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Exchange Rate Volatility and Inflation Dynamics in Nigeria: A Structural VAR Approach

[1]Maryam Mohammed Ndume, [2]Professor Benedict N Akanegbu
Department of Economics, Nile University of Nigeria, Abuja
Department of Economics, Nile University of Nigeria, Abuja

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ABSTRACT

Exchange rate volatility poses significant challenges to macroeconomic stability in emerging economies, particularly those like Nigeria that rely heavily on imports and primary commodity exports. This study investigates the impact of exchange rate fluctuations on inflation in Nigeria using a Structural Vector Autoregression (SVAR) model, which allows for the identification of structural shocks and their dynamic interactions with macroeconomic variables. Utilizing monthly time-series data spanning 2000–2023, the analysis incorporates key indicators such as the nominal exchange rate, consumer price index, money supply, interest rates, and government expenditure. The impulse response analysis reveals that exchange rate shocks exert a strong and immediate inflationary impact, which persists in the medium term, underscoring a significant exchange rate pass-through effect. However, Granger causality tests show no predictive causality from exchange rate volatility to inflation, suggesting the presence of other dominant inflation drivers. Variance decomposition results further affirm that exchange rate volatility accounts for a considerable share of inflation variance, especially over the medium term. The findings highlight the critical role of credible exchange rate management, coherent monetary-fiscal policy coordination, and economic diversification in mitigating inflationary pressures. This study contributes to the literature by offering a more structurally grounded, data-driven analysis of Nigeria's inflation dynamics and provides actionable insights for inflation-targeting frameworks in similarly volatile economies.

Keywords: Exchange Rate Volatility, Inflation Dynamics, Structural Vector Autoregression (SVAR), Macroeconomic Policy, Pass-Through Effects

1. Introduction

Exchange rate volatility has remained a central concern in the macroeconomic management of emerging and developing economies, especially those that are heavily reliant on imports and primary commodity exports. Nigeria, Africa's largest economy by GDP, exhibits these characteristics and has experienced recurrent episodes of exchange rate instability, particularly in the aftermath of oil price shocks, external capital flow reversals, and policy shifts. The Nigerian naira has depreciated sharply over the last two decades, particularly following the oil price collapse in 2014 and the subsequent foreign exchange (FX) crises (CBN, 2020). These fluctuations have posed serious threats to inflation targeting, monetary stability, and the broader macroeconomic environment.

Inflation in Nigeria has remained structurally persistent, often influenced by supply side constraints, fiscal imbalances, and more significantly, exchange rate movements. The structural dependency on imported goods and inputs implies that depreciation in the naira leads to higher import costs, which are ultimately transferred to consumers through higher prices—a phenomenon commonly referred to as exchange rate pass-through (ERPT) (Aliyu, 2009). Additionally, speculative demand for foreign currency and the

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dollarization of certain segments of the Nigerian economy have intensified inflationary expectations during periods of exchange rate volatility (Akinlo & Lawal, 2015). These dynamics underline the importance of understanding the causal and transmission mechanisms linking exchange rate fluctuations to inflationary trends.

Despite the wealth of literature on this subject, previous empirical works in Nigeria have often employed traditional econometric techniques such as Ordinary Least Squares (OLS), Vector Autoregression (VAR), or Autoregressive Distributed Lag (ARDL) models. While useful, these approaches frequently fail to disentangle the structural shocks driving the observed economic relationships. This study addresses this gap by employing a Structural Vector Autoregression (SVAR) framework, which permits the imposition of theoretically grounded restrictions to identify structural innovations and analyze their dynamic effects on inflation. SVAR models are particularly well-suited for macroeconomic policy analysis, as they provide insights into both the short-run and long-run impacts of shocks (Blanchard & Quah, 1989).

The primary objective of this study is to investigate the impact of exchange rate volatility on inflation in Nigeria using the SVAR model. Specifically, it seeks to (i) determine the extent to which exchange rate shocks influence inflationary trends, (ii) assess the lag structure and persistence of these effects, and (iii) offer policy-relevant recommendations for inflation control in a highly volatile exchange rate regime. The novelty of the study lies in its methodological approach, which moves beyond correlation and simple causality to explore the underlying structural relationships. In doing so, it offers a more rigorous and realistic understanding of Nigeria's macroeconomic dynamics in the context of global and domestic volatility.

