2021), and Korley and Giouvris (2022) suggests that such asymmetries are potentially important.

Consequently, the present study, "Global Financial Shocks, Capital Flows, and Exchange Rate Fluctuations: Evidence from Nigeria," extends the literature by bringing these interconnected dimensions into a single empirical framework. Rather than treating capital flows and exchange-rate fluctuations as independent outcomes, the study recognises them as interrelated channels through which global financial shocks are transmitted to the Nigerian economy. The study therefore contributes to the literature by providing Nigeria-specific evidence on how global financial disturbances affect capital movements and exchange-rate dynamics, while also addressing the possibility that these effects vary according to the type and direction of the shock.

Overall, the empirical literature supports the proposition that Nigeria's integration into the global financial system creates both opportunities for capital mobilisation and vulnerabilities to external financial disturbances. The key unresolved issue is not simply whether global shocks affect Nigeria, but how those shocks are transmitted through capital flows and exchange-rate fluctuations, and whether the transmission is symmetric, persistent, and dependent on the nature of the underlying shock. This constitutes the central empirical gap addressed by the present study.

METHODOLOGY

This study adopts the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration proposed by Pesaran et al. (2001) to investigate the effect of exchange rate fluctuations on foreign investment, with institutional quality serving as the moderating variable. The ARDL technique has several advantages over conventional cointegration methods, such as Engle and Granger (1987), Johansen (1988), and Johansen and Juselius (1990). First, the ARDL approach is applicable irrespective of whether the underlying variables are integrated of order zero, $I(0)$, or order one, $I(1)$, thereby removing the necessity for prior unit root testing. This reduces the likelihood of erroneous integration order classification and improves the robustness of the estimation. Second, the bounds testing procedure is particularly appropriate for studies with relatively small sample sizes, in contrast to the Johansen approach, which generally requires large samples for reliable inference. Third, the ARDL framework allows each variable to have a distinct optimal lag structure, offering greater flexibility than traditional cointegration techniques. As noted by Öztürk and Acaravci (2010), while conventional cointegration methods estimate long-run relationships within a multivariate system, the ARDL approach relies on a single-equation framework. It combines ordinary least squares (OLS) estimation with an unrestricted error correction model (UECM) to assess the presence of a long-run equilibrium relationship among the variables. Cointegration is established by testing the joint significance of the lagged level variables within the bounds testing framework. Data for all variables employed in the study were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin (2025), the World Development Indicators (WDI, 2025) and World Governance Indicators (WGI, 2025)

Model Specification

Functional relationship

$$REER = f(EXRGR, GDPGR, INFL, INST, \ln OILP, NPI, TBR, USFEDR) \quad (1)$$

The econometric model of equation (1)

$$REER_t = \beta_0 + \beta_1 EXRGR_t + \beta_2 GDPGR_t + \beta_3 INFL_t + \beta_4 INST_t + \beta_5 \ln OILP_t + \beta_6 NPI_t + \beta_7 TBR_t + \beta_8 USFEDR_t + \mu_t \quad (2)$$

Where:

REER= Real Effective Exchange Rate

EXRGR= External Reserve growth rate

GDPGR= Gross Domestic Product growth rate

INFL= Inflation rate

INST= Institutional quality

LnOILP= natural log of oil price rate (Brent oil)

NPI= Net foreign inflow as % of GDP

TBR- Treasury bills rate

USFEDR= United State Fed. Rate

M= error term

The Augmented ARDL-ECM (Short- run dynamics) version of equation (1):

$$\begin{aligned} \Delta REER_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 REER_{t-i} + \sum_{i=0}^{q1} \alpha_2 \Delta EXRGR_{t-i} + \sum_{i=0}^{q2} \alpha_3 \Delta GDPGR_{t-i} \\ & + \sum_{i=0}^{q3} \alpha_4 \Delta INFL_{t-i} + \sum_{i=0}^{q4} \alpha_5 \Delta INST_{t-i} + \sum_{i=0}^{q5} \alpha_6 \Delta \ln OILP_{t-i} \\ & + \sum_{i=0}^{q6} \alpha_7 \Delta NPI_{t-i} + \alpha_8 TBR_{t-1} + \alpha_9 USFEDR_{t-1} + \lambda ECT_{t-1} + \mu_t \end{aligned} \quad (3)$$

Δ = first-difference operator,

ECT_{t-1} = lagged error correction term,

λ = speed of adjustment coefficient,

$p, q_1 \dots q_6$ = optimal lag lengths,

μ_t = serially independent disturbance term.

The coefficient of the error correction term is expected to be negative and statistically significant to confirm long-run convergence toward equilibrium.

The Long-run Dynamics of Equation (1)

$$REER_t = \theta_0 + \theta_1 EXRGR_t + \theta_2 GDPGR_t + \theta_3 INFL_t + \theta_4 INST_t + \theta_5 \ln OILP_t + \theta_6 NPI_t + \theta_7 TBR_t + \theta_8 USFEDR_t + \mu_t \quad (4)$$

RESULTS

Table 1: Descriptive Statistics of Variables

	REER	EXRGR	GDPGR	INFL	INST	OILP	NPI	TBR	USFEDR
Mean	111.042	26.056	4.000	19.039	4.166	72.796	-0.768	12.206	2.686
Median	101.019	-0.330	3.925	13.127	4.250	69.360	-0.231	12.125	2.040
Maximum	273.010	530.190	15.330	72.836	4.611	145.790	1.002	26.900	6.240
Minimum	49.750	-82.120	-2.040	5.388	3.417	23.400	-6.938	2.000	0.080
Std. Dev.	47.660	100.062	3.674	15.983	0.311	33.820	1.500	5.473	2.197
Skewness	1.801	3.916	0.541	2.037	-0.738	0.777	-2.426	0.623	0.168
Kurtosis	6.467	20.263	4.022	6.327	2.843	2.667	9.822	3.695	1.441
Jarque-Bera	35.407	509.042	3.137	39.199	3.120	3.575	99.280	2.882	3.600
Probability	0.000	0.000	0.208	0.000	0.210	0.167	0.000	0.237	0.165
Sum	3775.428	885.900	136.000	647.330	141.636	2475.050	-26.098	415.007	91.340
Sum Sq. Dev	74959.910	330406.300	445.347	8430.071	3.183	37744.460	74.281	988.555	159.257
Observation	34.000	34.000	34.000	34.000	34.000	34.000	34.000	34.000	34.000

Source: Author's Calculation using E views 13 (2026)

Table 1 presents the descriptive statistics for the nine variables used in the study based on 34 observations. The statistics provide information on the central tendency, dispersion, distributional characteristics and normality of the variables.

The mean value of Real Effective Exchange Rate (REER) is 111.042, while the median is 101.019, indicating that the distribution is positively skewed and that some relatively high REER observations have pulled the mean above the median. REER ranges from a minimum of 49.750 to a maximum of 273.010, giving a relatively wide range of 223.260. The standard deviation of 47.660 indicates substantial variability in the real effective exchange rate over the period. The positive skewness of 1.801 and kurtosis of 6.467 indicate a distribution characterised by a pronounced right tail and relatively heavy tails. The Jarque-Bera statistic of 35.407, with a probability value of 0.000, rejects the null hypothesis of normality at the 5% level. Thus, REER is not normally distributed.

External Reserve Growth Rate (EXTRGR) has a mean of 26.056, compared with a median of -0.330. The substantial difference between the mean and median is largely attributable to extreme positive observations. The variable has a minimum of -82.120 and a maximum of 530.190, representing exceptionally wide variation. Its standard deviation of 100.062 is considerably larger than its mean, confirming substantial volatility in exchange-rate growth. The skewness of 3.916 indicates strong positive asymmetry, while kurtosis of 20.263 reveals very heavy tails and the presence of extreme observations. The Jarque-Bera statistic of 509.042 with a probability of 0.000 strongly rejects normality. EXTRGR is therefore the most highly dispersed and non-normal variable in the table.

Gross Domestic Product growth rate (GDPGR) records a mean of 4.000% and a median of 3.925%, suggesting that the mean and median are relatively close. The variable ranges from -2.040% to 15.330%, with a standard deviation of 3.674. This indicates moderate fluctuations in economic growth over the observation period. The skewness value of 0.541 indicates a mild positive skew, while kurtosis of 4.022 suggests somewhat heavier tails than a normal distribution. However, the Jarque-Bera probability of 0.208 is greater than 0.05. Consequently, the null hypothesis of normality cannot be rejected, indicating that GDPGR is approximately normally distributed.

Inflation has a mean of 19.039% and a median of 13.127%, showing that

relatively high inflation episodes have increased the mean above the median. The minimum and maximum values are 5.388% and 72.836%, respectively, while the standard deviation is 15.983. This indicates considerable variation in inflation over the period. The skewness of 2.037 demonstrates substantial positive asymmetry, while kurtosis of 6.327 indicates heavy tails. The Jarque-Bera statistic of 39.199 with a probability of 0.000 leads to rejection of normality at the 5% level.

Institutional Quality (INST) has a mean of 4.166 and a median of 4.250, indicating that the distribution is relatively concentrated around its central value. The variable ranges from 3.417 to 4.611, with a relatively small standard deviation of 0.311. This suggests that institutional quality experienced considerably less variation than variables such as EXRGR, REER and INFL. The skewness of -0.738 indicates moderate negative asymmetry, while kurtosis of 2.843 is close to the benchmark value of 3 for a normal distribution. The Jarque-Bera probability of 0.210 exceeds 0.05; hence, normality cannot be rejected.

