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Exchange Rate and Inflation in Nigeria: A Non Linear Approach (1992Q1 – 2024Q4)

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A R T I C L E I N F O

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A B S T R A C T

This study employs the Nonlinear Autoregressive Distributed Lag (NARDL) methodology to examine how asymmetric exchange rate variations influence inflation in Nigeria, covering the period from early 1992Q1 to late 2024Q4. The theoretical framework draws from purchasing power parity (PPP) and the law of one price (LOP) principles. The research aimed to analyze both immediate and extended temporal relationships between inflation and exchange rate movements, alongside other economic indicators. Using bounds testing for co integration, the study established a sustained equilibrium relationship among the examined variables. Results reveal that exchange rate fluctuations both strengthening and weakening demonstrate minimal and statistically insignificant positive effects on inflation across both timeframes, suggesting no asymmetric relationship exists. Additionally, the analysis shows that crude oil prices, monetary supply, and lending rates maintain significant inverse relationships with inflation over extended periods, while GDP exhibits significant negative correlations with price levels. Import levels display an insignificant positive correlation with inflation and demonstrate no substantial impact throughout the observation period. Given these outcomes, the research recommends that Nigerian monetary policymakers adopt an integrated strategy emphasizing exchange rate steadiness, careful monetary supply control, and structural economic transformations to enhance local production capacity. A comprehensive approach combining inflation management and macroeconomic stability measures would facilitate sustainable outcomes

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INTRODUCTION

The connection between currency exchange rates and price inflation remains a prominent concern in Nigeria's economic and political discourse. The persistent weakening of the Naira over recent years has generated substantial implications for domestic price levels and broader economic indicators. The declining strength of the exchange rate has elevated the costs associated with imported merchandise and industrial inputs. Currency depreciation, characterized by lower exchange rate values, plays a considerable role in driving Nigeria's elevated inflation rates. This phenomenon occurs primarily because the nation annually imports substantial quantities of consumer products and production inputs at premium costs. A weakened exchange rate means greater amounts of domestic currency (Naira) are necessary to purchase foreign currencies like the US dollar. While currency depreciation reduces export prices for Nigerian goods, it simultaneously increases import costs for domestic consumers. Consequently, currency value fluctuations significantly impact financial markets by affecting international trade flows, capital movements, inflation dynamics, and overall economic prosperity (Maana et al., 2010).

Moreover, exchange rate movements influence inflation through various mechanisms. Initially, effects on imported merchandise directly alter consumer prices. For instance, currency depreciation elevates the costs of imported final consumer products, thereby contributing to aggregate consumer price inflation. Additionally, certain imported items serve as production inputs; therefore, currency depreciation raises production expenses, affecting multiple stages of domestic intermediate and finished goods manufacturing, ultimately influencing domestic consumer pricing. Third, as currency values decline, domestically manufactured products gain competitive pricing advantages in international markets. This leads to increased net exports, accelerated output expansion, and eventual consumer price increases driven by enhanced labor demand and rising wage levels (Roberta and Ieva, 2020).

The asymmetric response of prices to exchange rate fluctuations is commonly emphasized within the macroeconomic framework of pricing-to-market theory, suggesting that international corporations likely adjust their profit margins in importing nations responding to exchange rate movements (Dornbusch 1985; Krugman 1986).

Exchange rate instability and inflation remain Nigeria's most critical macroeconomic concerns. The Naira's ongoing depreciation has elevated import expenses, increased production costs for businesses dependent on imported inputs, and contributed to rising consumer prices. Simultaneously, inflationary forces have diminished purchasing power, weakened investment confidence, and complicated macroeconomic governance. These dynamics hold particular significance in Nigeria, where the economy maintains heavy import dependence and exhibits substantial vulnerability to fluctuations in both foreign exchange markets and international petroleum prices.

According to theoretical and empirical scholarship, exchange rate modifications affect inflation through multiple pathways. Depreciation increases domestic prices for imported goods, raises production costs for firms utilizing imported inputs, and generates indirect demand-side pressures through elevated wages and enhanced export competitiveness. Conversely, currency appreciation may reduce import prices while simultaneously undermining export revenues, influencing domestic prices through complex channels. The magnitude of this pass-through effect varies across nations and time periods, depending on structural characteristics and policy frameworks.

Previous Nigerian research has utilized both linear and nonlinear methodologies to explore the exchange rate-inflation relationship. While valuable, most studies have concentrated on either aggregate economic growth or specific inflationary components, providing limited attention to the comprehensive price environment. More significantly, few studies have investigated how recent macroeconomic reforms specifically the 2023/2024 oil subsidy elimination and the shift toward a more flexible exchange rate system shape the inflationary consequences of exchange rate movements. These policy modifications are anticipated to substantially alter exchange rate pass-through channels, though their empirical impacts remain unexplored.

This study seeks to address that research gap by examining the following question:

Does an asymmetric relationship exist between exchange rate fluctuations and inflation in Nigeria, particularly considering recent exchange rate reforms and subsidy removal?