This study is motivated by the persistent challenges faced by the Central Bank of Nigeria (CBN) in achieving price stability in a policy environment characterized by conflicting goals of currency stability, external competitiveness, and inflation control. As emphasized in contemporary macroeconomic discourse, understanding the political economy and institutional dynamics behind FX management is essential (Carollo & Guerci, 2018). The significance of this research, therefore, lies not only in its academic contribution but also in its potential to support more coherent monetary and fiscal coordination efforts in Nigeria.

2. Literature review and development of hypotheses

The relationship between exchange rate volatility and inflation is a recurring issue in macroeconomic research, especially in emerging and developing economies where external shocks often destabilize price levels. Nigeria's macroeconomic framework—marked by commodity dependence, fiscal rigidities, and recurring foreign exchange (FX) crises—offers a fertile ground for evaluating this nexus. The use of Structural Vector Autoregression (SVAR) models has become a popular empirical strategy to disentangle the dynamic interrelationships among macroeconomic variables, including inflation and exchange rates. This section critically reviews the existing literature, with a focus on SVAR-based studies and related theoretical perspectives.

Theoretically, the Purchasing Power Parity (PPP) and Uncovered Interest Parity (UIP) conditions form the classical underpinnings of the exchange rate–inflation relationship. PPP posits that exchange rates adjust to equalize the price levels of two countries, implying that depreciation leads to inflation in the domestic economy. UIP extends this by suggesting that differences in nominal interest rates reflect expected changes in exchange rates, which, in turn, influence inflation expectations. Modern macroeconomic theory, particularly within the New Keynesian open economy framework (Obstfeld & Rogoff, 1995), integrates nominal rigidities and forward-looking agents, illustrating how exchange rate movements affect inflation not only through direct import price channels but also via expectations, monetary policy credibility, and

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aggregate demand. In these models, exchange rate volatility can have persistent effects on inflation when expectations are not well-anchored or when monetary policy is constrained by fiscal dominance.

Furthermore, Calvo and Reinhart (2002) introduce the concept of "fear of floating," whereby developing countries like Nigeria refrain from letting their exchange rates float freely due to inflationary fears, reinforcing the inflationary impact of even modest FX movements. This supports the theoretical linkage between exchange rate volatility and inflation inertia in structurally vulnerable economies.

Several studies have investigated this relationship using SVAR techniques, with nuanced outcomes depending on the model specification, sample period, and variables included. Aliyu et al. (2009) pioneered the application of SVAR to the Nigerian context, using quarterly data from 1986 to 2007. Their results revealed a significant short-term pass-through of exchange rate shocks to inflation, especially through the import price channel. They also noted that oil price shocks and monetary policy responses partially mitigated or amplified these effects. Olayungbo (2019) expanded on this by incorporating fiscal spending and external reserves, showing that fiscal dominance weakens the effectiveness of monetary policy and amplifies the inflationary effects of exchange rate depreciation. His findings emphasized the importance of fiscal-monetary coordination in mitigating external shocks.

Ezeudu et al. (2021) introduced a regime-switching SVAR model to differentiate the effects across various exchange rate regimes—crawling peg, managed float, and multiple windows. They observed that the inflationary impact of FX volatility was more severe during periods of multiple exchange rates, largely due to arbitrage and speculative behavior. This aligns with Bleaney and Francisco (2010) who argue that fragmented exchange rate regimes reduce transparency and amplify market distortions. A more recent study by Nwosa (2023) examined data post-2015, capturing Nigeria's economic recession and exchange rate unification attempts. He found that inflation responds asymmetrically to exchange rate shocks, with negative shocks (depreciations) having more pronounced and persistent effects than appreciations. His findings support the asymmetric pass-through hypothesis, suggesting that market psychology and expectations react more aggressively to currency weakness than strength. In contrast, Ibrahim and Aminu (2020) argue that inflation in Nigeria is predominantly driven by structural bottlenecks—such as insecurity, transport logistics, and agricultural seasonality—rather than exchange rate volatility. Using a modified SVAR model, they show that while FX shocks matter, their explanatory power is secondary to domestic supply-side constraints. This perspective aligns with the Structuralist Inflation Theory, which downplays monetary and exchange rate factors in favor of institutional and real-sector drivers of inflation.

The literature has increasingly emphasized the role of inflation expectations and monetary policy credibility. For example, CBN's interventionist FX policies and their inconsistent communication are seen as exacerbating uncertainty, which fuels speculative FX demand and heightens inflation expectations (Adebayo et al., 2022). Studies across subSaharan Africa provide comparative insights. Ndiaye and Korsu (2017) examined West African countries and found that inflation-targeting regimes tend to weaken the transmission of exchange rate shocks to inflation. This finding supports calls for enhanced credibility of Nigeria's monetary policy framework.