Bent Oil Price (OILP) records a mean of 72.796 and a median of 69.360, with observations ranging from 23.400 to 145.790. The standard deviation of 33.820 indicates considerable fluctuations in oil prices during the study period. The skewness value of 0.777 indicates moderate positive asymmetry, while kurtosis of 2.667 is slightly below the normal benchmark of 3. The Jarque-Bera probability of 0.167 is greater than 0.05, indicating that the null hypothesis of normality cannot be rejected. Thus, OILP can reasonably be regarded as approximately normally distributed.

Net Portfolio Inflow (NPI) has a mean of -0.768 and a median of -0.231, with values ranging from -6.938 to 1.002. The standard deviation of 1.500 indicates moderate dispersion around the mean. The negative skewness of -2.426 shows substantial leftward asymmetry, suggesting the presence of relatively large negative observations. The kurtosis of 9.822 indicates a highly leptokurtic distribution with heavy tails. The Jarque-Bera statistic of 99.280 and probability of 0.000 strongly reject the hypothesis of normality. Thus, NPI exhibits significant distributional irregularity.

Treasury bills Rate (TBR) has a mean of 12.206% and a median of 12.125%, indicating that the two measures of central tendency are very close. The minimum value is 2.000%, while the maximum is 26.900%, with a standard deviation of 5.473. The relatively moderate standard deviation indicates that TBR fluctuated, but less dramatically than EXRGR, REER and INFL. Its skewness of 0.623 indicates moderate positive asymmetry, while kurtosis of 3.695 suggests moderately heavy tails. However, the Jarque-Bera probability of 0.237 exceeds 0.05, implying that the distribution does not significantly depart from normality.

US federal fund rate (USFEDR) records a mean of 2.686% and a median of 2.040%, with a minimum of 0.080% and a maximum of 6.240%. Its standard deviation is 2.197, indicating moderate variability. The skewness of 0.168 is close to zero, suggesting that the distribution is relatively symmetric. However, the kurtosis of 1.441 is substantially below 3, indicating a relatively flat distribution. The Jarque-Bera probability of 0.165 is greater than 0.05, so the null hypothesis of normality cannot be rejected.

Table 2: Correlation Matrix of Variables

	REER	EXRGR	GDPGR	INFL	INST	NPI	TBR	USFEDR	lnOILP
REER	1.0000								
EXRGR	0.0635	1.0000							
GDPGR	-0.1711	-0.1819	1.0000						
INFL	-0.0309	0.2380	-0.4079	1.0000					
INST	-0.0093	0.0303	-0.5331	0.3454	1.0000				
NPI	0.0861	0.1132	-0.0138	-0.1450	-0.3186	1.0000			
TBR	-0.1680	-0.0558	-0.0750	0.4525	0.1052	-0.3788	1.0000		
USFEDR	0.2112	0.2019	-0.2166	0.3033	0.1067	-0.0282	0.3287	1.0000	
lnOILP	-0.2689	-0.1483	0.3881	-0.3935	0.0511	-0.2479	-0.3397	-0.5051	1.0000

Source: Author's Calculation using E views 13

Table 2 presents the correlation matrix used to assess the possibility of multicollinearity among the explanatory variables. Multicollinearity occurs when two or more independent variables are highly linearly correlated, making it difficult to isolate their individual effects on the dependent variable. As a general rule, a pairwise correlation coefficient exceeding 0.80 in absolute value is often regarded as an indication of potentially serious multicollinearity.

The results show that none of the correlation coefficients among the explanatory variables exceeds 0.80 in absolute value. The highest correlation is between GDPGR and INST, with a coefficient of -0.5331 , followed by USFEDR and lnOILP at -0.5051 . Other relatively notable correlations include INFL and TBR (0.4525), GDPGR and INFL (-0.4079), INFL and lnOILP (-0.3935), GDPGR and lnOILP (0.3881) and NPI and TBR (-0.3788).

Although these relationships indicate moderate associations between some variables, they are substantially below the 0.80 threshold. This suggests that the explanatory variables do not exhibit sufficiently high pairwise correlations to raise serious concerns about multicollinearity.

In particular, the -0.5331 correlation between GDPGR and INST indicates a moderate inverse association, but it is not sufficiently strong to suggest that the two variables contain substantially overlapping information. Similarly, the -0.5051 correlation between USFEDR and lnOILP is moderate and does not constitute evidence of severe multicollinearity. The remaining correlations are either weak or moderate.

Table 4: Variance Inflation Factor

Variable	Variance	VIF	VIF
EXRGR	0.008489	1.242284	1.16116
GDPGR	10.75598	4.40541	1.98306
INFL	0.500633	4.30153	1.74718
INST	1432.198	351.7189	1.88701
NPI	51.5331	2.012084	1.58471
TBR	4.427192	11.09611	1.81183
USFEDR	22.42132	3.755922	1.47825
lnOILP	752.418	187.6655	2.22913
C	30413.9	428.0938	NA

Source: Author's Calculation (2026)

Table 4 presents the Variance Inflation Factor (VIF) results for the explanatory variables included in the model. The VIF test is employed to determine whether the regressors exhibit excessive linear dependence that could inflate the variances of the estimated coefficients and thereby undermine the reliability of the regression results. While the table reports both uncentered and centered VIF values, the centered VIF is the more appropriate measure for assessing multicollinearity in a regression model containing a constant term.

The results indicate that the centered VIF values range from 1.1612 to 2.2291, which are considerably below the commonly used threshold of 10 and also below the more conservative threshold of 5. Specifically, EXRGR records a centered VIF of 1.1612, GDPGR 1.9831, INFL 1.7472, INST 1.8870, NPI 1.5847, TBR 1.8118, USFEDR 1.4783, and lnOILP 2.2291. These values indicate that none of the explanatory variables has a sufficiently strong linear relationship with the remaining regressors to constitute a serious multicollinearity problem.

The relatively highest centered VIF is recorded by lnOILP (2.2291), followed by GDPGR (1.9831) and INST (1.8870). Although these variables exhibit some degree of association with other explanatory variables, their VIF values remain well below the conventional diagnostic thresholds. Consequently, the relationships among these variables are unlikely to cause substantial inflation of the estimated coefficient variances.

The uncentered VIF results, however, show considerably larger values for INST (351.7189), lnOILP (187.6655), and the constant term (428.0938). These high uncentered values should not be interpreted as evidence of severe multicollinearity among the explanatory variables. Uncentered VIFs can be substantially affected by the presence of the intercept and by the non-zero means and scales of the variables. The relevant evidence for determining multicollinearity among the regressors is therefore provided by the centered VIF values. The contrast between the uncentered and centred VIFs reinforces the importance of relying on the latter for this purpose.

The results also show that TBR, despite having an uncentered VIF of 11.0961, has a centered VIF of only 1.8118. Thus, the uncentered value does not provide sufficient evidence to conclude that TBR is affected by problematic multicollinearity. The same reasoning applies to INST and lnOILP, whose very high uncentered VIFs decline substantially when the variables are centered.

Overall, the centred VIF results provide strong evidence that multicollinearity is not a serious concern in the estimated model. Since all centred VIF values are

below 5, there is no statistical basis for excluding any explanatory variable because of excessive linear association with the other regressors. The explanatory variables can therefore be retained in the model without substantial concern that multicollinearity will distort the precision or interpretation of the estimated coefficients.

These findings should also be considered alongside the correlation matrix. Where the correlation analysis identifies moderate associations between some explanatory variables, the relatively low centred VIF values demonstrate that these associations do not translate into problematic multicollinearity when the variables are considered jointly. The VIF evidence therefore supports the suitability of the variables for subsequent regression and ARDL estimation.

Table 4
Unit Root Test for Stationarity (Augmented Dickey-Fuller)

Variables	Level	First Differences	Integration order
	Intercept and Trend	Intercept and Trend	
EXTRGR	-4.162492**	-	I (0)
GDPGR	-2.965259	-8.021652***	I (1)
INFL	-2.163946	-5.470847***	I (1)
INST	-2.943607	-5.746437***	I (1)
lnOilP	-2.656843	-7.413609***	I (1)
NPI	-3.170190	-7.534875***	I (1)
REER	-2.698104	-5.420365***	I (1)
TBR	-2.045483	-6.249221***	I (1)
USFEDR	-3.351443	-4.540844**	I (1)

Unit Root Test for Stationarity (Phillips- Perron)

Variables	Level	First Differences	Integration order
	Intercept and Trend	Intercept and Trend	
EXTRGR	-7.652160***	-	I (0)
GDPGR	-2.911055	-6.72261***	I (1)
INFL	-2.550698	-8.642463***	I (1)
INST	-3.496722	-6.69928***	I (1)
lnOilP	-2.627029	-8.145204***	I (1)
NPI	-3.160024	-7.561748***	I (1)
REER	-2.823600	-5.415620***	I (1)
TBR	-2.045483	-7.030372***	I (1)
USFEDR	-1.299074	-4.317023**	I (1)

Source: Author's Computation (2025)

Table 4 presents the results of the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests conducted to establish the stationarity properties and order of integration of the variables used in the model. Establishing the order of integration is an important preliminary step because regression involving non-stationary variables may produce misleading relationships if the variables are not appropriately modelled. The use of both ADF and PP tests also provides a

robustness check, given that the two procedures employ different approaches to handling serial correlation and other forms of disturbance in the data.

