NAIRA REDESIGN AND FOREIGN EXCHANGE RATE IN NIGERIA

BAKER, ESTHER OYEINTARI, PhD
Department of Economics and Development Studies, Faculty of Social Sciences
Federal University Otuoke, Bayelsa State, Nigeria
bakereo@fuo.edu.ng
https://orcid.org/0009-0000-8194-7345

ABSTRACT

This study examined the relationship between Naira redesign and exchange rate in Nigeria, with money supply, inflation rate and interest rate included as explanatory variables. The study employed annual time-series data covering the period 1981–2024. The Autoregressive Distributed Lag (ARDL) model was adopted to examine the short-run and long-run relationships among the variables. The long-run estimates showed that Naira redesign had a positive but statistically insignificant effect on the exchange rate. Money supply had a positive and statistically significant effect on the exchange rate, while interest rate also had a positive and statistically significant effect. Inflation rate had a negative but statistically insignificant effect in the long run. The study concludes that Naira redesign, when considered in isolation, did not have a statistically significant long-run effect on the exchange rate in Nigeria, while monetary factors, particularly money supply and interest rate, played more significant roles in determining exchange-rate movements. The study recommends that currency redesign policies should be implemented alongside effective monetary and foreign-exchange management measures. It also recommends prudent management of money supply and a stable interest-rate framework to support exchange-rate stability in Nigeria and strengthen policy coordination between monetary authorities and market institutions to promote stability.

Keywords: Naira Redesign, Exchange Rate, Money Supply, Inflation Rate, Interest Rate, ARDL, Error Correction Mechanism.

Introduction

The foreign exchange rate is an important macroeconomic indicator because it determines the value of the domestic currency relative to foreign currencies and influences international trade, investment, external debt servicing and other cross-border transactions. Exchange-rate movements also affect the competitiveness of domestic firms, import costs, inflation and the country's balance of payments. Recent evidence by Oyewole, Ibidun and Al-Faryan (2024) shows that trade shocks have significant implications for Nigeria's real effective exchange rate, with both short-run and long-run asymmetries in the response of the exchange rate to external-sector developments.

Key currency reform period in Nigeria includes the 1984 currency colour change under CBN Governor Abdulkadir Ahmed, the 2007 currency redesign/reissue under CBN Governor Chukwuma Soludo, the 2009 polymer redesign under CBN Governor Sanusi Lamido Sanusi, and the 2022 redesign under CBN Governor Godwin Emefiele. The CBN confirms that the 1984 exercise changed the colours of the banknotes to address currency trafficking, while the 2007 exercise introduced redesigned notes and coins as part of currency reforms (Central Bank of Nigeria, 2007) The 2022 exercise involved the ₦200, ₦500 and ₦1,000 denominations and was

announced in October 2022, launched in November, and introduced into circulation in December 2022.

Naira redesign in Nigeria has occurred at different periods as part of efforts to improve currency management, strengthen the security features of banknotes, control currency trafficking and enhance the effectiveness of monetary policy. One notable redesign exercise occurred in April 1984, when the colours of virtually all banknotes in circulation, except the 50 kobo note, were changed to address currency trafficking. Another major currency reform occurred in February 2007, when the ₦50, ₦20, ₦10 and ₦5 banknotes were redesigned, while the ₦1 and 50 kobo coins were also redesigned and a new ₦2 coin was introduced. This was followed by the conversion of the redesigned ₦50, ₦10 and ₦5 notes to polymer substrate in September 2009, following the earlier introduction of the polymer ₦20 note.

The most recent major naira redesign occurred in 2022 under the leadership of Central Bank of Nigeria Governor Godwin Emefiele. The policy was announced on October 26, 2022 and involved the redesign of the ₦200, ₦500 and ₦1,000 banknotes. The new notes were launched on November 23, 2022 and effectively came into circulation on December 15, 2022. The CBN stated that the policy was aimed at addressing currency hoarding, improving the availability of clean banknotes, reducing counterfeiting and strengthening monetary policy management.

The naira redesign was also associated with an attempt to improve the control of currency in circulation. Dada (2023) notes that a substantial proportion of currency in circulation was outside the vaults of deposit money banks before the redesign. The study argues that the policy was motivated partly by concerns about currency hoarding, illicit financial activities and the management of cash within the Nigerian economy. However, Dada (2023) also found that the implementation of the policy created significant reductions in cash availability and negatively affected the performance of businesses and industrial activities. These changes in currency availability and domestic liquidity are relevant to exchange-rate behaviour because monetary conditions can influence the demand for foreign currency.

The implementation of the naira redesign generated considerable disruption in economic activities because of the scarcity of the redesigned notes and the difficulty experienced by many economic agents in accessing cash. Folorunso and Adebayo (2023) found that the policy had potential benefits but was hurriedly implemented, resulting in considerable hardship and disruptions to economic activities. Similarly, Osita, Ozike, Okafor and Nebolisa (2023) found that the naira redesign adversely affected small and medium-scale enterprises through cash shortages, increased transaction costs and difficulties in conducting everyday business activities. Such disruptions could have implications for exchange-rate behaviour through their effects on liquidity, economic transactions and demand for foreign currency.