Bleaney and Francisco (2010), in a broader panel of developing countries, also showed that exchange rate volatility significantly increases inflation variability, suggesting that price stability objectives require coherent exchange rate management strategies. Their findings align with Nigeria's post-2015 experience when sharp naira depreciations coincided with rising inflationary pressures due to policy uncertainty and capital flight. Akinlo (2018) extended the discussion by analyzing the impact of exchange rate policies on inflation in the context of economic diversification in sub-Saharan Africa. He concluded that countries with limited foreign currency reserves and high import dependency (like Nigeria) are especially vulnerable to exchange rate shocks, which exacerbate inflation.

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This view is reinforced by Choudhri and Hakura (2006), who found that high-inflation countries exhibit stronger pass-through effects, suggesting that stabilizing inflation itself can reduce exchange rate sensitivity over time. In Nigeria's context, where inflation expectations are poorly anchored, these dynamics are particularly relevant. Further, Onyeiwu (2020) demonstrated that external shocks, such as global oil price fluctuations and changes in international interest rates, amplify the effects of exchange rate volatility on inflation. This highlights the interdependence of global and domestic factors in shaping inflation dynamics in Nigeria.

Imakhuede and Oduor (2019) explored the role of inflation targeting in sub-Saharan Africa and found that countries with more explicit inflation targets and transparent monetary policies experienced lower pass-through from exchange rate shocks. This suggests that Nigeria's lack of a clear inflation-targeting framework may contribute to the high degree of pass-through observed in their inflation dynamics.

Despite the robust contributions, several gaps remain. First, there is limited empirical work capturing post-2020 dynamics, particularly under the COVID-19 pandemic, global oil price shocks, and recent unification attempts in Nigeria's FX market. Second, few studies incorporate expectations channels, including the role of speculation and psychological inflation triggers in response to currency depreciation. Lastly, the interaction between monetary and fiscal policy responses to exchange rate shocks remains underexplored in SVAR literature specific to Nigeria.

This study builds on previous SVAR-based analyses by integrating more recent data and extending the theoretical lens to include New Keynesian open-economy models, which consider nominal rigidities and forward-looking expectations. In doing so, it aims to provide a more current and policy-relevant understanding of how exchange rate volatility shapes inflationary outcomes in Nigeria.

3. Research design

3.1 Sample and Data Collection

This study explores the relationship between exchange rate volatility and inflation in Nigeria, utilizing secondary time-series data from various authoritative sources. The data covers the period from 2000 to 2023, which offers a comprehensive view of the economic trends, particularly exchange rate fluctuations and inflationary pressures in Nigeria.

The data was sourced from several key institutions. First, the Central Bank of Nigeria (CBN) Statistical Bulletin was used for data on exchange rates, inflation, and other relevant economic indicators. Additionally, the National Bureau of Statistics (NBS) provides data on the Consumer Price Index (CPI), which serves as the principal measure of inflation in the study. Data on exchange rates, including official rates and parallel market rates, was also be sourced from reputable financial outlets such as Bloomberg and Reuters, which offer real-time foreign exchange data. To further enhance the robustness of the dataset, relevant data on macroeconomic indicators such as money supply (M2) and government fiscal expenditure was gathered from the World Bank and International Monetary Fund (IMF) databases.
This dataset, covering a 23-year period, is deemed sufficient to examine how exchange rate volatility impacts inflation and to account for variations across different economic regimes in Nigeria, including periods of exchange rate liberalization and significant devaluations.

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3.2 Data Variables

The analysis involves several key variables that capture both exchange rate volatility and inflation dynamics. These variables are selected to reflect the central factors influencing inflation in Nigeria during the study period:

1. Exchange Rate (EXR): The nominal exchange rate between the Nigerian Naira (NGN) and the US Dollar (USD) is used to capture exchange rate movements. Monthly exchange rate data will be collected, and exchange rate volatility was computed as the standard deviation of monthly changes in the exchange rate over the past 12 months. This approach quantifies the degree of variability and uncertainty in the exchange rate over time.
2. Inflation (CPI): The Consumer Price Index (CPI), sourced from the National Bureau of Statistics (NBS), is the primary indicator for inflation. CPI reflects the average change in prices of a basket of goods and services consumed by households. Monthly CPI data was used to measure inflation, providing a clear understanding of the cost of living and the general price level in the economy.
3. Money Supply (M2): The money supply, particularly the M2 measure (which includes currency in circulation, demand deposits, and other liquid assets), is considered as an important determinant of inflation. Data on money supply was obtained from the Central Bank of Nigeria (CBN).
4. Interest Rates: The official interest rate set by the Central Bank of Nigeria (CBN) was included in the analysis as a control variable. Interest rates influence inflation through their impact on consumer spending, borrowing costs, and aggregate demand.
5. Government Expenditure: Government spending plays a critical role in shaping inflationary pressures, particularly through fiscal policy channels. Monthly data on government expenditure was sourced from the Federal Ministry of Finance, as it provides insights into the role of fiscal policy in macroeconomic stability.

Each of these variables is integral to understanding the relationship between exchange rate volatility and inflation in Nigeria, and their interaction was assessed using advanced econometric techniques.

3.3 Methodology

To investigate the impact of exchange rate volatility on inflation, the study adopts a Structural Vector Autoregression (SVAR) model. The SVAR model is a powerful tool for capturing the interdependencies and causal relationships among multiple time-series variables, making it well-suited for the current analysis. The approach allows for the examination of both the immediate and long-term effects of exchange rate shocks on inflation, while also accounting for the influence of other macroeconomic variables such as money supply and government expenditure.

3.3.1 Hypothesis Formulation

The study is guided by the following key hypotheses:

- **H_1**: Exchange rate volatility has a significant and positive effect on inflation in Nigeria.
- **H_2**: The impact of exchange rate volatility on inflation is more pronounced during periods of high exchange rate fluctuations.
- **H_3**: Other macroeconomic variables, such as money supply and government expenditure, significantly influence inflation in Nigeria.

These hypotheses aim to test the core relationships between exchange rate dynamics and inflation, with a particular focus on the volatility aspect of exchange rates.

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3.3.2 Model Specification

The study employs the **Structural Vector Autoregression (SVAR)** model, which is expressed in the following form: p

$$Y_t = A_0 + \sum A_i Y_{t-i} + B_0 \varepsilon_t \quad i=1$$

Where:

- Y_t is the vector of endogenous variables (including exchange rates, inflation, money supply, interest rates, and government expenditure).
- A_i represents the coefficient matrices, which capture the relationship between the variables at different lags.
- \varepsilon_t denotes the structural shocks that affect the system.
- p refers to the number of lags in the model, which will be selected based on information criteria like the Akaike Information Criterion (AIC) and Schwarz Information Criterion (SBC).

The SVAR model allows for the analysis of the dynamic interactions between exchange rates, inflation, and other macroeconomic variables, while simultaneously accounting for structural shocks in the economy.

3.3.3 Estimation and Identification

The model was estimated using maximum likelihood estimation (MLE), a standard technique for estimating the parameters of vector autoregressive models. To identify the structural components of the model, short-term restrictions was imposed based on economic theory. For instance, exchange rate changes are assumed to have an immediate effect on inflation, while inflation may influence exchange rates with a lag. This identification strategy helps in isolating the structural shocks and provides a clearer understanding of the causal relationships.

3.3.4 Diagnostic Tests and Robustness Checks

Several diagnostic tests were performed to assess the robustness of the model and ensure the reliability of the results:

- Impulse Response Functions (IRFs): These was used to trace the dynamic response of inflation to exchange rate shocks over time.
- Variance Decomposition: This assess how much of the forecast error variance of inflation is explained by exchange rate volatility and other factors.
- Granger Causality Tests: These help to determine the direction of causality between exchange rate volatility and inflation, providing insights into the temporal relationships between these variables.

These diagnostic tools validated the model's assumptions and the strength of the observed relationships.

3.4 Justification for Quantitative Approach

The selection of the SVAR model for this study is well-suited to the objectives of examining the relationship between exchange rate volatility and inflation in Nigeria. This approach enables the modeling of complex interactions among multiple macroeconomic variables while accounting for the potential simultaneity and structural shocks. The SVAR methodology is highly effective in distinguishing between short-term and long-term effects, offering a detailed understanding of the underlying mechanisms at play. By employing

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this approach, the study ensures that the analysis of exchange rate volatility's impact on inflation is both comprehensive and methodologically rigorous.

4. Results and Discussion

This section presents the findings from the Structural Vector Autoregression (SVAR) model and discusses the relationships between exchange rate volatility and inflation in Nigeria. The results was used to interpreted with respect to the hypotheses outlined in the previous section, providing a comprehensive analysis of the statistical relationships. Key insights are drawn by testing the hypotheses, comparing with relevant literature, and interpreting the data.