The ADF results indicate that EXTRGR is stationary at level, recording a test statistic of -4.162492, which is statistically significant at the 5% level. It is therefore classified as $I(0)$. In contrast, GDPGR, INFL, INST, InOilP, NPI, REER, TBR and USFEDR do not attain stationarity at levels, as their respective level statistics are not statistically significant at the conventional levels. However, each becomes stationary after first differencing. Their first-difference statistics are statistically significant, ranging from -4.540844 for USFEDR to -8.021652 for GDPGR, with most significant at the 1% level. These variables are consequently classified as $I(1)$.

The Phillips-Perron results provide broadly consistent evidence. EXTRGR is again found to be stationary at level, with a test statistic of -7.652160, significant at the 1% level, confirming its classification as $I(0)$. The remaining variables—GDPGR, INFL, INST, InOilP, NPI, REER, TBR and USFEDR—are non-stationary at levels but become stationary after first differencing. Their first-difference PP statistics are all statistically significant, with values ranging from -4.317023 for USFEDR to -8.642463 for INFL. Thus, the PP test independently confirms that these variables are integrated of order one.

The close agreement between the ADF and PP tests is particularly important. Both procedures produce the same overall classification: EXTRGR is $I(0)$, while GDPGR, INFL, INST, InOilP, NPI, REER, TBR and USFEDR are $I(1)$. This consistency enhances confidence in the stationarity diagnosis and reduces the likelihood that the subsequent estimation results are driven by a particular unit-root testing procedure.

The findings reveal a mixed order of integration, comprising both $I(0)$ and $I(1)$ variables. Importantly, none of the variables is integrated of order two, $I(2)$. This is a crucial result for the choice of estimation technique because the ARDL bounds-testing approach is designed to accommodate regressors that are a mixture of $I(0)$ and $I(1)$, but it is not appropriate where variables are integrated at $I(2)$ or higher orders.

Consequently, the stationarity results provide an econometric basis for proceeding with the ARDL bounds-testing approach to cointegration. The presence of both level-stationary and first-difference-stationary variables does not constitute a problem for ARDL estimation. Rather, it represents one of the circumstances in which the ARDL framework is particularly useful, as it permits the estimation of both short-run dynamics and long-run equilibrium relationships within a single modelling framework.

Overall, the ADF and PP results demonstrate that the variables are either $I(0)$ or $I(1)$, with no evidence of an $I(2)$ process. This confirms that the data satisfy the stationarity prerequisite for the subsequent ARDL analysis. The next stage is therefore to conduct the ARDL bounds test for cointegration to establish whether a stable long-run relationship exists among the variables.

Table 5: Bound Test for Cointegration (Dependent Variable: REER)

T-Statistic	Value	K
F-statistic	9.586969	8

Level of Significance	Lower (Bound I (0))	Upper Bound I (1)
10%	1.95	3.06
5%	2.22	3.39
2.50%	2.48	3.7
1%	2.79	4.1

K is the number of exogenous variables in the model

Source: Author's Compilation (2026)

Table 5 presents the ARDL bounds test for cointegration, with the Real Effective Exchange Rate (REER) specified as the dependent variable and eight explanatory variables included in the model. The purpose of the bounds test is to determine whether a stable long-run equilibrium relationship exists between REER and the selected macroeconomic, institutional, financial and external-sector variables.

The reported F-statistic of 9.586969 is substantially higher than both the lower-bound I(0) and upper-bound I(1) critical values at all the reported significance levels. At the 10% level, the lower and upper bounds are 1.95 and 3.06, respectively, while at the 5% level they are 2.22 and 3.39. At the 2.5% level, the bounds are 2.48 and 3.70, and at the 1% level, they are 2.79 and 4.10.

The calculated F-statistic of 9.586969 exceeds the upper-bound critical value of 4.10 even at the 1% significance level. Therefore, the null hypothesis of no long-run level relationship among the variables is decisively rejected. Since the F-statistic is well above the I(1) upper bound, the result falls clearly within the rejection region rather than the inconclusive region of the ARDL bounds-testing procedure.

The evidence consequently establishes the existence of a statistically significant long-run relationship between REER and the explanatory variables. This implies that although the variables may experience independent short-run fluctuations, they share a systematic long-run equilibrium relationship. Deviations from this equilibrium are expected to generate adjustment processes through which REER and/or the explanatory variables gradually return towards their long-run path.

The strength of the result is particularly noteworthy because the F-statistic is more than twice the 5% upper-bound critical value (3.39) and considerably exceeds the 1% upper bound (4.10). Thus, the evidence of cointegration is very strong, rather than marginal or dependent on the choice of significance level. This provides a robust statistical basis for estimating both the long-run coefficients and the associated short-run error-correction dynamics.

The result is also consistent with the unit-root findings reported in Table 4, where the variables were found to be a mixture of I(0) and I(1) processes, with no variable integrated of order two. The ARDL bounds approach is therefore appropriate for examining the long-run relationship among the variables.

Overall, the bounds-test result leads to the rejection of the null hypothesis of no cointegration and confirms that REER and its explanatory variables are cointegrated in the long run. The analysis can consequently proceed to estimate the long-run ARDL coefficients and the short-run Error Correction Model (ECM). The statistical significance and magnitude of the error-correction term in the subsequent model will further indicate the speed at which deviations from the long-run equilibrium are corrected.

Table 6: VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-791.1441	NA	4.23e+10	50.00901	50.42124	50.14565
1	-632.0452	218.7610	3.90e+08	45.12782	49.25020	46.49428
2	-459.3981	140.2757*	5248086.*	39.39988*	47.23241*	41.99614*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Table 6 presents the Vector Autoregression (VAR) lag order selection criteria used to determine the appropriate lag length for the dynamic analysis. The selection of an appropriate lag structure is important because an inadequate number of lags may fail to capture the dynamic relationships among the variables, whereas excessive lags may consume degrees of freedom and reduce the efficiency of the estimates.

The results consider lag orders from zero to two, using five standard lag-selection criteria: the sequential modified Likelihood Ratio (LR) test, Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) and Hannan-Quinn Information Criterion (HQ). An asterisk indicates the lag order selected by the respective criterion.

At lag zero, the Log Likelihood (LogL) is -791.1441, while the AIC, SC and HQ are 50.00901, 50.42124 and 50.14565, respectively. At lag one, there is a substantial improvement in the LogL, rising to -632.0452, accompanied by reductions in the information criteria. However, the results improve considerably further at lag two, where the LogL rises to -459.3981 and the LR statistic is 140.2757, which is statistically significant at the 5% level.

More importantly, lag two is selected unanimously by all the reported criteria. The LR test, FPE, AIC, SC and HQ all identify lag 2 as the optimal lag length. The AIC falls from 50.00901 at lag 0 to 45.12782 at lag 1 and further to 39.39988 at lag 2. Similarly, the Schwarz Criterion declines from 50.42124 to 49.25020 and then to 47.23241, while the Hannan-Quinn criterion falls from 50.14565 to 46.49428 and subsequently to 41.99614. The FPE also declines substantially from 4.23×10^{10} at lag zero to 3.90×10^8 at lag one and 5,248,086 at lag two.

The unanimous selection of lag two provides particularly strong evidence in favour of using two lags in the subsequent VAR-based dynamic specification. It suggests that the inclusion of two periods of lagged information provides the most appropriate representation of the temporal dynamics among the variables while achieving a substantial improvement in model fit and predictive performance.

The result is also economically meaningful because macroeconomic and financial variables may not respond instantaneously to changes in other variables. Effects of exchange-rate movements, inflation, interest rates, oil prices, institutional conditions and external financial developments may be transmitted with delays. The selection of two lags therefore allows the model to capture these delayed adjustment mechanisms rather than imposing an overly restrictive contemporaneous relationship.

Overall, all five lag-selection criteria—LR, FPE, AIC, SC and HQ—unanimously select lag 2 as the optimal lag length. Consequently, two lags should be adopted as the appropriate lag structure for the subsequent dynamic analysis. This provides a statistically supported basis for specifying the model and reduces the risk of under-fitting the dynamic relationships among the variables.