To investigate this, the study utilizes the Nonlinear Autoregressive Distributed Lag (NARDL) model developed by Shin, Yu, and Greenwood (2011) for empirical analysis, representing an asymmetric extension of the established ARDL model by Pesaran and Shin (1999) and Pesaran et al. (2001). This approach allows the paper to advance beyond existing literature that employed standard time series techniques including co integration, error-correction modeling, Granger causality, and ARDL in their empirical analysis. While these techniques enable assessment of extended and immediate relationships, they have inadequately captured potential asymmetries between exchange rates and inflation in Nigeria using recent data from the latest economic recession affecting the country during 2023-2024. Additionally, unlike previous research, this paper incorporates structural policy changes into its analysis, enabling more relevant policy discussion. This represents a significant literature contribution in three ways:

First, it provides current evidence on the exchange rate-inflation relationship using quarterly data spanning 1992q1 through 2024q4. Second, unlike prior research assuming symmetry, it explicitly examines asymmetries in the pass-through effect. Third, it positions the analysis within the policy context of subsidy removal and exchange rate reforms, offering insights for ongoing macroeconomic stabilization initiatives. The paper's remaining sections follow this structure: Section 2 reviews relevant literature including theoretical models, Section 3 describes the methodology, Section 4 discusses findings, and Section 5 concludes with policy recommendations.

LITERATURE REVIEW

Symmetric Effects of Exchange Rates on Inflation

Several studies have looked at the linear pass-through effect of exchange rates on inflation, assuming that appreciation and depreciation have similar effects. Ade and Alege (2014), for example, discovered a bidirectional relationship between exchange rates and macroeconomic variables in 40 countries in Sub-Saharan Africa, recommending more effective exchange rate management. Similarly, Ilyas et al. (2021) used the ARDL model to demonstrate that shocks to exchange rates and the money supply have a significant impact on inflation in the West African Monetary Zone. In the Nigerian context, Nwanko (2023) discovered that exchange rate volatility has a weak but negative effect on output, whereas Ubadaki et al. (2023) discovered that exchange rate changes increase inflation but have no causal relationship. These findings imply that, while exchange rate fluctuations are important for inflation, their magnitude and direction are frequently context-dependent.

Asymmetric Effects and the NARDL Approach

The emphasis has shifted to asymmetric effects, in which appreciation and depreciation influence inflation differently. Ahmad et al. (2020) used the NARDL model to look into money demand stability in the United States and discovered significant asymmetries. Similarly, Ferjani et al. (2022) discovered asymmetric effects of exchange rates on US trade flows, whereas Aysan et al. (2023) discovered short-run asymmetries in trade flows between Asian economies. Rasaki and Oyedepo (2023) and Adedokun et al. (2022) found that exchange rate volatility affects imports more than exports in Nigeria, while Valentic et al. (2022) confirmed asymmetric effects on inflation. However, the majority of these Nigerian studies predate recent structural reforms and do not take into account the potential shift in exchange rate pass-through mechanisms.

The Role of Oil Prices and Policy Reforms

Given Nigeria's reliance on oil revenues, several studies have highlighted the role of oil prices in inflation dynamics. Jakpa et al. (2024) found a positive and significant pass-through of exchange rate depreciation into consumer prices, while import prices sometimes offset these effects. Laurent et al. (2024) also observed that large depreciations in Sub-Saharan Africa result in stronger and more persistent inflationary pressures. However, there is limited evidence on how the removal of oil subsidies and recent foreign exchange liberalisation (2023/2024) will reshape these relationships.

Identified Gap

Overall, the literature agrees that the fluctuations in exchange rate have inflationary effect in Nigeria, but disagreements persist about the magnitude, direction, and symmetry of these effects. Importantly, three major gaps stand out:

1. The majority of Nigerian studies assume either symmetry or partial effects (for example, segregated inflation), ignoring the possibility of a nonlinear pass-through to overall prices.
2. Despite their significant impact on inflationary pressures, the elimination of oil subsidies and recent exchange rate reforms have received little attention in empirical models.

3. Previous research frequently focuses on exchange rates in isolation, failing to account for other macroeconomic drivers such as the money supply, interest rates, GDP, and oil prices. This study fills these gaps by using a nonlinear ARDL framework to analyze quarterly Nigerian data (1992Q1-2024Q4), explicitly examining both short-run and long-run asymmetries, and situating the analysis within the context of recent macroeconomic reforms.

Theoretical Model

The study incorporates two fundamental theories from international economics: Purchasing Power Parity (PPP) and the Law of One Price (LOP), which serve as a theoretical foundation for investigating the impact of exchange rate fluctuations on inflation.

Purchasing Power Parity (PPP)

Gustav Cassel developed the PPP theory, which states that in the absence of trade barriers and transportation costs, identical goods should sell for the same price in different countries when expressed in a single currency. Mathematically, for a basket of goods: The core premises of the PPP theory suggest that trade barriers or transportation costs that raise the prices of goods and services may have an impact on a country's exchange rate (Badas et al., 2016). Furthermore, earlier research used this model to investigate the asymmetric effects of exchange rate fluctuations on inflation in Nigeria. (See Rasaki & Oyedepo 2023, and Adedokun et al. 2022). For example, Bada et al. (2016) argued that when trade impediments or transportation costs exist, the price of a good could be impacted, leading to a general rise in commodity prices within the country. Therefore, the theory is represented through the functional association between inflation and exchange rates, outlined in the following model:

$Pt = Et \times Pt^*$

Where:

Pt = domestic price level

Et = nominal exchange rate (domestic currency per unit of foreign currency)

Pt* = foreign price level

PPP implies that changes in the exchange rate (Et) directly influence domestic price levels (Pt), providing the theoretical basis for including the exchange rate (EXCR) as the key explanatory variable in the inflation model.