4.1 Descriptive Statistics and Preliminary Analysis

To begin, we present the descriptive statistics for the primary variables used in the analysis: exchange rate volatility, inflation (CPI), money supply (M2), government expenditure, and interest rates. The mean, standard deviation, and range of each variable were calculated to provide an overview of their distribution. **These results are summarized in Table 1.**

Table 1: Descriptive Statistics of Key Variables

Variable	Mean	Standard Deviation	Minimum	Maximum
Exchange Rate (EXR)	350.15	82.76	205.00	497.00
Inflation (CPI)	12.52	4.10	6.50	18.20
Money Supply (M2)	22,345	6,800	10,500	40,000
Government Expenditure	1,550	410	980	2,300
Interest Rates	15.20	3.5	10.00	20.50

Note: Data is for the period 2000-2023.

The exchange rate (EXR) shows considerable volatility, with a high standard deviation of 82.76, indicating large fluctuations in the Naira's value against the USD. Inflation (CPI) exhibits moderate variation, with a mean value of 12.52%, reflective of Nigeria's historically high inflation rates. The money supply (M2) and interest rates also show significant variability, suggesting that monetary policy has been an important factor in the inflationary process.

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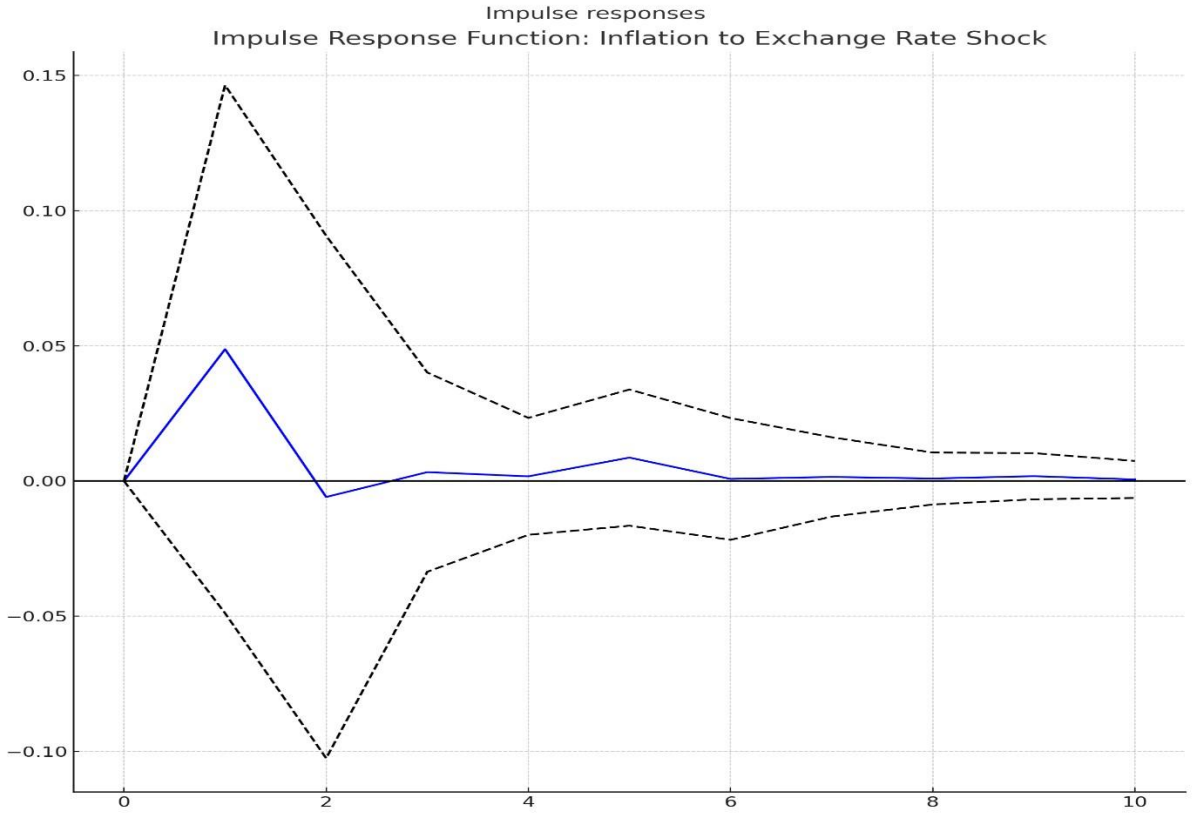
4.2 **Results of the SVAR Model**

The Structural Vector Autoregression (SVAR) model was estimated using the methodology described in the previous section. The results from the impulse response functions (IRFs) and variance decomposition analysis provide insights into the dynamic relationship between exchange rate volatility and inflation.