Table 5: Long and short run Dynamics of estimated results for the selected ARDL (Selected Model: ARDL (2, 2, 1, 2, 1, 2, 2, 1, and 1))

Panel A: Long-Run Dynamics: REER				
EXRGR	2.877853	1.685544	1.707374	0.1219
GDPGR	18.929745	15.450001	1.225226	0.2516
INFL	0.691015	1.380227	0.500653	0.6286
INST	280.014637	200.369982	1.397488	0.1958
LNOILP	-58.880202	46.292467	-1.271918	0.2353
NPI	-5.648659	16.158914	-0.349569	0.7347
TBR	0.427936	2.488554	0.171962	0.8673
USFEDR	-46.050399	24.951267	-1.845614	0.0980
C	-858.472561	723.053847	-1.187287	0.2655

Panel B: Short-Run Dynamics

D(REER(-1))	-0.357376	0.119693	-2.985770	0.0153
D(EXRGR)	0.318424	0.088185	3.610880	0.0057
D(EXRGR(-1))	-0.456895	0.093673	-4.877565	0.0009
D(GDPGR)	1.272663	1.484336	0.857395	0.4135
D(INFL)	1.303843	0.935505	1.393733	0.1969
D(INFL(-1))	-2.052264	0.971184	-2.113157	0.0637
D(INST)	5.446085	21.289931	0.255806	0.8039
D(LNOILP)	-44.820938	11.426728	-3.922465	0.0035
D(LNOILP(-1))	-28.205811	13.654572	-2.065668	0.0688
D(NPI)	-4.805142	2.257194	-2.128813	0.0621
D(NPI(-1))	-5.670069	4.034776	-1.405299	0.1935
D(TBR)	0.983648	1.110089	0.886098	0.3986
D(USFEDR)	-9.264794	3.388718	-2.734012	0.0231
CointEq(-1)	-0.380565	0.176615	-2.154773	0.0006

$$\begin{aligned} \text{Cointeq} = & \text{REER} - (2.8779 \cdot \text{EXRGR} + 18.9297 \cdot \text{GDPGR} + \\ & 0.6910 \cdot \text{INFL} + \\ & 280.0146 \cdot \text{INST} - 58.8802 \cdot \text{LNOILP} - 5.6487 \cdot \text{NPI} + \\ & 0.4279 \cdot \text{TBR} \\ & - 46.0504 \cdot \text{USFEDR} - 858.4726) \end{aligned}$$

Panel C: Goodness-of-fit measures				
R -Squared	0.781457			
Adj. R-Squared	0.736131			
F- statistics	21.65315			
P-value (F-stat.)	0.0000			
Durbin-Watson Statistics	2.053996			
Panel D: Diagnostic Tests				
		Test	Probability	
Breusch-Godfrey Serial Correlation LM Test:		2.95598	0.0615	
Heteroskedasticity Test: Breusch-Pagan-Godfrey		20.80587	0.5328	
Heteroskedasticity Test: ARCH		1.314515	0.2516	
Ramsey RESET Specification Test		7.629926	0.1246	
Jarque-Bera Statistics		0.252213	0.881521	

Note: ***, **, and * are 1%, 5% and 10% level of significance respectively

Source: Author's Calculation (2026)

Table 6 presents the estimated long-run and short-run dynamics from the selected ARDL model, with REER as the dependent variable. The selected specification is ARDL (2, 2, 1, 2, 1, 2, 2, 1, 1). Given the earlier bounds-test result, which established a strong long-run relationship among the variables, the ARDL estimates provide a basis for distinguishing between the long-run equilibrium effects and the short-run adjustments in REER.

The long-run results indicate that none of the explanatory variables, except USFEDR at the 10% level, has a statistically significant effect on REER over the long run.

EXRGR has a positive coefficient of 2.877853, implying that an increase in external reserves growth is associated with an appreciation in the real effective exchange rate, *ceteris paribus*. However, the coefficient is statistically insignificant ($p = 0.1219$). Thus, although the direction of the relationship suggests that stronger external reserve accumulation may support exchange-rate conditions, the evidence is insufficient to establish a significant long-run effect.

Similarly, GDPGR has a positive coefficient of 18.929745, suggesting that stronger economic growth is associated with an increase in REER. Nevertheless, the effect is statistically insignificant ($p = 0.2516$). The result therefore does not provide sufficient evidence that economic growth systematically determines the long-run real effective exchange rate over the study period.

INFL has a positive coefficient of 0.691015, but the relationship is statistically insignificant ($p = 0.6286$). This suggests that inflation does not have a statistically discernible long-run effect on REER in the estimated model. Although inflation differentials can theoretically influence the real exchange rate through purchasing-power and competitiveness channels, the empirical evidence here does not support a significant long-run relationship.

INST records a large positive coefficient of 280.014637, indicating that improvements in institutional quality are associated with an increase in REER. However, this coefficient is statistically insignificant ($p = 0.1958$). The magnitude should therefore not be interpreted independently of the statistical evidence. The result indicates that institutional quality does not exert a sufficiently precise long-run

effect on REER within the estimated model.

In contrast, $\ln OILP$ has a negative coefficient of -58.880202, implying that increases in international oil prices are associated with a decline in REER in the long run. However, the relationship is statistically insignificant ($p = 0.2353$). Given the importance of oil revenues to Nigeria's external sector, the negative sign may reflect the exchange-rate consequences of oil-price movements, but the model does not provide sufficient statistical evidence to confirm this effect.

NPI also has a negative coefficient (-5.648659) but is statistically insignificant ($p = 0.7347$). Thus, non-performing loans do not appear to exert a significant long-run influence on the real effective exchange rate.

The coefficient of TBR is positive (0.427936) but highly insignificant ($p = 0.8673$). Consequently, there is no evidence that the Treasury bill rate has a statistically significant long-run effect on REER.

The most notable long-run result is observed for $USFEDR$, which has a negative coefficient of -46.050399 and is statistically significant at the 10% level ($p = 0.0980$). This indicates that an increase in the US Federal Reserve rate is associated with a decline in Nigeria's REER in the long run. Economically, higher US interest rates can strengthen the US dollar, encourage capital reallocation toward US financial assets and generate depreciation pressures in emerging and developing economies. The negative coefficient is therefore consistent with an international monetary transmission mechanism, although the relatively weak 10% significance level means that the finding should be interpreted cautiously.

Overall, the long-run estimates suggest that $USFEDR$ is the only explanatory variable with statistically significant long-run evidence, and its effect is negative. The coefficients of $EXRGR$, $GDPGR$ and $INST$ are positive, while those of $\ln OILP$ and NPI are negative, but none of these effects is statistically significant at the conventional 10% level.

The short-run results reveal substantially more dynamic relationships than the long-run estimates. The lagged dependent variable, $D(REER(-1))$, has a negative coefficient of -0.357376 and is statistically significant at the 5% level ($p = 0.0153$). This indicates that short-run changes in REER exhibit a degree of adjustment or reversal over time. The negative coefficient suggests that an increase in REER in the preceding period is associated with a reduction in the current-period change in REER, consistent with partial adjustment dynamics.

The contemporaneous change in $EXRGR$ has a positive and statistically significant coefficient of 0.318424 ($p = 0.0057$). This indicates that an increase in external reserves growth is associated with an immediate increase in REER in the short run. However, the first lag of $EXRGR$ has a negative coefficient of -0.456895, significant at the 1% level ($p = 0.0009$). The opposing signs of the contemporaneous and lagged effects indicate that the influence of external reserves growth on REER is dynamic rather than uniform. An initial positive effect is followed by a negative adjustment in the subsequent period.

$D(GDPGR)$ has a positive coefficient of 1.272663, but the effect is statistically insignificant ($p = 0.4135$). Thus, short-run changes in economic growth do not appear to exert a statistically significant immediate influence on REER.

The contemporaneous change in $INFL$ has a positive coefficient of 1.303843, but is statistically insignificant ($p = 0.1969$). Its first lag, however, has a negative coefficient of -2.052264 and is statistically significant at the 10% level ($p = 0.0637$).

This suggests that inflation may have a delayed negative effect on REER, even though its immediate effect is statistically indistinguishable from zero.

Changes in INST have a positive coefficient of 5.446085, but the effect is highly insignificant ($p = 0.8039$). Consequently, there is no evidence that short-run changes in institutional quality materially affect REER.

The results for InOILP are more pronounced. The contemporaneous change in oil prices has a negative coefficient of -44.820938, statistically significant at the 1% level ($p = 0.0035$). This indicates that increases in international oil prices are associated with a significant short-run decline in REER. The first lag is also negative (-28.205811) and statistically significant at the 10% level ($p = 0.0688$). The persistence of the negative effect into the following period suggests that oil-price movements have both immediate and delayed effects on the real effective exchange rate.

D(NPI) has a negative coefficient of -4.805142 and is statistically significant at the 10% level ($p = 0.0621$). This indicates that an increase in non-performing loans is associated with a short-run decline in REER. However, its first lag, D(NPI(-1)), is also negative (-5.670069) but statistically insignificant ($p = 0.1935$). Thus, the evidence suggests a contemporaneous rather than persistent short-run effect.

D(TBR) has a positive coefficient of 0.983648, but the effect is statistically insignificant ($p = 0.3986$). Hence, changes in the Treasury bill rate do not appear to exert a significant short-run influence on REER.

Finally, D(USFEDR) has a negative coefficient of -9.264794 and is statistically significant at the 5% level ($p = 0.0231$). This indicates that an increase in the US Federal Reserve rate produces a significant short-run decline in REER. The fact that USFEDR is significant in both the short run and, at a weaker level, the long run provides evidence that changes in US monetary policy have important implications for Nigeria's real exchange-rate dynamics.

The CointEq(-1) coefficient is -0.380565 and statistically significant at the 1% level ($p = 0.0006$). This result is particularly important because the coefficient is both negative and statistically significant, satisfying the expected conditions for a valid error-correction mechanism.

The magnitude of -0.380565 implies that approximately 38.1% of the disequilibrium between REER and its long-run equilibrium relationship is corrected within one period. Put differently, following a short-run shock that moves REER away from its equilibrium path, about 38% of the deviation is eliminated in the subsequent period, with the remaining disequilibrium being gradually corrected thereafter.