Law of One Price (LOP)

According to the LOP, identical goods should be priced the same across countries after adjusting for exchange rates. Deviations from the LOP indicate frictions such as transportation costs, tariffs, or market imperfections, which can amplify the impact of exchange rate changes on domestic inflation. This theory adds to the evidence for asymmetric effects, as appreciation and depreciation may affect prices differently depending on market rigidities.

Justification for the inclusion of other control variables

While exchange rate fluctuations are important, domestic macroeconomic factors also have an impact on inflation.

1. Money Supply (M2): According to monetarist theory, increasing the money supply, while keeping other factors constant, tends to raise the price level.

2. Interest Rate (INTR): Interest rates, as a monetary policy tool, have an impact on aggregate demand and borrowing costs, indirectly influencing inflation.
3. Gross Domestic Product (GDP): Increased real output can alleviate inflationary pressures by increasing supply.
4. Oil Prices (OIL P): In an oil-dependent economy like Nigeria, fluctuations in crude oil prices have an impact on production and transportation costs, contributing to cost-driven inflation.
5. Imports (IMP) and Exports (EXP): Changes in import and export prices have an impact on domestic price levels via external trade channels.

Derivation of the Empirical Model

According to the theories presented above, inflation (INFt) is modelled as a function of both exchange rate movements and key macroeconomic determinants:

INFt = f(EXCRt, LM2t, INTRt, LGDPt, LOILt, LIMPt,)

To account for asymmetric effects (the difference between the impact of appreciation and depreciation), the Nonlinear ARDL (NARDL) framework divides exchange rate changes into positive (EXCR+) and negative (EXCR-) partial sums. This enables the model to estimate both short- and long-term effects in accordance with PPP, LOP, and standard macroeconomic theory. This theoretical structure justifies the inclusion of all variables in the empirical model and serves as the conceptual foundation for testing the asymmetric pass-through of exchange rate changes on inflation in Nigeria, particularly in light of recent reforms such as the removal of oil subsidies and exchange rate liberalization in 2023/24.

METHODOLOGY

Source of Data

The study analysed quarterly time series data from 1992Q1 to 2024Q4. All data were obtained online from the Central Bank of Nigeria's (HYPERLINK "http://www.cbn.gov.ng" www.cbn.gov.ng) website, as well as global development indicators. This time frame was chosen to capture the independent effects of both positive and negative changes in exchange rates and some macroeconomic indicators on inflation in Nigeria during the global economic crises, the post-global economic crisis, and the recession that began in August 2016. Furthermore, the current administration will remove oil subsidies in 2024 and implement a flexible exchange rate regime.

Model Specification

The model for the study is specified in its functional form as follows:

- lnINFRt = f (lnEXCRt+ ,lnEXCRt- ,lnLGDPt, lnLM2t, lnINTRtlnLIMPt , lnLOILt)………(3.1)

Thus the econometrics specification of the model is express as:

- INFRt= β0 +β1EXCR+t+β2 EXCRRt- +β3LGDPt, +β4M2t+β5INTRt+β6IMPt +β7OILt+ μt (3.2)

Where, INFR = Inflation rate, EXCR+ is the partial sum of positive change in Exchange rate, EXCR- is the partial sum of negative change in Exchange rate, LGDP donate Log of Gross Domestic Product, LM2 is Log of Money Supply, INTR represent Real Interest rate, LIMP is Log of Import, and LOIL donate Log of Oil price. L= Natural Logarithm, β_0 = Constant term, β_1, to β_7 = co-efficient of independent variables that captured in the model, μ = Error Term t = Time Period (indicating time series analysis).

Apriori Expectation

A priori, we expect the real exchange rate to have an asymmetric impact on inflation. Real exchange rate depreciation is assumed to increase inflation by making imports more expensive, while real exchange rate appreciation is assumed to have the opposite impact on inflation. Shin et al. (2011) used the non-linear NARDL model to analyse the asymmetric effect of exchange rates on inflation in Nigeria.

$$\Delta\ \mathrm{in}\ INFR_t = \delta_0 + \delta_1 \ln EXCR_{(t-1)}^{+} + \delta_2 \ln EXCR_{(t-1)}^{-} + \delta_3 \ln INTR_{(t-1)} + \delta_4 \ln LM2_{(t-1)} + \delta_5 \ln LGDP_{(t-1)} + \delta_6 \ln IMP_{(t-1)} + \delta_7 \ln LOIL_{(t-1)} + \sum_{j=1}^{p1} \beta_{1j} \ln INF_{(t-j)} + \sum_{j=0}^{q1} \beta_{2j} \ln EXCR_{(t-1)}^{-} + \sum_{j=0}^{q2} \beta_{3j} \ln EXCR_{(t-1)}^{+} + \sum_{j=0}^{q3} \beta_{4j} \ln INTR_{(t-j)} + \sum_{j=0}^{q4} \beta_{5j} \ln LM2_{(t-j)} + \sum_{j=0}^{q5} \beta_{6j} \ln LGDP_{(t-j)} + \sum_{j=0}^{q6} \beta_{7j} \ln LIMP_{(t-j)} + \sum_{j=0}^{q7} \beta_{8j} \ln LOil_{(t-j)} + \mu_{(t.)} \quad \ldots\ldots\ldots(3.3)$$