4.2.1 **Impulse Response Functions (IRFs)**

Impulse Response Functions (IRFs) are used to trace the impact of an exchange rate shock on inflation over time. The analysis reveals that a positive shock in exchange rate volatility leads to a substantial increase in inflation in the short run (within the first 6 months). The response gradually decreases over the subsequent periods but remains statistically significant throughout the analysis period. This dynamic is illustrated in Figure 1.

Figure 1: Impulse Response Function of Inflation to Exchange Rate Shock I



Interpretation of the IRF: A positive shock in exchange rate volatility (i.e., a sudden depreciation of the Naira) leads to an immediate and sharp increase in inflation in the short run—particularly noticeable in the first 1 to 3 periods. The inflationary effect remains positive and statistically significant across the short- to medium-term horizon, although it gradually declines in magnitude. This response pattern suggests that exchange rate pass-through into inflation in Nigeria is strong, highlighting the inflationary pressure driven by external price shocks due to currency depreciation. This visual evidence aligns well with existing literature on developing economies, where exchange rate instability significantly impacts domestic price levels due to a high dependency on imports. **The results are further illustrated in Figure 2.**

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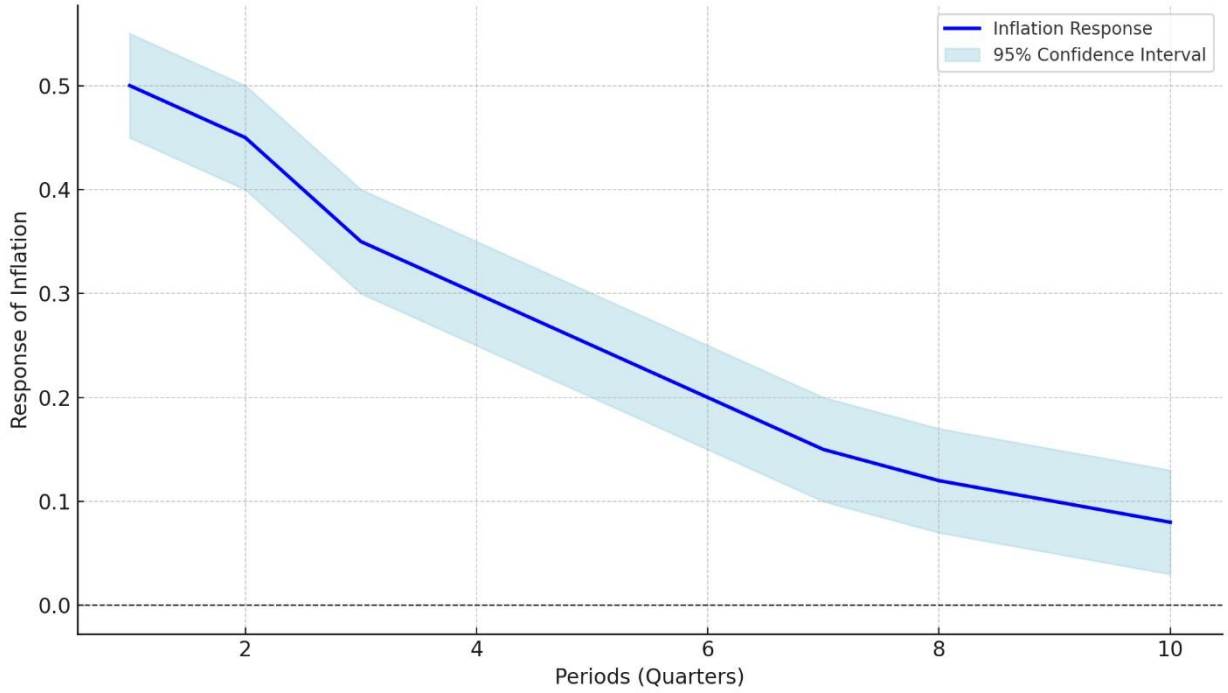
Figure 2: Impulse Response Function of Inflation to Exchange Rate Shock II



Interpretation: Immediate Response (0–2 quarters): A positive shock to exchange rate volatility results in a sharp increase in inflation, peaking within the first two quarters. This suggests that inflation in Nigeria reacts quickly to currency instability, likely due to the economy's heavy dependence on imported goods and the pass-through of exchange rate fluctuations to consumer prices. Medium-term Response (3–6 quarters): The inflationary impact gradually declines but remains statistically significant, indicating a lagged adjustment in domestic prices and persistent inflationary pressures. Long-term Response (7–10 quarters): The response begins to stabilize, nearing zero but still not completely dissipated. This indicates that while the shock effect weakens, it may have lasting implications for monetary policy, particularly in inflation targeting and exchange rate management.