The relatively moderate speed of adjustment suggests that REER does not immediately return to its long-run equilibrium following a disturbance. Instead, the adjustment process occurs progressively. Nevertheless, the statistical significance of the coefficient confirms the existence of a meaningful equilibrium-correction mechanism and reinforces the earlier bounds-test evidence of cointegration.

The model has an R-squared of 0.781457, indicating that approximately 78.15% of the variation in REER is explained by the variables included in the ARDL specification. The adjusted R-squared of 0.736131 remains relatively high after accounting for the number of explanatory variables and degrees of freedom. This indicates that the model has substantial explanatory power.

The overall F-statistic of 21.65315 is statistically significant at the 1% level, with a probability value of 0.0000. The null hypothesis that the explanatory variables

are jointly insignificant can therefore be rejected. The model as a whole is statistically significant, indicating that the variables collectively provide meaningful information for explaining movements in REER.

The Durbin-Watson statistic of 2.053996 is very close to the benchmark value of 2, providing preliminary evidence against serious first-order residual autocorrelation. This is consistent with the formal Breusch-Godfrey diagnostic reported in Panel D.

The diagnostic tests generally support the adequacy of the estimated ARDL model. The Breusch-Godfrey Serial Correlation LM test reports a probability value of 0.0615. Since this is above the conventional 5% significance level, the null hypothesis of no serial correlation cannot be rejected at 5%. Thus, there is no statistically significant evidence of serial correlation at the 5% level. However, because the probability is relatively close to 0.05, the result should be described as borderline rather than as unequivocal evidence of the complete absence of serial correlation.

The Breusch-Pagan-Godfrey heteroskedasticity test has a probability value of 0.5328, while the ARCH test has a probability value of 0.2516. Both exceed 0.05, indicating that the null hypotheses of homoskedasticity and absence of ARCH effects, respectively, cannot be rejected. The residuals therefore do not exhibit statistically significant evidence of conventional heteroskedasticity or ARCH-type conditional heteroskedasticity.

The Ramsey RESET test produces a probability value of 0.1246, which is above 0.05. The null hypothesis of correct functional specification cannot therefore be rejected. This suggests that there is no statistically significant evidence of functional-form misspecification or omitted nonlinear terms in the estimated model.

Finally, the Jarque-Bera statistic of 0.252213, with a probability value of 0.881521, indicates that the null hypothesis of normally distributed residuals cannot be rejected. The residuals therefore exhibit no statistically significant departure from normality.

Taken together, the ARDL results demonstrate that the determinants of Nigeria's real effective exchange rate operate differently across the short and long run. The long-run results are relatively weak, with USFEDR being the only variable that is statistically significant at the 10% level, exerting a negative effect on REER. By contrast, several variables exhibit statistically significant short-run effects. External reserves growth has significant contemporaneous and lagged effects with opposite signs, while oil prices exert a significant negative effect both contemporaneously and with a one-period lag. NPI and USFEDR also have negative short-run effects, while inflation exhibits a marginally significant delayed effect.

The negative and significant error-correction coefficient of -0.380565 provides important evidence that deviations from the long-run equilibrium are corrected over time, with approximately 38.1% of disequilibrium eliminated within one period. This is consistent with the strong cointegration result from the bounds test, where the F-statistic of 9.586969 exceeded the 1% upper-bound critical value.

The model also demonstrates good explanatory and overall statistical performance, with an adjusted R-squared of 73.61% and a highly significant F-statistic. The diagnostic tests provide no evidence at the 5% level of heteroskedasticity, ARCH effects, functional-form misspecification or non-normal residuals. The serial-correlation test is also insignificant at 5%, although its 0.0615

probability warrants cautious interpretation because it is close to the 5% threshold.

Overall, the findings suggest that REER is influenced more strongly by external and financial shocks in the short run than by the long-run coefficients of the individual explanatory variables. In particular, the significant effects of external reserves growth, oil prices and US monetary policy highlight the sensitivity of Nigeria's real exchange-rate dynamics to external-sector and international financial developments.

DISCUSSION OF FINDINGS

The findings of the study provide evidence of a significant long-run relationship between global financial shocks, capital flows, macroeconomic conditions and Nigeria's real effective exchange rate (REER). The ARDL bounds test produced an F-statistic of 9.586969, which exceeds the upper-bound critical value even at the 1% level. This confirms the existence of a long-run equilibrium relationship among REER, external reserve growth, economic growth, inflation, institutional quality, oil prices, net portfolio inflows, the Treasury bill rate and the US Federal Funds Rate. The result is important because it demonstrates that although these variables may experience considerable short-run fluctuations, their movements are connected over the long term. It also supports the theoretical proposition that Nigeria's exchange-rate dynamics are influenced jointly by domestic fundamentals and external financial conditions rather than by isolated domestic factors. The finding is consistent with the study's theoretical framework, which conceptualises capital flows as an important channel through which global financial disturbances are transmitted to the Nigerian economy.

The most important finding concerns the effect of the US Federal Funds Rate (USFEDR). The long-run coefficient is negative (-46.0504) and statistically significant at the 10% level, while its short-run coefficient is also negative (-9.2648) and significant at the 5% level. This indicates that an increase in the US policy rate is associated with a decline in Nigeria's REER, suggesting depreciation pressure on the domestic currency. The result provides strong support for the Mundell–Fleming model and the Global Liquidity and Spillover Hypothesis. Under the Mundell–Fleming framework, higher foreign interest rates can redirect internationally mobile capital away from emerging economies towards foreign assets, thereby increasing pressure on the domestic currency. Similarly, Rey's Global Liquidity and Spillover Hypothesis argues that monetary tightening in major financial centres reduces global liquidity and encourages capital repatriation from emerging markets. The negative USFEDR coefficient therefore indicates that US monetary policy constitutes an important external transmission mechanism for Nigeria's exchange-rate dynamics.

This result is also consistent with the empirical evidence reviewed in the study. Karimo (2020) found that interest-rate differentials significantly explained foreign portfolio investment in Nigeria, while exchange-rate movements significantly influenced portfolio inflows and outflows. Odionye et al. (2023) similarly established that interest-rate differentials influence foreign capital inflows into Nigeria, with a threshold beyond which higher differentials encouraged inflows. The present finding extends these results by demonstrating that the international interest-rate channel is not limited to capital-flow behaviour but also has direct implications for Nigeria's real exchange rate. It is particularly relevant to the Nigerian experience during periods of global monetary tightening, when higher US interest rates can make dollar-denominated assets relatively more attractive and increase the incentive for

investors to reduce exposure to Nigerian assets.

The finding also provides support for International Capital Flow Theory, which holds that investors allocate funds internationally according to differences in expected returns, risks and financial conditions. A rise in the US Federal Funds Rate changes the relative risk-return profile between US and Nigerian assets and may consequently encourage capital reallocation towards the United States. Such reallocation increases demand for foreign currency and places depreciation pressure on the Nigerian currency. The result therefore supports the integrated theoretical framework of the study, in which global interest-rate shocks influence investors' portfolio decisions, capital movements subsequently affect foreign-exchange demand and supply, and these movements ultimately influence the REER.

External reserve growth (EXRGR) has a positive but statistically insignificant long-run coefficient of 2.8779. In the short run, however, its contemporaneous effect is positive and significant, while its first lag is negative and highly significant. This suggests that reserve accumulation can initially support exchange-rate conditions, but its effect is subsequently reversed or adjusted. The short-run result is consistent with the role assigned to external reserves in the Mundell–Fleming framework, since reserves strengthen the monetary authority's capacity to intervene in the foreign-exchange market and provide external liquidity. However, the absence of a significant long-run effect suggests that reserve accumulation alone may not be sufficient to establish sustained exchange-rate stability. This interpretation is consistent with the study's empirical review, particularly Diaz and Collin (2025), who identified reserve adequacy as an important domestic factor affecting vulnerability to sudden stops, but not as an independent substitute for sound macroeconomic fundamentals and institutional resilience.

Economic growth (GDPGR) has a positive long-run coefficient of 18.9297 but is statistically insignificant, while its short-run effect is also positive but insignificant. The positive direction suggests that stronger economic performance could improve investor confidence and support the domestic currency, but the lack of statistical significance indicates that economic growth alone did not systematically determine Nigeria's REER during the study period. This finding qualifies the International Capital Flow Theory, since investors may respond not only to growth prospects but also to external interest rates, exchange-rate expectations, risk and institutional conditions. Thus, improvements in economic activity do not automatically translate into sustained capital inflows or exchange-rate appreciation where external financial conditions remain unfavourable.

Inflation also produces an insignificant positive long-run coefficient, although its lagged short-run effect is negative and significant at the 10% level. The delayed negative effect indicates that inflationary pressures may weaken the exchange-rate position over time rather than generating an immediate response. This is broadly compatible with the empirical evidence of Ben-Obi et al. (2025), who found that exchange-rate depreciation significantly increased inflation in Nigeria in both the short and long run, while appreciation reduced inflation. The present study therefore suggests a potentially dynamic interaction between inflation and exchange-rate conditions, although the insignificant long-run coefficient means that a strong long-run inflation–REER relationship cannot be established from the current evidence.