The relationship between naira redesign and the foreign exchange rate is important because changes in the availability of domestic currency can influence the demand for foreign currency and consequently affect the value of the naira. During periods of monetary uncertainty, economic agents may seek foreign currencies as alternative stores of value. Therefore, a policy that substantially alters cash availability and domestic liquidity could potentially influence exchange-rate movements. This argument is particularly relevant to Nigeria because the naira has historically experienced significant pressure against major international currencies. Duke et al. (2024) demonstrate that the allocation of foreign exchange

and other macroeconomic fundamentals have significant implications for exchange-rate dynamics in Nigeria.

Nigeria has continued to experience significant challenges in maintaining a stable exchange rate. Persistent depreciation of the naira, exchange-rate volatility, differences between official and parallel-market rates, speculative demand for foreign currency and pressure on foreign exchange supply have remained major concerns. Recent empirical evidence confirms that Nigeria's exchange-rate behaviour is influenced by several macroeconomic and structural factors. Duke et al. (2024), for example, found that foreign exchange allocation, oil prices and net trade balance have significant implications for exchange-rate dynamics. This suggests that movements in the value of the naira are associated with both external-sector conditions and domestic monetary and institutional factors.

Exchange-rate volatility further compounds the problem. Frequent changes in the value of the naira create uncertainty for businesses, investors, importers and other economic agents whose activities depend on foreign currencies. Oyadeyi (2024) provides recent evidence that Nigeria's exchange-rate series exhibits significant volatility effects, while Adams and Uchema (2024) similarly identify exchange-rate volatility as a major feature of Nigeria's foreign exchange environment. These findings demonstrate that exchange-rate instability remains an important macroeconomic problem requiring continuous policy attention.

The problem is further associated with the structural characteristics of the Nigerian economy. Heavy reliance on crude oil exports makes foreign exchange earnings vulnerable to changes in international oil prices and oil production. In addition, restricted access to foreign exchange and concentration in foreign exchange allocation can create distortions that affect the value of the naira. Duke et al. (2024) found that concentration in foreign exchange allocation could contribute to exchange-rate depreciation in the long run, while improvements in oil prices and net trade balance could reduce pressure on the foreign exchange market.

Within this challenging monetary and exchange-rate environment, Nigeria has implemented different currency redesign and currency-management exercises. These include the 2007 currency redesign, the 2009 conversion of selected denominations to polymer notes and the major naira redesign introduced in 2022. The 2022 policy involved the redesign of the ₦200, ₦500 and ₦1,000 banknotes and was intended to reduce currency hoarding, improve currency management, encourage the return of cash to the banking system and strengthen the effectiveness of monetary policy. However, the implementation of the policy generated considerable disruption in economic activities. Abubakar and Yandaki (2023) found that the currency redesign created an artificial cash shortage and adversely affected economic activities, while Osita et al. (2023) reported negative effects on the operations of small and medium-scale enterprises.

It is against this background that this study examines the relationship between naira redesign and foreign exchange rate in Nigeria using annual time-series data covering 1990 to 2024.

Objectives of the Study

The broad objective of this study is to examine the relationship between naira redesign and foreign exchange rate in Nigeria. The specific objectives are to:

1. Examine the relationship between naira redesign and nominal exchange rate in Nigeria;
2. Determine the relationship between money supply and nominal exchange rate in Nigeria;

3. Evaluate the relationship between inflation rate and nominal exchange rate in Nigeria; and
4. Examine the relationship between interest rate and nominal exchange rate in Nigeria.

Literature Review

Conceptual Literature Review

Naira Redesign

Naira redesign refers to the process of changing the physical features, security characteristics and appearance of a country's currency while retaining its monetary function as legal tender. Currency redesign is generally undertaken to improve the security of banknotes, discourage counterfeiting, enhance currency management and respond to changes in the financial system. In Nigeria, the redesign of selected naira denominations became an important monetary policy issue following the decision to redesign the ₦200, ₦500 and ₦1,000 notes and introduce the redesigned notes into circulation. Otitoju et al. (2023) explain that the Nigerian naira redesign was closely connected with the country's cashless policy and the objective of reducing excessive dependence on physical cash.

The implementation of the redesign, however, generated substantial disruption because of shortages of the redesigned notes and difficulties experienced by households and businesses in accessing cash. Hassan, Bala and Marafa (2024), using survey evidence from Sokoto Metropolis, found that currency redesign had a significant negative effect on household standard of living, although the cashless policy itself had a positive effect. This indicates that the economic consequences of the redesign depended not only on the objectives of the policy but also on the manner and speed of implementation.

Foreign Exchange Rate

Foreign exchange rate refers to the price of one country's currency expressed in terms of another country's currency. In Nigeria, the exchange rate is commonly expressed as the amount of naira required to obtain one unit of a foreign currency, particularly the United States dollar. Thus, an increase in the naira-per-dollar exchange rate represents a depreciation of the naira, while a reduction represents an appreciation, assuming the quotation is maintained in the same direction.