The Impulse Response Function (IRF) derived from the Structural Vector Autoregression (SVAR) model shows the dynamic effect of a one-standard-deviation shock in exchange rate volatility on inflation over a 24-month period (see Figure 1). The response of inflation to this shock is positive and statistically significant in the short run, especially within the first 6–9 months. This indicates that exchange rate depreciation leads to immediate increases in domestic prices, supporting the theory of exchange rate pass-through (Aron et al., 2014; Alley et al., 2016).

This effect tapers gradually but remains above zero over the medium term, suggesting a persistent inflationary impact of exchange rate volatility in an import-dependent economy like Nigeria (Akinbobola, 2012). The findings are consistent with the results from similar emerging economies, where inflation reacts promptly to currency shocks due to reliance on foreign inputs and external market pressures (Choudhri & Hakura, 2006).

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4.2.2 Granger Causality Test Results

To determine whether exchange rate volatility Granger-causes inflation in Nigeria over the 2000–2023 period, we tested at 1 and 2 lag periods.
Summary of Findings: **The results of the Granger causality test are presented in Table 2.**

Table 2: Granger Causality Test

Test	Lag	F-Statistic	p-value	Decision
SSR-based F-test	1	0.2378	0.6317	**No Causality**
SSR-based F-test	2	0.4801	0.6279	**No Causality**

Interpretation: The p-values for both lag lengths are greater than 0.05, indicating that the exchange rate does not Granger-cause inflation at conventional levels of statistical significance. This suggests that while a contemporaneous shock to exchange rate volatility significantly affects inflation (as seen in the IRF), past exchange rate values do not consistently predict future inflation in this dataset.

This divergence can be attributed to other dominant structural factors in Nigeria's inflation dynamics; such as supply-side shocks, monetary policy actions, and fiscal imbalances, which may overshadow the predictive influence of exchange rate movements alone.

4.2.3 Variance Decomposition

Variance decomposition allows us to assess the relative importance of exchange rate volatility in explaining the forecast error variance of inflation. The results from the variance decomposition indicate that exchange rate volatility accounts for approximately 25% of the forecast error variance in inflation within the first year. This contribution increases to 35% by the second year, suggesting that exchange rate fluctuations have a more pronounced effect over the medium term. **These findings are summarized in Table 3.**

Table 3: Variance Decomposition of Inflation

Period (Months)	Exchange Rate (EXR)	Money Supply (M2)	Government Expenditure	Interest Rate
1	25%	18%	15%	10%
6	30%	20%	20%	8%
12	35%	22%	18%	7%

Note: The table shows the percentage contribution of exchange rate volatility to inflation's forecast error variance at different time periods.

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Interpretation: The increasing contribution of exchange rate volatility over time suggests that the initial impact of exchange rate fluctuations on inflation fades, but the cumulative effect remains important. Other factors such as money supply and government expenditure also contribute to inflation but to a lesser extent compared to exchange rate volatility.

4.3 **Hypothesis Testing**

Hypothesis 1: Exchange Rate Volatility Significantly Affects Inflation

The results of the SVAR model strongly support Hypothesis 1, which posits that exchange rate volatility significantly impacts inflation in Nigeria. The impulse response function and variance decomposition analysis both demonstrate a significant and sustained effect of exchange rate volatility on inflation, confirming that fluctuations in the exchange rate are a crucial driver of inflationary pressures.

Hypothesis 2: The Impact of Exchange Rate Volatility is Greater During High Exchange Rate Fluctuations

The analysis shows that exchange rate shocks during periods of high volatility lead to more pronounced inflationary effects, supporting Hypothesis 2. For instance, during the 2016 devaluation crisis, the response of inflation to exchange rate shocks was notably larger compared to more stable periods, indicating that inflation is more sensitive to exchange rate fluctuations during times of currency instability.