Where, p represents the optimal lag lengths selected for dependent variables whereas q1 toq7 represents the optimum lag lengths determined by lag selection criterion. The coefficients $\beta_{1j}=\beta_{2j}=\beta_{3j}=\beta_{4j}=\beta_{5j}=\beta_{6j}=\beta_{7j}=\beta_{8j}$ captures short-run dynamics, while the coefficients $\delta_0 = \delta_1 = \delta_2 = \delta = \delta_4 = \delta_5 = \delta_6 = \delta_7$ represents the long-run relationships. The presence of long-run relationship can be proven by rejecting the null hypothesis, which states no long-run relationship $\delta_0 = \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = 0$.

Techniques of Data Analysis

To evaluate asymmetrical long-term relationships and dynamic multipliers, the study uses the nonlinear Auto regressive Distributed Lag (NARDL) modelling approach popularised by Shin et al. (2014). Peasant, Yu, and Green-Wood (2013) proposed the linear ARDL framework for estimating equilibrium relationships, which is the foundation for this approach. The NARDL, which is well-known in academic literature, incorporates both positive and negative partial sums of explanatory variables to account for short- and long-run linearity in the model. These analyses are designed to prevent spurious regression and adhere to the ARDL bounds co-integration test criteria, which state that I (2) variables should be excluded from the estimation to maintain the validity of the calculated F-statistics. The study also uses the ARDL bounds testing methodology to conduct a co-integration test among the variables. After confirming co-integration using the results, the analysis investigates the asymmetrical effects of exchange rate fluctuations on inflation in both the short and long run. The study also employs a variety of diagnostic statistical tests to assess the suitability of the dynamic model specifications. These assessments include the Jarque-Bera statistics for determining error normality (J-B) and the LM statistics for examining autocorrelation up to order 2.

RESULT AND DISCUSSION

Trend of Inflation and of Exchange Rate in Nigeria

Graphical presentation of the variables (Exchange rate (EXCR), Inflation rate (INFR) from 1992 to 2024 are in figures below. Figure 1 and 2 depict the movement of the exchange rate and inflation, while figures 3 and 4 demonstrate the series' volatility.

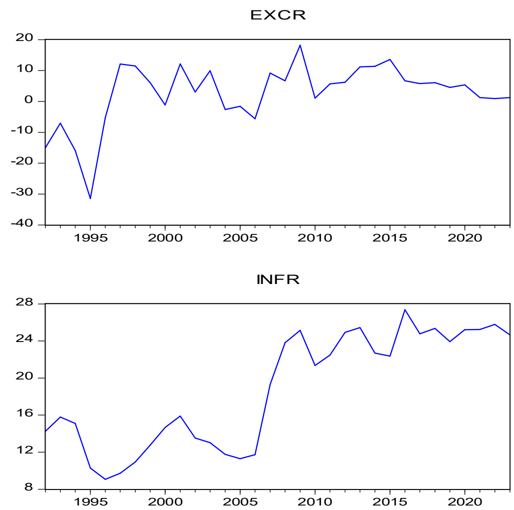

Figure 1. Depict the Movement of the Exchange Rate and Inflation

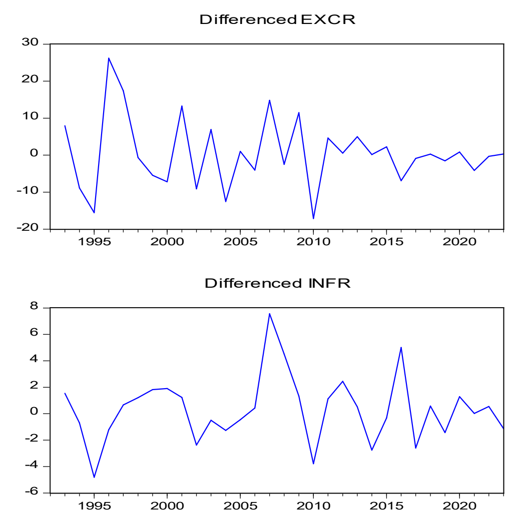

Figure 2. Demonstrate the Series' Volatility

According to the figures, both the exchange rate and inflation rate have grown slowly over time. The exchange rate, on the other hand, fluctuates more frequently than inflation. This indicates that exchange rates were more volatile than Nigerian inflation during the period. It also demonstrates that between 1994 and 1996, inflation and exchange rates fell as a result of tight government controls imposed by General Sani Abacha's military regime. In 1994, the government implemented a fixed exchange rate system, establishing the Naira's official value at ₦21.996 = $1. The foreign exchange market was closed, and the Central Bank of Nigeria (CBN) strictly controlled allocation. Furthermore, the government froze wages and prices, limited public spending, and slowed money supply expansion. These measures temporarily reduced inflation and stabilized the exchange rate, but they were not long-term viable. (CBN 2000). Furthermore, both the exchange rate and inflation began rapidly rising in 1996, peaking between 1998 and 2000 as a result of the following measures.