Exchange rates perform an important economic function because they establish the relative price between domestic and foreign goods, services and financial assets. Changes in the exchange rate can affect import prices, export competitiveness, international investment and domestic inflation. Oyewole, Ibidun and Al-Faryan (2024), examining trade shocks and real effective exchange-rate dynamics in Nigeria, demonstrate that external-sector developments can generate important short-run and long-run movements in Nigeria's exchange rate. This highlights the sensitivity of exchange-rate behaviour to developments in international trade and the external sector.

Naira Redesign and Foreign Exchange Rate in Nigeria

The relationship between naira redesign and foreign exchange rate can be explained through the monetary and liquidity channels. A currency redesign changes the physical currency available to economic agents and may influence the amount of cash circulating within the formal and informal sectors. If the policy results in a substantial reduction in cash holdings, it may influence domestic liquidity and the demand for alternative financial assets, including

foreign currency. This potential relationship makes naira redesign relevant to exchange-rate analysis.

The major episodes relevant to your study include the 1984 currency colour change under CBN Governor Abdulkadir Ahmed, the 2007 currency redesign/reissue under CBN Governor Chukwuma Soludo, the 2009 polymer redesign under CBN Governor Sanusi Lamido Sanusi, and the 2022 redesign under CBN Governor Godwin Emefiele. The CBN confirms that the 1984 exercise changed the colours of the banknotes to address currency trafficking, while the 2007 exercise introduced redesigned notes and coins as part of currency reforms (Central Bank of Nigeria, 2007) The 2022 exercise involved the ₦200, ₦500 and ₦1,000 denominations and was announced in October 2022, launched in November, and introduced into circulation in December 2022.

Empirical evidence on Nigeria supports the importance of monetary conditions to exchange-rate behaviour. Iliyasu, Ibrahim and Musa (2024), using annual data from 1987 to 2023, found evidence of conditional exchange-rate volatility and a long-run relationship among monetary-policy variables and exchange-rate volatility. Their findings indicate that changes in money supply and previous exchange-rate fluctuations are important in explaining exchange-rate volatility. The naira redesign may therefore have implications for the foreign exchange rate through its effect on currency circulation, liquidity and economic expectations. However, it is important to distinguish the effect of the redesign from the effects of other monetary and macroeconomic factors. This is why the present study includes money supply, inflation rate and interest rate alongside naira redesign in explaining exchange-rate behaviour.

Theoretical Literature Review

Quantity Theory of Money

The Quantity Theory of Money is one of the foundational monetary theories used to explain the relationship between money supply, prices and economic activity. The classical formulation is associated particularly with Irving Fisher, who presented the formal quantity equation in 1911. Fisher's equation is expressed as:

$$MV = PY$$

Where:

M = money supply

V = velocity of money

P = general price level

Y = real output

The theory argues that, assuming velocity and real output are relatively stable in the long run, an increase in money supply will eventually result in an increase in the general price level. Thus, excessive growth in the quantity of money relative to output can create inflationary pressure.

The relevance of the Quantity Theory of Money to the present study arises from the effect of the naira redesign on currency circulation. The redesign was partly intended to reduce the quantity of physical cash circulating outside the banking system and encourage funds to return to the formal banking system. From the quantity-theory perspective, changes in the amount of money available in the economy can influence prices and broader monetary conditions.

The theory is also relevant to exchange-rate behaviour because domestic monetary conditions can influence the value of a currency relative to foreign currencies. If the supply of domestic money increases faster than the demand for money or real output, it can generate inflationary pressure and weaken the purchasing power of the domestic currency. In an open economy, persistent monetary expansion and inflation may place downward pressure on the exchange rate.

Monetary Approach to Exchange Rate Determination

The Monetary Approach to Exchange Rate Determination developed from the monetary approach to the balance of payments and was strongly associated with scholars such as Harry G. Johnson and Jacob A. Frenkel during the 1970s. The approach explains exchange-rate movements primarily through differences in money supply, money demand, income and interest rates between countries.

The central proposition of the monetary approach is that the exchange rate is determined by the relative supply and demand for money in two countries. Where domestic money supply increases relative to foreign money supply, holding other factors constant, the domestic currency is expected to depreciate. Similarly, an increase in domestic money demand can strengthen the domestic currency because economic agents require more domestic money relative to foreign currency.

The Monetary Approach to Exchange Rate Determination is therefore considered highly relevant to this study because it directly explains how monetary variables can influence the exchange rate. It also provides a theoretical basis for including money supply, inflation and interest rate as explanatory variables in the model.

Empirical Literature Review

Otitoju, Dirisu, Ojokojo and Abdul (2023) examined the cashless policy and naira redesign in Nigeria, with emphasis on the rationale, benefits and implementation challenges of the policies. The study adopted a review-based research design rather than a conventional econometric design. Data were obtained from secondary sources, including existing research studies, government publications, policy statements and other documentary materials. The study found that the policies had potential benefits, including improved currency management, greater financial inclusion and increased use of electronic payment systems. However, the authors also found that the implementation period was too short and generated considerable hardship for economic agents. The study concluded that successful implementation of currency and cashless policies requires adequate preparation, stakeholder engagement and effective communication.