Institutional quality (INST) has a large positive long-run coefficient of 280.0146 but is statistically insignificant. Its short-run coefficient is also positive but

highly insignificant. The positive sign is theoretically plausible because stronger institutions can improve investor confidence, reduce uncertainty and enhance the attractiveness of domestic assets. However, the absence of statistical significance indicates that changes in the institutional-quality measure used in the study were not sufficiently strong or persistent to exert a measurable independent influence on REER. This finding is nevertheless relevant to the Currency Crisis and Capital Flow Volatility perspectives, which emphasise investor confidence and institutional conditions as factors that can amplify or mitigate exchange-rate pressures. It also corresponds with Diaz and Collin (2025), who found that institutional quality, can mitigate the vulnerability of emerging economies to sudden stops. The present result suggests, however, that institutional quality may operate more effectively as a conditioning factor on capital-flow transmission than as a direct determinant of the exchange rate.

Oil prices produce a negative and statistically insignificant long-run coefficient, but their short-run effects are strongly negative and significant both contemporaneously and at the first lag. This indicates that international oil-price movements have a substantial short-run association with Nigeria's REER, although the effect does not remain statistically significant in the long run. The short-run result is particularly important given Nigeria's dependence on oil revenues and foreign-exchange earnings. It is broadly consistent with Olayeni et al., who found that oil prices and global economic conditions influence Nigeria's exchange-rate dynamics and that the relationship exhibits long-run asymmetry. It is also consistent with Korley and Giouvris (2022), who found that oil-market volatility significantly affects exchange rates and that adverse oil-market conditions can generate currency depreciation.

The negative short-run oil-price coefficient should nevertheless be interpreted within the broader Nigerian context. Since oil exports constitute a major source of foreign-exchange earnings, the conventional expectation would be that higher oil prices improve external liquidity and support the domestic currency. The negative estimated coefficient therefore suggests that the relationship between oil prices and the REER may involve additional transmission mechanisms, including imported inflation, changes in domestic demand, fiscal responses, international risk conditions and the timing of oil-price effects. This reinforces the argument in the empirical literature that the effect of commodity-price shocks depends on the nature and source of the shock rather than simply on whether commodity prices increase or decrease. The finding is therefore compatible with the broader evidence of asymmetric and state-dependent exchange-rate responses reported by Okere et al. (2021) and Korley and Giouvris (2022).

Net portfolio inflow (NPI) has a negative and statistically insignificant long-run coefficient of -5.6487. Its contemporaneous short-run coefficient is negative and significant at the 10% level, whereas the lagged effect is insignificant. The result suggests that increases in net portfolio inflows are associated with a short-run decline in REER within the estimated specification, although there is insufficient evidence of a persistent long-run effect. The short-run result is noteworthy because it does not conform to the simple expectation that capital inflows should necessarily appreciate the domestic currency. Instead, it suggests that the relationship between portfolio flows and exchange rates in Nigeria may be influenced by the composition, timing and volatility of capital movements. This interpretation is consistent with the

International Capital Flow Theory and the Currency Crisis and Capital Flow Volatility perspective, both of which recognise that the effects of capital movements depend on investor expectations and the stability of the flows.

The result partly differs from Ahmad et al. (2025) and Adegbe and Kummer (2025), who emphasised the sensitivity of portfolio flows to exchange-rate risk and the possibility of sudden reversals. It also differs from the conventional appreciation channel implied by the Mundell–Fleming model. However, the difference does not necessarily constitute a theoretical contradiction. Rather, it suggests that Nigeria's portfolio-flow and exchange-rate relationship may be characterised by feedback effects and short-term market adjustments. The empirical review already identifies evidence that excessive or volatile financial integration can increase vulnerability to external shocks, while the composition and magnitude of capital flows determine their consequences for macroeconomic stability.

The Treasury bill rate (TBR) has a positive but statistically insignificant coefficient in both the long and short run. Although interest-rate theory would suggest that higher domestic returns could attract foreign capital and support the exchange rate, the absence of statistical significance indicates that the Treasury bill rate alone was not sufficient to influence Nigeria's REER during the period examined. This finding contrasts somewhat with Odionye et al. (2023), who found that interest-rate differentials above a threshold significantly encouraged foreign capital inflows. The difference may reflect the distinction between the domestic Treasury bill rate and the broader domestic–foreign interest-rate differential. It suggests that investors may respond more strongly to relative returns and international financial conditions than to domestic interest rates considered in isolation.

The short-run dynamics further demonstrate that Nigeria's exchange-rate response to global and domestic shocks is not instantaneous or uniform. The negative and significant coefficient of the lagged change in REER indicates partial adjustment, while the contrasting contemporaneous and lagged effects of external reserve growth demonstrate that the response to reserve accumulation changes over time. Similarly, inflation and oil prices show delayed effects. These results reinforce the Currency Crisis and Capital Flow Volatility theories, which emphasise expectations, reversals and adjustment processes rather than purely contemporaneous relationships. They also correspond with the empirical studies of Hashmi et al. (2021), Odionye et al. (2024) and Sheikh et al. (2020), which demonstrate that exchange-rate and financial-market relationships can be asymmetric and dependent on the direction and magnitude of shocks.

A particularly important result is the error-correction coefficient of -0.380565, which is negative and statistically significant at the 1% level. This confirms that deviations from the long-run equilibrium are corrected over time. Approximately 38.1% of disequilibrium is eliminated within one period following a shock. The result provides further evidence that the variables in the model are not merely associated statistically but are linked by a meaningful long-run equilibrium relationship. The moderate speed of adjustment also indicates that Nigeria's exchange-rate system does not immediately absorb external shocks and return to equilibrium; rather, adjustment takes place progressively.

The significant error-correction mechanism is particularly relevant to the theoretical framework of the study. The Mundell–Fleming model explains the initial

transmission of international financial and monetary shocks through capital mobility and the balance of payments, while the Global Liquidity and Spillover Hypothesis explains how shocks originating in major financial centres are transmitted to emerging markets. International Capital Flow Theory identifies investor portfolio reallocation as an important transmission mechanism, while the Currency Crisis and Capital Flow Volatility perspectives explain how expectations, sudden reversals and capital-flow volatility can amplify exchange-rate pressures. The significant adjustment coefficient demonstrates empirically that these interactions ultimately converge towards a long-run equilibrium rather than producing permanent disequilibrium.

Overall, the findings provide strongest empirical support for the role of global monetary conditions, particularly US monetary policy, in explaining Nigeria's exchange-rate dynamics. The significant negative effect of USFEDR in both the short and long run demonstrates that Nigeria remains exposed to monetary-policy developments in major global financial centres. By contrast, domestic variables such as economic growth, inflation, institutional quality and the Treasury bill rate do not exhibit statistically significant long-run effects in the estimated model. Oil prices, external reserves and net portfolio inflows exert more pronounced short-run effects but do not demonstrate significant long-run relationships. This pattern suggests that the Nigerian exchange-rate system is particularly sensitive to external financial conditions in the short run, while domestic factors may influence the speed and manner of adjustment rather than independently determining the long-run exchange-rate path.

The findings therefore largely support the central proposition of the study that global financial shocks are transmitted into Nigeria through financial and external-sector channels. They also complement the empirical literature by showing that these effects are differentiated across variables and across time horizons. Rather than providing evidence of a simple one-directional relationship, the results reveal a dynamic transmission mechanism in which global monetary conditions, capital flows, oil prices and external reserves interact with domestic macroeconomic conditions to influence exchange-rate behaviour. This is consistent with the study's theoretical synthesis, which identifies capital flows as a principal transmission channel linking global financial shocks to Nigeria's exchange-rate fluctuations.

Finally, the overall explanatory power of the model reinforces the relevance of the selected variables. The R-squared of 0.7815 indicates that approximately 78.15% of the variation in REER is explained by the variables included in the ARDL model, while the overall F-statistic is statistically significant at the 1% level. The diagnostic tests also provide no strong evidence of heteroskedasticity, ARCH effects, model misspecification or non-normal residuals. Thus, the model provides a reasonably adequate empirical basis for interpreting the identified relationships.

In sum, the study confirms that Nigeria's exchange-rate dynamics cannot be understood solely through domestic macroeconomic variables. Global monetary tightening, represented by the US Federal Funds Rate, emerges as the most consistent external determinant, while oil prices, external reserves and portfolio flows mainly affect the exchange rate through short-run adjustment channels. The findings consequently reinforce the relevance of the Mundell–Fleming model, Global Liquidity and Spillover Hypothesis, International Capital Flow Theory, and Currency Crisis and Capital Flow Volatility perspectives when analysing Nigeria's exposure to global

financial shocks. They further demonstrate that the consequences of financial integration depend on the nature, timing and persistence of external shocks, thereby supporting the central argument of the study that Nigeria's integration into global financial markets creates both opportunities for capital mobilisation and significant exposure to external financial instability.

CONCLUSION

This study examined the relationship between global financial shocks, capital flows and exchange-rate fluctuations in Nigeria, with particular emphasis on the influence of external reserve growth, economic growth, inflation, institutional quality, oil prices, net portfolio inflows, Treasury bill rates and the US Federal Funds Rate on the real effective exchange rate (REER). The ARDL bounds-testing results established the existence of a long-run equilibrium relationship among the variables, indicating that Nigeria's exchange-rate dynamics are shaped by the combined influence of domestic macroeconomic conditions and external financial factors. The error-correction result further confirmed that deviations from the long-run equilibrium are corrected over time, with approximately 38.1% of disequilibrium being eliminated within one period.