Table 1. Dickey-Fuller GLS and Philip-Perron Unit Root Test

Variables	**Dickey-fuller GLS**		**Philip- Perron**		**Integration Order of Variables**
	Trend and Intercept		Trend and Intercept		
	Level 1 (0)	First diff I(1)	Level 1 (0)	First diff 1 (1)	
INFR	-3.048**	-3.666	-3.609**	-3.734	I (0)
EXCR+	-4.635***	-6.613	-4.646***	-9.282	I (0)
EXCR-	-3.865***	-5.409	-3.904**	-6.787	I (0)
INTR	-2.608	-3.490**	-2.905	-4.342**	I (1)
LM2	-3.304**	-3.768	-3.136	5.079***	I (0) I (1)
LIMPT	-3.209**	-4.916	-3.556**	-5.871	I (0)
LGDP	-3.094**	-4.851	-3.743**	-5.735	I (0)
LOIL	-1.923*	-0.532	-121.840***	-0.943	I (0)

Note: ***, **, * donates series are stationary at 1,5 and 10 percent respectively.

Source: Authors Computation Using Eviews Version 10 (2025)

According to the Dickey fuller GLS unit root tests in Table 1, all variables in the model, with the exception of interest rate (INTR), are not stationary in their first differences. However, their levels were all discovered to be stationary, implying that the variables were I (0). Constant and trend terms were added to the unit root test estimation because they became stationary at their level. Similarly, the Philip-Perron unit root test shows that inflation rate (INFR), negative and positive changes in exchange rate (EXCR- & EXCR +), log of import (LIMPT), log of gross domestic product (LGDP), and log of oil price (LOIL P) are not stationary in their first differences but each turned out to be stationary in their levels, implying that the variables were I(0), while interest rate (INTR) and log of money supply (LM2) are not stationary in their levels but their f Because the series were integrated of order one, I (1) and I (0), and none of them were found to be integrated of order two, the study proceeded to perform the NARDL bounds test for co integration.

Table 2. Presents the NARDL Bound Test result

Test statistics	**Value**	**K**	**Significance**	**I (0) Lower Bound**	**I (1) Upper Bound**
F- statistics	8.87	8	10%	2.26	3.34
			5%	2.55	4.68
			1%	3.15	4.43

Source: Authors Computation Using Eviews Version 10 (2025)

Table 2 shows that the calculated F statistic of 8.87 exceeds both the lower and upper critical values at the 1% significance level, which are 3.15 and 4.43, respectively. This means that in the long run, all of the variables are cointegrated.

Table 3. Result of Long Run Coefficients of NARDL

Dependent Variable: Inflation Rate			
Variables	**Coefficient**	**t- statistic**	**P- Value**
EXCR+	0.005	0.499	0.619
EXCR-	0.011	1.512	0.133
LM2	-0.094	-5.875	0.000***
LIMPT	2.321	1.215	0.227
LGDP	-0.111	-1.204	0.231
INTR	-0.023	-1.741	0.085***
LOIL	-0.003	-2.371	0.020**
C	2.081	6.109	0.000***

Note: ***, ** &* indicate significance at 1, 5 and 10 percent level respectively.

Source: Authors Computation Using Eviews output Version 10 (2025)

Table 3 shows that there was a positive but insignificant long-run relationship between rising exchange rates and inflation rates in Nigeria during the study period. According to the findings, a one-percent increase in the exchange rate raises inflation by 0.005 percent, indicating that exchange rate fluctuations have no significant impact on long-term inflation, as demonstrated by a p-value of 0.61. Similarly, a decrease in the exchange rate has a negligible positive impact on inflation; a 1% increase in exchange rate depreciation results in a 0.011 percent increase in inflation. This finding supports the Purchasing Power Parity (PPP) theory, which states that exchange rate fluctuations, positive or negative, have an impact on national price levels. The findings are consistent with previous research that has found an association between exchange rates and inflation (Jakpa et al., 2024; Obadaki, 2023; Rasaki and Oyedepo, 2023, among others). The estimates are based on the situation in Nigeria, where an increase in the exchange rate raises the cost of a wide range of goods. Food inflation increased from 1.16% in December 2014 to 2.21% in January 2019, while the exchange rate increased from N158 = 1$ to N413.07 = 1$ between 2014 and 2021 (CBN, 2021). Furthermore, at the 1% probability level, the money supply coefficient has a negative and significant effect on inflation, implying that a 1% increase in money supply causes a -0.09% decrease in inflation. Imports, on the other hand, have a negligible positive effect on inflation, with a one-percent increase yielding a 2.31-percent increase. In contrast, gross domestic product has a marginally negative relationship with inflation, with a 1% increase in GDP resulting in a -0.11% drop in inflation. Similarly, interest rates have a weak but significant negative effect on inflation, with a 10% rise in interest rates resulting in a (-0.02%) drop in inflation. At the 5% significance level, the oil price coefficient has a negative and significant relationship with inflation, resulting in a (-0.003%) decrease in inflation for every 5% increase in oil prices.