Folorunso and Adebayo (2023) explored the effect of cashless and naira redesign policies on economic development in Abuja. The study employed a survey research design and collected primary data from respondents within the Federal Capital Territory. The researchers used statistical analysis to evaluate the perceptions and experiences of economic agents concerning the two policies. The findings showed that the policies had potential benefits but that their implementation generated considerable hardship, particularly because of inadequate cash availability. The study concluded that better coordination, adequate preparation and effective stakeholder engagement are required in implementing major monetary policies.

Maijama'a, Yakubu and Musa (2023) examined the implications of currency redesign and the cashless policy in Nigeria during a period that also coincided with fuel scarcity. The study adopted an evidence-based descriptive approach and relied on secondary information concerning currency availability, cashless transactions and economic activities. The study found that the simultaneous occurrence of currency redesign, cash scarcity and fuel scarcity placed considerable pressure on households and businesses. The authors observed that although cashless transactions could improve the efficiency of financial transactions, the shortage of physical currency disrupted economic activities, particularly among agents who depended heavily on cash. The study concluded that currency reforms should be accompanied by adequate payment infrastructure and sufficient preparation. The relevance to the present study lies in the monetary and liquidity effects of the redesign, which could potentially affect demand for foreign currency.

Okechukwu, Ifionu and Omojefe (2024) conducted a study on the Nigerian experience with naira redesign and cashless policy. The study employed secondary quarterly time-series data covering 1992–2021. Data were obtained from relevant Nigerian economic and financial sources. The study used unit-root tests, Johansen cointegration analysis, an error-correction model and Granger causality tests. The findings showed that point-of-sale and USSD transactions contributed positively and significantly to economic growth, while website/internet transactions and mobile payments had negative effects. The authors concluded that the cashless policy and currency redesign had both opportunities and challenges and recommended improvements in digital infrastructure and financial regulation.

Hassan, Bala and Marafa (2024) investigates the impact of currency redesign and cashless policy on household standard of living in Sokoto Metropolis. The study adopted a survey research design and collected primary data from 365 respondents. Ordinary Least Squares regression was employed to analyse the data. The findings revealed that currency redesign had a significant negative effect on household standard of living, while cashless policy had a positive and significant effect. The study concluded that although digital financial transactions may improve economic welfare, the implementation of currency redesign can impose significant short-run costs on households.

Ani, Ajayi-Ojo and Batisai (2024) examined the consequences of financial scarcity associated with the Nigerian currency redesign policy. The study employed primary survey data and investigated the relationship between financial scarcity, psychological well-being and perceptions of the currency redesign. The researchers used quantitative statistical techniques to analyse the responses. The findings indicated that the scarcity of cash associated with the redesign generated substantial difficulties and affected people's perceptions and welfare. The study concluded that currency-management policies need to consider the social and financial consequences of implementation, particularly for vulnerable populations.

Okoye, Nwokoye and Uzonwanne (2024) explored the impact of money supply on exchange-rate volatility in Nigeria. The study used annual time-series data covering 1981–2022 and adopted an Autoregressive Distributed Lag (ARDL) model. The study established a long-run relationship among the variables. The findings showed that money supply and output growth had positive effects on exchange-rate volatility in the long run, while interest rate, inflation and trade openness had negative effects. In the short run, money supply was statistically significant. The study concluded that excessive growth in money supply can increase exchange-rate

volatility and recommended appropriate monetary-policy measures to control excessive liquidity.

Odoh, Nnamdi and Onah (2024) examined the role of the Central Bank of Nigeria in exchange-rate stabilization. The study adopted a quantitative time-series research design using quarterly Nigerian data. GARCH-family models were employed to examine the effects of anchor interest rate, official exchange rate and money supply on exchange-rate volatility. The findings showed that interest rate, official exchange rate and money supply were important determinants of exchange-rate stability. The study further found that exchange-rate instability persisted despite monetary-authority interventions. The authors concluded that monetary-policy instruments remain important for managing exchange-rate volatility in Nigeria.

Musa, Izuchukwu and Akadiri (2024) accessed the determinants of exchange rate in Nigeria, with particular emphasis on oil prices, oil exports and economic diversification. The study employed monthly time-series data covering January 2008 to December 2020, obtained from the Central Bank of Nigeria and Nigerian National Petroleum Corporation. The researchers employed ARDL and nonlinear ARDL (NARDL) techniques to examine both symmetric and asymmetric relationships. The findings indicated that positive changes in oil prices were associated with appreciation of the domestic currency, while negative oil-price changes contributed to depreciation. The study also found that imports increased pressure on the exchange rate by increasing demand for foreign currency. The authors concluded that economic diversification and development of the non-oil export sector could reduce pressure on the naira. The study demonstrates that exchange-rate behaviour in Nigeria is affected by external-sector fundamentals but does not incorporate naira redesign as an explanatory variable.