The findings demonstrate that global monetary conditions constitute an important source of exchange-rate pressure in Nigeria. The US Federal Funds Rate was the only variable with a statistically significant long-run effect on REER, with a negative coefficient, while it also exerted a significant negative short-run effect. This indicates that monetary tightening in the United States can generate depreciation pressure on the Nigerian currency through international capital reallocation, changes in global liquidity and shifts in investor risk preferences. This finding supports the Global Liquidity and Spillover Hypothesis, International Capital Flow Theory and the Mundell–Fleming framework, all of which emphasise the importance of international interest rates, capital mobility and external financial conditions in determining exchange-rate outcomes.

The study also established that several domestic and external variables have important short-run effects even though their long-run effects are statistically insignificant. External reserve growth has a positive contemporaneous effect but a negative lagged effect; oil prices exert significant negative contemporaneous and lagged effects; inflation has a delayed negative effect; and net portfolio inflows exert a negative contemporaneous effect. These findings suggest that Nigeria's exchange-rate response to external and domestic shocks is dynamic rather than instantaneous. Economic growth, institutional quality and Treasury bill rates, on the other hand, do not demonstrate statistically significant effects on REER in the estimated model.

Overall, the study concludes that Nigeria's integration into the global financial system exposes its exchange-rate market to international monetary and financial shocks. The evidence particularly identifies US monetary policy as a significant external source of exchange-rate pressure, while capital flows, oil prices and external reserves contribute mainly through short-run transmission and adjustment mechanisms. Consequently, exchange-rate stability in Nigeria requires policies that do not focus exclusively on domestic monetary conditions but also account for global financial developments, capital-flow behaviour and the country's external vulnerability.

Based on the findings, the study recommends that the Central Bank of Nigeria should adopt a more proactive and externally oriented exchange-rate management

framework that incorporates developments in global monetary conditions, particularly changes in the US Federal Funds Rate, given its significant effect on Nigeria's REER. The authorities should strengthen external reserve accumulation and management to provide adequate buffers against capital-flow reversals and external shocks, while promoting policies that attract stable, long-term capital rather than highly volatile portfolio flows. Government should also accelerate economic diversification and reduce excessive dependence on oil revenues, given the significant short-run influence of oil prices on exchange-rate dynamics. In addition, monetary and fiscal policies should be better coordinated, macroprudential surveillance of capital movements and foreign-exchange exposures should be strengthened and institutional quality, policy credibility and regulatory predictability should be improved to enhance investor confidence and the economy's capacity to absorb global financial shocks.

REFERENCES

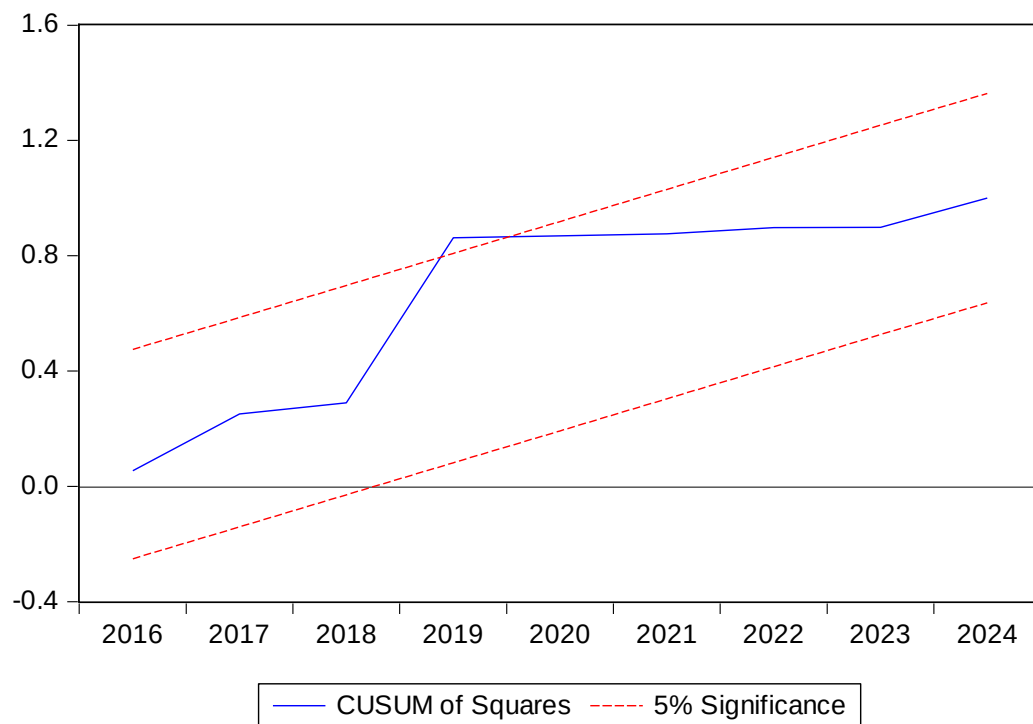
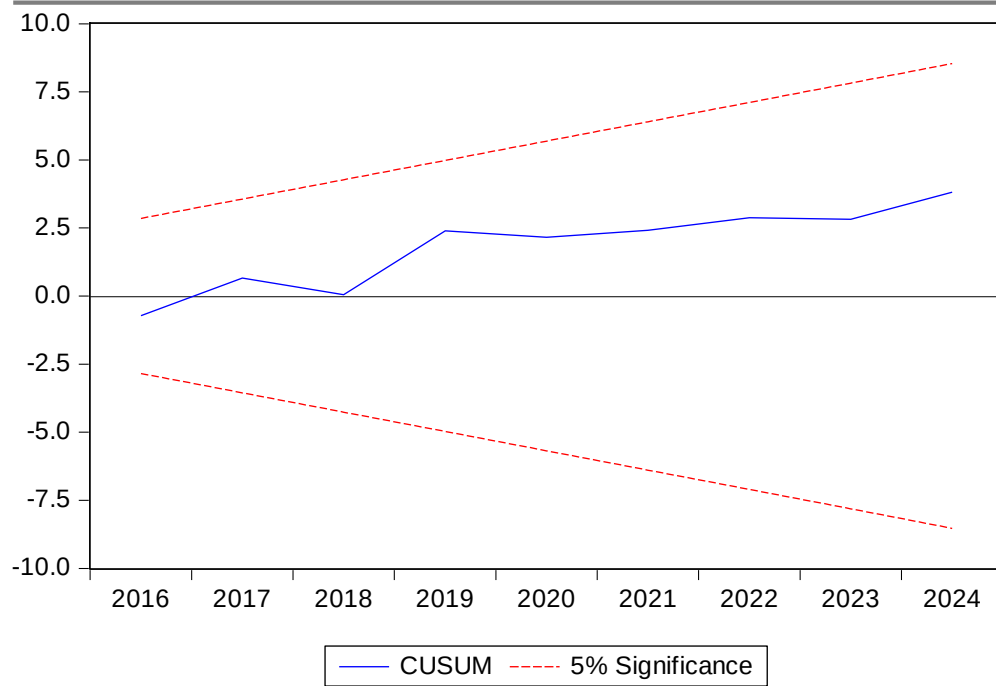
- Adegbe, J. U., & Kummer, A. (2025). Exchange rate volatility and foreign portfolio investment in emerging and developing economies. *World Journal of Advanced Research and Reviews*, 25(2), 2408-2424; <https://doi.org/10.30574/wjarr.2025.25.2.0616>
- Adegbe, J. U., & Kummer, A. (2025). Exchange rate volatility and foreign portfolio investment in emerging and developing economies. *World Journal of Advanced Research and Reviews*, 25(2), 2408–2424. <https://doi.org/10.30574/wjarr.2025.25.2.0616>
- Ahmad, s. m., Ibrahim, a. t., & Dauda, k. i. (2025). Exchange rate volatility and its impact on cross-border capital flows: evidence from emerging economies. *Journal of economics and allied research (jear)*, 15, 173-191. <https://doi.org/10.5281/zenodo.18146646>
- Alabdulwahab, S. Z., & Abou-Zaid, A. S. (2024). Sources of real exchange rate fluctuations in Egypt. *Review of Economics and Political Science*, 9(1), 40-57. <https://doi.org/10.1108/REPS-05-2022-0032>
- Anyikwa, I., & Le Roux, P. (2020). Integration of African stock markets with the developed stock markets: An analysis of co-movements, volatility and contagion. *International Economic Journal*, 34(2), 279–296. <https://doi.org/10.1080/10168737.2020.1755715>
- Ben-Obi, O. A., Olaniyi, O., Okoroafor, D. O., & Obi, B. (2025). Asymmetric effect of exchange rate volatility on foreign direct investment, inflation and balance of trade in Nigeria. *American Journal of Industrial and Business Management*, 15(05), 681-698. <https://doi.org/10.4236/ajibm.2025.155033>
- Boubaker, S., Karim, S., Naeem, M. A., & Sharma, G. D. (2023). Financial markets, energy shocks, and extreme volatility spillovers. *Energy Economics*, 126, 107031. <https://doi.org/10.1016/j.eneco.2023.107031>
- Branson, W. H. (1977). Asset markets and relative prices in exchange rate determination. *Sozialwissenschaftliche Annalen*, 1.
- Calvo, G. A. (1998). Capital flows and capital-market crises: The simple economics of sudden stops. *Journal of Applied Economics*, 1(1), 35–54. <https://doi.org/10.1080/15140326.1998.12040516>