Table 4. Short Run Coefficients of NARDL and Error Correction Mechanism

Dependent Variable: Inflation Rate			
Variables	**Coefficient**	**T- Statistic**	**P value**
Δ (EXCR+)	0.029	0.420	0.675
Δ (EXCR-)	0.042	1.018	0.311
Δ (LM2)	-3.497	-1.110	0.270
Δ (LIMPT)	6.251	1.620	0.108
Δ (LGDP)	-0.003	-2.387	0.019**
Δ (INTR)	0.032	1.705	0.091*
Δ(OIL)	0.005	2.278	0.025**
ECM (-1)	-0.027	-9.261	0.000***
R2 = 0.54, D.W = 0.71, F statistic= 23.33(0.000),			

Note: ***, ** &* indicate significance at 1, 5 and 10 percent level respectively.
Source: Authors Computation Using Eviews Version 10 (2025)

Table 4 shows that there is no significant positive short-term relationship between rising exchange rate changes and inflation in Nigeria. Notably, a 1% increase in the exchange rate leads to a 0.02 percent increase in inflation. Similarly, negative exchange rate changes have an insignificant positive relationship with inflation, implying that neither positive nor negative exchange rate changes have a significant influence on inflation, as indicated by their p-values of (0.67 and 0.31, respectively). Furthermore, the findings indicate a negligible negative relationship between the money supply and inflation. A 1% increase in the money supply resulted in a (-3.49) percent drop in inflation, while imports had a positive but insignificant effect on inflation, with a 1% increase in imports resulting in a (6.25) percent increase in inflation. At the 5% probability level, the GDP coefficient shows a weak and significant negative relationship with inflation, indicating that a percentage increase in GDP results in a (-0.03) percent decrease in inflation. Interest rates have a significant positive influence on inflation at the 10% level, implying that a 10% increase in interest rates causes a (0.032) increase in inflation. At the 5% significance level, the oil price coefficient demonstrates a significant positive relationship with inflation, with a 5% increase in oil prices resulting in a 0.005% increase in inflation. This finding is consistent with our predictions that as oil prices rise, so will transport costs, increasing the cost of goods and services. As a result, because crude oil is such an important economic input, rising oil prices contribute to inflation, which measures the overall rate of price increases throughout the economy. Rising fuel prices raise the cost of transporting goods and services, exacerbating inflation by increasing the total price that customers must pay for all goods. Furthermore, the error correction term is negative, less than one, and statistically significant at the 1% level, implying that in the event of an exchange rate decrease, the system returns to long-term equilibrium at a rate of 27% of every quarter.

Table 5. Diagnostic Test Result

Test	LM. Version	F. Statistics
Jarque Bera Test Statistics (Normality)	JQ= 6.181 [0.045]	Un applicable
Breusch Godfrey LM Test (Serial Correlation)	CHSQ=55.994 [0.000]	F= 44.050 [0.000]
Breusch pagan Godfrey (Heteroscedasticity)	CHSQ= 35.096[0.000]	F= 3.073 [0.000]

Source: Authors Computation Using Eviews Version 10 (2025)

The results presented in Table 5 above show that the series were discovered to be non-normally distributed, as JQ demonstrated statistical significance. As a result, we reject the null hypothesis of normal distribution in favor of the alternative hypothesis that the series' frequency distributions are not normal. The Breusch-Godfrey serial correlation test showed that both the F and LM versions were significant, implying that the series are serially correlated. This also implies that the error terms are independent, which means that the error term in one period influences the error term in another. As a result, we can say that there is autocorrelation at the 1% level. The Breusch-Pagan-Godfrey test is a Lagrange multiplier that examines the null hypothesis of no heteroscedasticity. The heteroscedasticity test yielded a high p-value, indicating statistical significance at the 1% level. This means we reject the null hypothesis and conclude that the residual variance is not constant (heteroscedasticity).

Stability Test

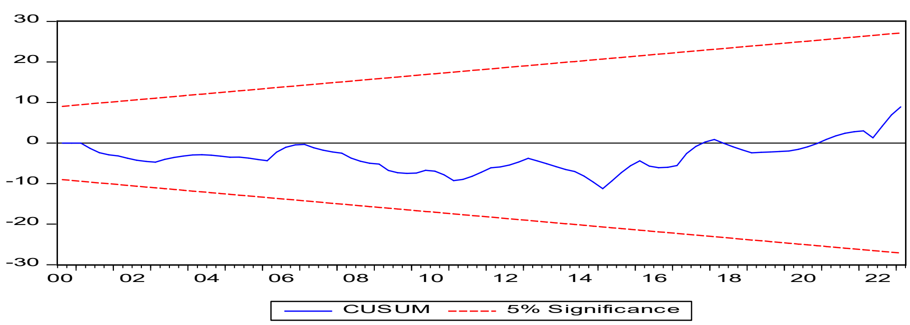

Figure 4.