Osadebay, Orubu and Awogbemi (2024) examined the macroeconomic determinants of exchange-rate dynamics in Nigeria over a 37-year period from 1986 to 2022. The study adopted a time-series obtained data from the Central Bank of Nigeria Statistical Bulletin and World Bank Development Indicators. A structural Vector Autoregressive (SVAR) model was employed, complemented by impulse-response and variance-decomposition analyses. The findings demonstrated that macroeconomic shocks produce significant responses in the exchange rate and that monetary and external-sector variables are important determinants of exchange-rate behaviour. The study concluded that exchange-rate stability requires appropriate coordination of monetary and macroeconomic policies.

Salihu, Akinromade, Abdullahi, Abdullahi, Muhammad and Jibo (2025) examined exchange-rate dynamics in Nigeria using the exchange-rate pass-through framework. The study employed annual data covering 1986–2023 obtained from the Central Bank of Nigeria and National Bureau of Statistics. The researchers used the Autoregressive Distributed Lag (ARDL) technique to investigate both short-run and long-run effects of money supply, monetary policy rate, inflation, government expenditure and real GDP on the exchange rate. The findings indicate that Nigeria's exchange-rate behaviour responds to changes in monetary and fiscal conditions, demonstrating the importance of macroeconomic fundamentals in exchange-rate determination. The study concluded that appropriate monetary and fiscal policy coordination is necessary to improve exchange-rate stability. The study is useful to the present research because its variables include money supply, inflation and interest rate, but it does not include naira redesign as a policy variable.

Ahmodu, Aribaba, Obeka, Adeyemi, Kolawole and Akinjobi (2025) investigated the relationship between currency-redesign attributes and economic performance in Nigeria over the period 1960–2023. The study adopted an ex-post-facto research design and examined ten currency-redesign periods using secondary data. The findings showed that the currency-redesign-related variables had negative relationships with real GDP, although the relationships were not statistically significant. However, when real exchange rate was considered, deposit growth rate had a statistically significant negative effect, suggesting that changes in deposit growth during currency-redesign periods were associated with exchange-rate stability. The study concluded that currency redesign can have monetary and exchange-rate implications, although the effects depend on the specific currency-redesign attributes considered. This study is especially important to the present research because it provides direct evidence connecting currency redesign with exchange-rate performance. However, it differs from the present study in its measurement of currency redesign, broader historical sampling of redesign episodes and methodology.

Methodology

The study adopted ex post facto research design for the study. The study further employs secondary annual time-series data covering the period from 1981 to 2024. The use of secondary data is appropriate because the variables investigated in the study are macroeconomic indicators that are systematically recorded and published by recognised national and international institutions.

The principal sources of data are the Central Bank of Nigeria (CBN) Statistical Bulletin and the World Bank's World Development Indicators. The exchange rate, money supply and interest-rate data can be obtained from the CBN Statistical Bulletin, while inflation data can be obtained from either the CBN or World Bank, subject to consistency in definition and measurement across the study period.

The choice of 1981–2024 gives a relatively long time-series period for examining exchange-rate behaviour and monetary conditions in Nigeria. It captures different phases of Nigeria's foreign exchange and monetary-policy environment, including periods of exchange-rate reforms, monetary adjustments and the introduction of the naira redesign.

Model Specification

The model for this study is formulated to examine the effect of naira redesign on the Nigerian foreign exchange market, using exchange rate as the dependent variable.

The functional relationship is specified as:

$$EXR_t = f(NRD_t, MS_t, INFR_t, INTR_t)$$

The econometric model is expressed as:

$$EXR_t = \beta_0 + \beta_1 NRD_t + \beta_2 MS_t + \beta_3 INFR_t + \beta_4 INTR_t + \mu_t$$

Where:

EXR_t = exchange rate in period t;

NRD_t = naira redesign variable in period t;

MS_t = money supply in period t;

INF_t = inflation rate in period t;

$INTR_t$ = interest rate in period t;

β_o = intercept;

β_1–β_4 = coefficients of the explanatory variables; and
μ_t = stochastic error term.

Measurement of Variables

Variable	Symbol	Measurement
Exchange Rate	EXR	Naira value per US dollar
Naira Redesign	NRD	Dummy variable capturing the introduction of the naira redesign policy in different years
Money Supply	MS	Broad money supply (M2)
Inflation Rate	INF	Annual percentage change in consumer prices
Interest Rate	INTR	Applicable annual interest-rate measure

For the naira redesign variable, a dummy specification is appropriate because the policy represents a discrete policy intervention rather than a continuously measured macroeconomic variable. Thus, the variable can take a value of 0 for the pre-redesign period and 1 for the redesign/post-redesign period, according to the precise policy-break definition adopted in the empirical estimation.