- Dagher, L., & Hasanov, F. J. (2023). Oil market shocks and financial instability in Asian countries. *International Review of Economics & Finance*, 84, 182–195. <https://doi.org/10.1016/j.iref.2022.11.008>
- Devereux, M. B., & Yu, C. (2020). International financial integration and crisis contagion. *The Review of Economic Studies*, 87(3), 1174–1212. <https://doi.org/10.1093/restud/rdz054>
- Diaz, L., & Collin, G. (2025). Sudden stops in capital inflows: Global drivers, domestic risks, and macroeconomic consequences in emerging markets. *Journal of Business and Economic Options*, 8(2), 10-19. <https://doi.org/10.5281/zenodo.15769992>
- Ebire, K., Ullah, S., Adeleye, B. N., & Shah, M. I. (2021). Effect of capital flows on financial stability in middle-income countries. *Journal of Financial Regulation and Compliance*, 29(5), 491-513. <https://doi.org/10.1108/JFRC-08-2020-0081>
- Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica*, 55(2), 251–276. <https://doi.org/10.2307/1913236>
- Fleming, J. M. (1962). Domestic financial policies under fixed and under floating exchange rates. *Staff Papers—International Monetary Fund*, 9(3), 369–380. <https://doi.org/10.2307/3866091>
- Hashmi, S. M., Chang, B. H., & Shahbaz, M. (2021). Asymmetric effect of exchange rate volatility on India's cross-border trade: Evidence from global financial crisis and multiple threshold nonlinear autoregressive distributed lag model. *Australian Economic Papers*, 60(1), 64–97. <https://doi.org/10.1111/1467-8454.12194>
- Ijirshar, V. U., Okpe, I. J., & Andohol, J. T. (2022). Impact of exchange rate on trade flow in Nigeria. *CBN Journal of Applied Statistics (JAS)*, 13(2), 185-222. <https://doi.org/10.33429/2476-8472.1254>
- Jajere, Z. M. (2009). Family Planning and Abortion in the Face of the Shari'ah. *Unimaid Journal of Women Studies*, 2, 85.
- Jajere, Z. M. (2026). FAITH-BASED RESOURCES AND DURABLE SOLUTIONS: ISLAMIC SOCIAL FINANCE AND THE PROTECTION OF INTERNALLY DISPLACED WOMEN AND CHILDREN IN BORNO STATE, NIGERIA. *Multi-Disciplinary Research and Development Journals Int'l*, 8(2), 1-36.
- Jajere, Z. M. (2026). Gender Inequality in Maiduguri: An Islamic Perspective. *Spanish Journal of Innovation and Integrity*, 51, 23-29.
- Jajere, Z. M., & Abdullahi, A. S. (2025). Muslim Women in Environmental Stewardship: Afforestation Initiatives and Socioeconomic Impact in Muslim-Majority Regions Sahel Region of Africa. *African Journal of Earth and Environmental Science*, 7(1).
- Jajere, Z. M., & ISHAQ, R. N. (2024). ISLAMIC VIEW ON ORPHANS, WIDOWS AND LESS PRIVILEGE IN ECONOMIC HARDSHIP. *EKERE JOURNAL OF RELIGION (EJR)*, 2(1), 71-86.
- Jajere, Z. M., & ISHAQ, R. N. ISLAMIC VIEW ON ORPHANS, WIDOWS AND LESS

PRIVILEGE IN ECONOMIC HARDSHIP. *EKERE JOURNAL OF RELIGION (EJR)*, 85.

- Jamal, F., & Malik, S. (2025). Financial market integration and economic stability in emerging markets. *Asian Journal of Research in Social Sciences and Humanities*. [DOI not identified in the available scholarly record.]
- Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, 12(2–3), 231–254. [https://doi.org/10.1016/0165-1889\(88\)90041-3](https://doi.org/10.1016/0165-1889(88)90041-3)
- Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52(2), 169–210. <https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x>
- Karimo, T. M. (2020). Impact of interest rate differential and exchange rate movement on the dynamics of Nigeria's international private capital flows. *CBN Journal of Applied Statistics*, 11(2), 29–63. <https://doi.org/10.33429/2476-8472.1225>
- Klein, M. W., & Shambaugh, J. C. (2015). Rounding the corners of the policy trilemma: Sources of monetary policy autonomy. *American Economic Journal: Macroeconomics*, 7(4), 33–66. <https://doi.org/10.1257/mac.20130237>
- Korley, M., & Giouvris, E. (2022). The impact of oil price and oil volatility index (OVX) on the exchange rate in Sub-Saharan Africa: Evidence from oil importing/exporting countries. *Economies*, 10(11), 272. <https://doi.org/10.3390/economies10110272>
- Krugman, P. (1979). A model of balance-of-payments crises. *Journal of Money, Credit and Banking*, 11(3), 311–325.
- Mundell, R. A. (1963). Capital mobility and stabilization policy under fixed and flexible exchange rates. *The Canadian Journal of Economics and Political Science*, 29(4), 475–485. <https://doi.org/10.2307/139336>
- Obstfeld, M. (1994). The logic of currency crises. NBER Working Paper No. 4640. National Bureau of Economic Research. <https://doi.org/10.3386/w4640>
- Odionye, J. C., Emmanuel O, N., Odo, A. C., Ugwuegbe, U. S., & Uba, C. N. (2024). Asymmetric impact of multifarious exchange rate shocks on stock prices: Fresh insights from multiple thresholds nonlinear autoregressive distributed-lag approach. *The Journal of International Trade & Economic Development*, 33(5), 868–902. <https://doi.org/10.1080/09638199.2023.2223320>
- Odionye, J. C., Ojiaku, E. U., & Uba, C. N. (2023). Impact of interest rate differential, exchange rate changes and political stability on foreign capital inflow in Nigeria: Discrete threshold regression model. *Cogent Economics & Finance*, 11(1), 2203590. <https://doi.org/10.1080/23322039.2023.2203590>
- Ohlin, B. (1933). *Interregional and international trade*. Harvard University Press.
- Okere, K. I., Muoneke, O. B., & Onuoha, F. C. (2021). Symmetric and asymmetric effects of crude oil price and exchange rate on stock market performance in

- Nigeria: Evidence from multiple structural break and NARDL analysis. *The Journal of International Trade & Economic Development*, 30(6), 930-956. <https://doi.org/10.1080/09638199.2021.1918223>
- Okere, K.I., Muoneke, O.B., Onuoha, F.C. (2022). Tripartite relationship between FDI, trade openness and economic growth amidst global economic crisis in Nigeria: application of combined cointegration and augmented ARDL analysis. *Futur Bus J* 8, 5 <https://doi.org/10.1186/s43093-022-00116-w>
- Olayeni, O. R., Tiwari, A. K., & Wohar, M. E. (2020). Global economic activity, crude oil price and production, stock market behaviour and the Nigeria-US exchange rate. *Energy Economics*, 92, 104938. <https://doi.org/10.1016/j.eneco.2020.104938>
- Oyadeyi, O. O. (2026). The macroeconomic determinants of exchange rate volatility and the impact of currency volatility on the performance of the Nigerian economy. *Foreign Trade Review*, 61(1), 79-108. <https://doi.org/10.1177/00157325241295884>
- Öztürk, I., & Acaravcı, A. (2010). An application of Thirlwall's law to the South African economy: Evidence from ARDL bounds testing approach. *African Journal of Business Management*, 4(2), 262–266.
- 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>
- Rashid, A., Jehan, Z., & Kanval, N. (2023). External shocks, stock market volatility, and macroeconomic performance: An empirical evidence from Pakistan. *Journal of Economic Cooperation & Development*, 44(2), 131–157. DOI not identified in the available record.
- Reinhart, C. M., & Sbrancia, M. B. (2015). The liquidation of government debt. *Economic Policy*, 30(82), 291–333. <https://doi.org/10.1093/epolic/eiv003>
- Rey, H. (2013). Dilemma not trilemma: The global financial cycle and monetary policy independence. *Proceedings—Economic Policy Symposium—Jackson Hole*, 1–2. Federal Reserve Bank of Kansas City.
- Sheikh, U. A., Asad, M., Ahmed, Z., & Mukhtar, U. (2020). Asymmetrical relationship between oil prices, gold prices, exchange rate, and stock prices during global financial crisis 2008: Evidence from Pakistan. *Cogent Economics & Finance*, 8(1), 1757802. <https://doi.org/10.1080/23322039.2020.1757802>
- Yadav, N., Singh, A. B., & Tandon, P. (2023). Volatility spillover effects between Indian stock market and global stock markets: A DCC-GARCH model. *FIIB Business Review*. <https://doi.org/10.1177/23197145221141186>
- Živkov, D., Kuzman, B., & Andrejević-Panić, A. (2021). Nonlinear bidirectional multiscale volatility transmission effect between stocks and exchange rate markets in the selected African countries. *Economic research-Ekonomska istraživanja*, 34(1), 1623-1650. <https://doi.org/10.1080/1331677X.2020.1844585>



Akaike Information Criteria (top 20 models)