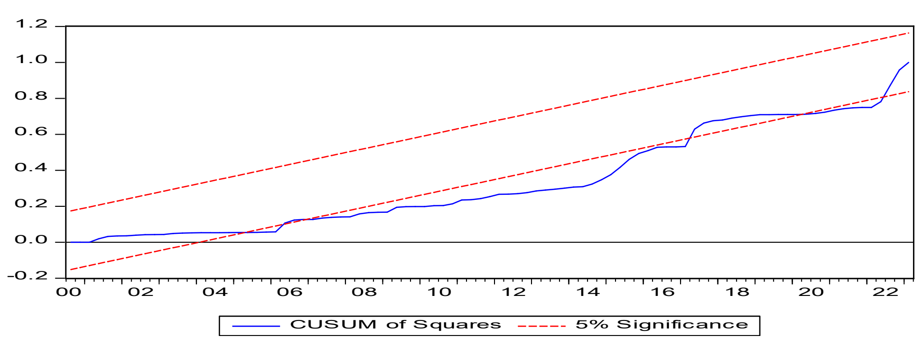

Figure 5.

The CUSUM test graph demonstrates that the model is still stable, with lines remaining within the (5%) critical boundaries represented by the blue lines. The CUSUMQ graph, on the other hand, shows that the model is unstable throughout the observation period, with the red line occasionally exceeding the critical upper and lower limits by 5%. This volatility could be linked to periods of global economic crisis, as well as political instability and economic difficulties in the country, such as oil theft, which could influence future exchange rate predictions.

CONCLUSION AND RECOMMENDATION

This study used quarterly data from 1992Q1 to 2024Q4 to investigate the asymmetric effects of exchange rate fluctuations on inflation in Nigeria, employing the Nonlinear Autoregressive Distributed Lag (NARDL) approach. The findings show that, while exchange rate movements, whether in the form of appreciation or depreciation, have a positive relationship with inflation, their effects are weak and statistically insignificant in both the short and long term. Oil prices and interest rates, on the other hand, exert significant short-run inflationary pressures, whereas money supply and GDP help to moderate inflationary trends across both time horizons. The findings suggest that structural and macroeconomic factors, rather than direct exchange rate pass-through, drive inflation in Nigeria. Importantly, the analysis suggests that recent reforms, such as the elimination of oil subsidies in 2023/2024 and the transition to a more flexible exchange rate regime, will amplify the role of oil price shocks and liquidity management in shaping inflation outcomes. This emphasises the importance of a comprehensive policy mix that goes beyond exchange rate stabilisation to address supply-side and fiscal vulnerabilities.

The empirical findings lead to the following recommendations:

1. Improve Oil Revenue Management: Given the high inflationary impact of oil price shocks, the government should establish stabilization funds or expand the sovereign wealth fund to protect the economy from international oil market volatility, particularly in the post-subsidy era.
2. Improve Monetary Policy Effectiveness: Because the money supply has a long-run dampening effect on inflation, the Central Bank of Nigeria (CBN) should maintain credible liquidity management frameworks and consider implementing inflation-targeting strategies with robust communication to anchor expectations.
3. Foster Productive Capacity Expansion: The negative relationship between GDP and inflation emphasizes the importance of increasing domestic output. To reduce supply-side inflation, policies should prioritize infrastructure investment, SMEs' access to credit, and agricultural value chain development.
4. Prudent Interest Rate Management: While interest rates help to control inflation in the long run, their short-run positive effect warrants caution. The CBN should strike a balance between inflation control and avoiding excessive borrowing costs, which could worsen cost-push inflation.
5. Exchange Rate Policy Alignment: While exchange rate fluctuations have little direct impact on inflation, exchange rate stability is still important for investor confidence. Policies should strive for a managed flexibility framework that avoids sharp volatility while preserving external competitiveness.

6. Integrated Fiscal and Monetary Policy Coordination: In Nigeria, inflationary pressures are influenced by both demand and supply factors. Closer coordination between fiscal spending, subsidy reforms, and monetary policy is required to avoid counterproductive measures that undermine stabilisation efforts.

The study admits two limitations. First, the presence of serial correlation and heteroskedasticity necessitated the use of robust corrections, which may have reduced estimation efficiency. Second, structural shocks like the global financial crisis and the COVID-19 pandemic were not explicitly modelled, despite the fact that they may have influenced inflation dynamics. Future research could use structural break tests, regime-switching, or GARCH models to better capture these episodes.

REFERENCES

Abbas S, Chien V, Yanfu Z &Tinh H. (2020). The Impact of China Exchange Rate Policy on its Trading Partners. Journal of Asian Finance, Economics and Business 7(8),131–141

Abdullahi, U & Umar, A. (2022). Effect of exchange rate on food inflation in Nigeria. A nonlinear ARDL approach. Gusau international journal of management and social science, federal university Gusau 5(1),195-209

Adedokun S, Ogbaekirigwe, O & Tiamiyu K. (2022). Exchange rate pass through to inflation: symmetric and asymmetric effect on monetory environment in Nigeria. Acta universities dambius, 18(2), 24-41

Adegbemi O., Bashir O.,& Ganiyu, O. (2019). Exchange Rate, Trade Balance and Growth in Nigeria: An Asymmetric Cointegration Analysis. The Journal of Developing Areas, 53 (4),115-127

Adeyemi J. (2020). Exchange rate dynamic and sectoral output in Nigeria, symmetric and asymmetric effect. American journal of social science and humanities, 5(1), 178-193

Ahmed M. (2019). Determinant of exchange rate fluctuation in Nigeria. Nigerian journal of management science, 7(1), 2-71

Ani E, Ojiya E.,& Abdulwahab S. (2019). Relationship between Exchange Rate and the Nigerian Economy. Journal of Business School, 2(3), 83-101

Central Bank of Nigeria (CBN) (2021). Understanding monetary policy series, No 8: http://www. cbn.gov.ng.