Results and Discussions

Multicollinearity Test

Testing for multicollinearity is important because a high correlation among independent variables may make it difficult to isolate their individual effects on the dependent variable and may produce unstable regression estimates. The results are given below in table 1

Table 1: Correlation matrix for multicollinearity

Variables	NRD	MS	INFR	INTR
NRD	1.000000			
MS	0.041626	1.000000		
INFR	-0.207865	-0.168946	1.000000	
INTR	-0.278586	0.215220	0.255887	1.000000

Source: Author's computation using EViews 12.

The results in the correlation matrix show that the relationships among the explanatory variables are generally weak. The results revealed that none of the correlation coefficients between the explanatory variables is sufficiently high to suggest serious multicollinearity. Therefore, the results indicate that NRD, MS, INFR, and INTR can be included simultaneously in the regression model without substantial concern that multicollinearity will adversely affect the estimation of their individual effects on the foreign exchange rate in Nigeria.

Test of Stationarity

The test of stationarity was conducted using the Augmented Dickey-Fuller (ADF) unit root test. The decision is based on the 5% significance level. Where the probability value is less than 0.05, the null hypothesis of a unit root is rejected, indicating stationarity.

Table 2: Augmented Dickey-Fuller (ADF) Unit Root Test

Variable	ADF @ Level	p-value	ADF @ 1st Diff	p-value	I (I)
LOG(EXR)	-1.820178	0.6775	-4.986911	0.0012	I (1)
LOG(MS)	0.551425	0.9991	-4.112452	0.0123	I (1)
INFR	-4.265494	0.0081	—	—	I (0)
INTR	-2.349859	0.3994	-7.731811	0.0000	I (1)

Source: Author's computation using EViews 12.

The results of the ADF unit root test show that the variables exhibit different orders of integration. The stationarity test establishes that INFR is I (0), while EXR, MS, and INTR are I (1). Thus, the variables are a mixture of I (0) and I (1), with none integrated of order two, I (2). This result is suitable for an ARDL/error-correction framework, subsequently followed by the bounds/cointegration test confirms a long-run relationship among the variables.

ARDL-Bound Test for Long-Run Relationship

The ARDL Bounds test was conducted to determine whether a long-run relationship exists among exchange rate (EXR), Naira redesign (NRD), money supply (MS), inflation rate (INFR), and interest rate (INTR). The result is presented in table 3

Table 3: ARDL Bound test for long run

Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	7.819396	10%	2.20	3.09
		5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Author's computation using EViews 12.

The calculated F-statistic of 7.819396 is higher than the upper-bound critical value of 3.49 at the 5% significance level. Therefore, the null hypothesis of no levels relationship is rejected at the 5% significance level. This indicates that a long-run relationship exists among exchange rate, Naira redesign, money supply, inflation rate and interest rate in Nigeria over the period of the study.

ARDL-Long Run Regression

Table 4: ARDL-Long run relationship between dependent and explanatory variables

Variable	Coefficient	Std. Error	t-Statistic	Probability
NRD	0.079472	0.099450	0.799107	0.4312
LOG(MS)	0.499401	0.089350	5.589278	0.0000
INFR	-0.012031	0.017533	-0.686154	0.4985
INTR	0.199464	0.058616	3.402922	0.0021
C	-1.152828	1.039221	-1.109320	0.2771

Source: Author's computation using EViews 12.

The coefficient of NRD is 0.079472, indicating a positive long-run relationship between Naira redesign and the exchange rate. This implies that, holding other variables constant, an increase in the Naira redesign is expected to increase exchange rate by approximately 0.0795

units in the long run. However, the probability value of 0.4312 is greater than the 5% significance level. This implies that Naira redesign has no significant long-run effect on the exchange rate.

The coefficient of money supply is 0.499401, indicating a positive long-run relationship between money supply and the exchange rate. The results indicate that 1% increase in money supply is associated with approximately a 0.4994% increase in the exchange rate, holding other factors constant. The probability value of 0.0000 is less than 0.05. Therefore, the null hypothesis is rejected. Money supply has a positive and statistically significant long-run effect on the exchange rate.

The coefficient of inflation rate is -0.012031, indicating a negative long-run relationship between inflation and the exchange rate. This suggests that an increase in inflation is associated with a decrease in the exchange rate in the estimated long-run relationship. However, the probability value of 0.4985 is greater than 0.05. Inflation rate has a negative but statistically insignificant long-run relationship with the exchange rate.

The coefficient of interest rate is 0.199464, indicating a positive long-run relationship between interest rate and the exchange rate. This means that an increase in interest rate is associated with an increase in the exchange rate. The probability value of 0.0021 is less than 0.05. This implies that interest rate has a positive and statistically significant long-run effect on the exchange rate.

ECM-ARDL Short Run Regression

The ARDL error correction model (ECM) was estimated using the selected ARDL (1, 0, 1, 4, 2) model to examine the short-run dynamics among exchange rate, Naira redesign, money supply, inflation rate and interest rate.

Table 5: ECM-ARDL short run

Variable	Coefficient	Std. Error	t-Statistic	Prob	Decision at 5%
DLOG(MS)	-0.343391	0.158688	-2.163941	0.0395	Significant
D(INFR)	-0.000284	0.001888	-0.150624	0.8814	Not significant
D(INFR(-1))	-0.000317	0.001959	-0.161964	0.8725	Not significant
D(INFR(-2))	-0.005891	0.002004	-2.939128	0.0067	Significant
D(INFR(-3))	-0.010605	0.001958	-5.416406	0.0000	Significant
D(INTR)	0.024529	0.008267	2.967114	0.0062	Significant
D(INTR(-1))	-0.022350	0.010094	-2.214228	0.0354	Significant
CointEq(-1)*	-0.241802	0.032427	-7.456849	0.0000	Significant

Source: Author's computation using EViews 12.

The error correction term is -0.241802 and has a probability value of 0.0000. The coefficient is negative and statistically significant, which confirms the presence of an adjustment mechanism that moves the exchange rate back toward its long-run equilibrium following short-run disturbances. The coefficient of -0.241802 indicates that approximately 24.18% of the disequilibrium from the previous period is corrected in the current period. In other words, the model adjusts toward long-run equilibrium at a speed of approximately 24.18% per year.

The R-squared value is 0.725776. This means that approximately 72.58% of the variations in the short-run exchange rate are explained jointly by the variables included in the ECM model. The remaining 27.42% is attributable to other factors not captured by the model. Likewise, the adjusted R-squared is 0.665790, indicating that after adjusting for the number of explanatory variables in the model, approximately 66.58% of the variation in the dependent variable is explained by the model. The Durbin-Watson statistic is 2.393991. Since the value is relatively close to 2, the result does not indicate serious first-order serial correlation in the model. Thus, the residuals do not show evidence of problematic serial correlation based on the Durbin-Watson statistic.

Diagnostic Test

CUSUM Test for Stability

The CUSUM test was used to examine the stability of the estimated ARDL model for the study on Naira Redesign and Exchange Rate in Nigeria.

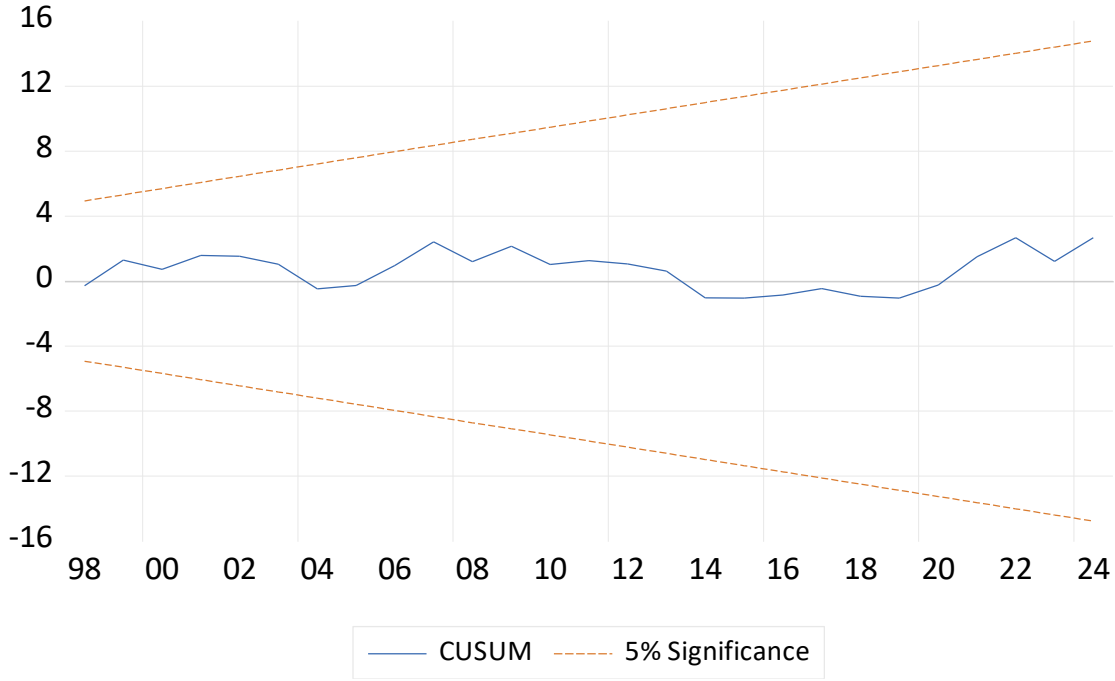


Figure 1: CUSUM test

From the graph, the CUSUM line (blue line) remains within the 5% significance boundaries (dashed lines) throughout the period 1998–2024. The CUSUM line does not cross either the upper or lower critical boundary at any point during the study period. This indicates that the estimated ARDL model is stable over the period of study and that there is no evidence of significant structural instability in the estimated parameters.

Conclusion and Recommendations

The study examined the effect of Naira redesign on the exchange rate in Nigeria. The ARDL bounds test established the existence of a long-run relationship among the variables. The long-run results showed that Naira redesign has a positive but statistically insignificant effect on the exchange rate. Money supply and interest rate have significant positive long-run effects, while inflation has a negative but insignificant effect. The study therefore concludes that Naira

redesign alone did not have a significant long-run effect on Nigeria's exchange rate, while money supply and interest rate were significant long-run determinants.