Central Bank of Nigeria (CBN). (2018). Available from: http://www. cbn.gov.ng.

Elahi. N.,& Musoomzadeh E. (2016). Asymmetric effect of monetary shock on exchange rate for targeting inflation in developing countries. Procedia economic and finance, 36(1), 165-176

Elias S. (2021). Asymmetric impact of real exchange rate in Ethiopia. Cogent economic and financial review. 1(9), 1-21

Erem I.,& Ceylan F. (2023). Symmetric and asymmetric effect of exchange rate on stock prices in frangile five economies: Analysis of global crisis and pandemic period. Journal of economic integration, 38 (4), 646-669

Ewubere. A., & Alberta, U. (2022). Exchange rate fluctuations and economic growth in Nigeria. International journal of development and economic sustainability, 10 (1), 141-55

Fracious D., Nawadali D.,& Jean A. (2019). Asymmetry in exchange rate pass through to consumer prices in sub-Saharan African Countries. Economies 2019, 7, 5; doi: 10.3390/economies7010005

Ibrahim D.,& Hassan S. (2019). Assessing the asymmetry of exchange rate pass through to inflation in West African common wealth countries. Academic journal of economic studies, 6(1), 93-109

Ihenachor, K.,& Elvis A. (2021). The consequences of exchange rate fluctuation on Nigerian economic performance. International journal of management economic and social science 10(2-3), 68-87

Ilyas. M., Layin, S.,& Danladi M. (2021). Shock effect of Inflation, Money supply, and Exchange rate in West African Monetary Zone. Journal of international trade and economic development, 3-22

Jakpa T., Eze C., & Egbon P. (2024). The effect of exchange rate pass through to inflation in Nigeria. World journal of advance research review 22(2),1526-1534

Kehinde A. (2022). Exchange rate passes through to inflation: Symmetric and Asymmetric effect on monetary environment. MPRA. 113223 14/ June 2022

Laurent K., Mustapha, M.,& Quayyum S. (2024). Effect of exchange rate movement in sub-Saharan Africa. IMF working papers, 24(59),2-28

Maana, I., Mwita, P. N., & Odhiambo. (2010). Modelling the volatility of exchange rates in the Kenyan market. Mediterranean Journal of Social Sciences, 3(3), 145-153.

Moses T. (2021). Exchange Rate Determination in Nigeria: Testing the Monetary Theory In The Presence of Asymmetries. West African Journal of Monetary and Economic Integration. 21(2), 66-85

Muhammad, U.,& Mahmud S. (2021). Asymmetric impact of exchange rate and inflation on financial development in Nigeria. Iranian economic review. 26 (40) 8-34

Mustapha A. (2022). Impact of exchange rate on inflation in Nigeria, symmetric and asymmetric analysis. Abuja journal of economic and allied field.11(5),2-22

Nuhu, M. (2021). Impact of exchange rate volatility on inflation in Nigeria. Journal of contemporary research in Business, Economics and Finance. 3(1),26-38

Obinna, C.,&Maduka, C. (2023). Real Exchange Rate Dynamic and Inflation Targeting Monetary Policy in Nigeria. International Journal of Scientific Research in Social Sciences & Management Studies. 7(1),579–928

Ojoade, T.,& Philip, O. (2014). Exchange rate fluctuation on macroeconomic performance in sub-Saharan Africa. Asian economic and financial review 4(11),15-73

Olufemi S. A. (2019). The nexus between exchange rate fluctuations and macroeconomics variables in Nigeria. Journal perspektif pembiayaan dan pembangunan daerah. 6(4), 489-502

Rasaki G.,& Oyedepo O. (2023). Asymmetric effect of exchange rate volatility on trade flows in Nigeria. Journal of enterprise and development. 5(3), 685-825

Roberta, C., & Ieva, R. (2020). Non-linear exchange rate pass-through to Euro Area inflation: A local projection approach. European Central Bank Working Paper Series No 23622

Simon, N. (2023). Effect of exchange rate fluctuation on economic growth in Nigeria. Gouni journal of faculty of management and social science, 11(1).65-75

Sule H., Hakimi, L.,& Rizky, B. (2023). Effect of exchange rate on export in Nigeria. The Es Economics and Entrepreneurship 2(2),117-136

Ubadaki I., Kalu, U., Maduka O & Chukwudi N. (2023). Real exchange rate dynamics and inflation targeting monetary policy in Nigeria. International Journal of Scientific Research in Social Sciences & Management Studies 7(1), 331-352

Umar N., Sambo I.,& Tijjani M. (2021). Asymmetric effect of exchange rate volatility on trade balance in Nigeria. National accounting review, 3(3), 3-43

Valentic, C., Eze, A.,& Nonye, S. (2022). Asymmetric impact of exchange rate on inflation in Nigeria. Journal of Xian Shiyon University, natural science edition 18(6), 761-772

Victor A.,& Friday N. (2017). Asymmetric Analysis of Exchange Rates Volatility: Evidence from Emerging Economy. Journal of Business and Management (IOSR-JBM), 19 (1) 82-90.