Based on the empirical results, the study recommends that:

i. The Central Bank of Nigeria should integrate Naira redesign policies with broader exchange-rate management measures, since Naira redesign alone was not significant in the long run.
ii. The Central Bank of Nigeria should strengthen control of money supply to reduce long-run exchange-rate pressures, given its significant positive effect.
iii. Monetary authorities should maintain a stable and predictable interest-rate policy because interest rate significantly affected the exchange rate in the long run.
iv. Future currency redesign programmes should be supported by effective monetary and foreign-exchange policies to enhance their effectiveness in promoting exchange-rate stability.

References

Abubakar, Y., & Yandaki, U. A. (2023). The 2022 Naira redesign programme in Nigeria: Implications on the local economy and financial history. *African Journal of Accounting and Financial Research, 6*(2), 22–32.

Adams, S. O., & Uchema, J. I. (2024). Nigeria exchange rate volatility: A comparative study of recurrent neural network LSTM and exponential generalized autoregressive conditional heteroskedasticity models. *Journal of Artificial Intelligence and Big Data, 4*(2), 61–73.

Ahmodu, A. L. O., Aribaba, F. O., Obeka, O. Q., Adeyemi, G., Kolawole, T. O., & Akinjobi, B. D. (2025). Currency redesign attributes and economic performance in Nigeria (1960–2023). *Public Administration & Regional Studies, 18*(1).

Ani, J. I., Ajayi-Ojo, V. O., & Batisai, K. (2024). Financial scarcity, psychological well-being and perceptions: An evaluation of the Nigerian currency redesign policy outcomes. *BMC Public Health, 24*, 1164.

Dada, A. D. (2023). Currency redesign policy implementation: Implications for industrial performance in Nigeria. *Asian Journal of Business and Management, 11*(3).

Duke, O. O., Adenuga, A. O., Olusegun, T. S., & Odu, A. T. (2024). Oligopoly and exchange rate dynamics in Nigeria. *Scientific African, 23*, e02080.

Folorunso, O. O., & Adebayo, O. M. (2023). The impact of cashless and naira redesign policies on economic development in Federal Capital Territory, Abuja. *Kashere Journal of Politics and International Relations, 1*(2).

Hassan, A., Bala, M., & Marafa, M. (2024). Impact of currency redesign and cashless policy on household standard of living in Sokoto Metropolis. *UMYU Journal of Accounting and Finance Research, 6*(1).

Maijama'a, R., Yakubu, M., & Musa, K. S. (2023). Currency redesign, cashless policy amidst fuel scarcity: Evidence from Nigeria. *Asian Journal of Sociological Research, 6*(1), 25–28.

Musa, N., Izuchukwu, O., & Akadiri, S. S. (2024). Assessment of exchange rate determination in a mono-resource economy: A case of Nigeria. *Journal of Economic Analysis, 3*(2), 59.

Odoh, T., Nnamdi, K. C., & Onah, A. (2024). The role of Central Bank of Nigeria in exchange rate stabilization. *Asian Journal of Probability and Statistics, 26*(11), 63–81.

Okechukwu, N., Ifionu, E. P., & Omojefe, G. O. (2024). Naira redesign and cashless policy: The Nigerian experience. *International Journal of Business Diplomacy and Economy, 3*(1), 180–203.

Okoye, C. G., Nwokoye, E. S., & Uzonwanne, M. C. (2024). Impact of money supply on exchange rate volatility in Nigeria. *The Nigerian Journal of Energy & Environmental Economics, 15*(1).

Osadebay, G. O., Orubu, C. O., & Awogbemi, T. O. (2024). Macroeconomic determinants of exchange rate dynamics in Nigeria. *Journal of Business Management and Economic Development, 3*(1).

Osita, F. C., Ozike, K. C., Okafor, N. D., & Nebolisa, C. C. (2023). Aftermath of the naira redesign on small and medium enterprises (SMEs) in Nigeria. *Journal of the Management Sciences, 60*(1), 235–244.

Otitoju, M. A., Dirisu, I. H., Ojokojo, P. P., & Abdul, F. (2023). Cashless policy and naira redesign of the Central Bank of Nigeria (CBN): A review. *Journal of Global Economics and Business, 4*(14), 45–59.

Oyadeyi, O. O. (2024). 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).

Oyewole, O. J., Ibidun, D. M., & Al-Faryan, M. A. S. (2024). Trade shocks and real effective exchange rates dynamics in Nigeria. *Portuguese Economic Journal, 23*(2), 335–354.

Salihu, A., Akinromade, O. W., Abdullahi, B., Abdullahi, M. M., Muhammad, H. H., & Jibo, S. A. (2025). Exchange rate pass-through and macroeconomic drivers in Nigeria: Evidence from ARDL analysis, 1986–2023. *ADSU International Journal of Applied Economics, Finance and Management*.