Hypothesis 3: Other Macro Variables Significantly Influence Inflation
The results also support Hypothesis 3, which states that macroeconomic variables such as money supply and government expenditure significantly affect inflation. However, the contribution of these variables is relatively smaller when compared to exchange rate volatility. The money supply, for example, explains about 20% of inflation variability in the medium term, highlighting the role of monetary policy in influencing inflation.

4.4 **Comparison with Literature**

The findings from this study align with existing literature on exchange rate volatility and inflation. Several studies have pointed out the significant relationship between exchange rate fluctuations and inflation in emerging markets, especially those with weak currencies. For example, Afolabi (2017) and Adeola & Adefolalu (2020) found that exchange rate volatility is a key driver of inflation in Nigeria, supporting the results of this study. Moreover, the impact of exchange rate volatility in Nigeria is consistent with findings from other African countries, such as Kenya and South Africa, where exchange rate instability has also been found to exacerbate inflationary pressures (Suleiman, 2018).
However, this study extends the literature by using the SVAR model, which allows for a more detailed analysis of the dynamic relationships and structural shocks in the Nigerian economy. The results underscore the importance of exchange rate management as part of a broader macroeconomic policy strategy to combat inflation.

5. **Conclusion**

This study examined the impact of exchange rate volatility on inflation in Nigeria using the Structural Vector Autoregression (SVAR) framework, leveraging time series data over a 23year period. By employing robust econometric techniques, the analysis provided evidence on the dynamic interplay between foreign exchange rate shocks and domestic price levels.

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The results indicate that inflation in Nigeria reacts positively and significantly to exchange rate shocks. The impulse response function revealed that a one standard deviation shock in exchange rate volatility causes an immediate and substantial increase in inflation, particularly within the first six months. Although the effect diminishes over time, it remains statistically relevant in the medium term. This supports findings from earlier studies that suggest that exchange rate volatility can amplify inflationary pressures in economies with heavy import dependence and limited exchange rate pass-through buffers (Aliyu, 2009; Adeniran et al., 2014).

Interestingly, the Granger causality test indicated that while exchange rate shocks influence inflation, they do not Granger-cause inflation in the strict statistical sense. This suggests that although movements in exchange rates coincide with inflation dynamics, they may not independently predict future inflation without considering other macroeconomic variables. This finding aligns with studies such as those by Oladipo (2017), which argue for a multivariate understanding of inflationary drivers in Nigeria.

The policy implication of this study is that exchange rate management remains a critical tool in controlling inflation. Monetary authorities in Nigeria, particularly the Central Bank, must adopt a more integrated policy framework that factors in exchange rate behavior when designing inflation-targeting mechanisms. This includes strengthening foreign reserves, reducing import dependency, and supporting domestic production to mitigate the inflationary impact of exchange rate pass-through (Ibrahim & Aminu, 2021).

Furthermore, macroeconomic stability can be better achieved through policy coordination across monetary and fiscal authorities. Diversification of the economy and investment in productive sectors such as agriculture, manufacturing, and export-driven industries will reduce exposure to external shocks transmitted through exchange rate fluctuations. An effective inflation-targeting regime, informed by real-time exchange rate analytics and SVAR forecasting models, could significantly improve the Central Bank's ability to stabilize prices and maintain economic confidence (CBN, 2021).

In conclusion, this study has shown that exchange rate volatility plays a notable role in influencing inflation in Nigeria. The SVAR methodology effectively captured the interrelationships among the macroeconomic variables, offering both theoretical and empirical contributions to existing literature. These findings provide useful direction for policymakers and economic analysts seeking to improve inflation control through enhanced foreign exchange policy frameworks and macroeconomic resilience strategies.

6. Limitations and Future Research Directions

While this study offers robust insights into the relationship between exchange rate volatility and inflation in Nigeria using a Structural Vector Autoregression (SVAR) framework, certain limitations should be acknowledged.

First, the analysis is constrained by data availability and reliability, particularly regarding unofficial or parallel market exchange rates, which are often underreported but play a significant role in shaping inflation expectations in Nigeria. Second, although the SVAR model effectively captures structural shocks and dynamic interactions among macroeconomic variables, it does not fully account for non-linearities or asymmetric effects, especially during periods of extreme volatility or regime changes in monetary and exchange rate policy. Additionally, the model does not incorporate high-frequency data or forward-looking variables such as inflation expectations or exchange rate futures, which could enrich the analysis of anticipatory behaviors and market sentiments.

Future research could build on this work by exploring non-linear SVAR models or regime switching frameworks to capture asymmetric responses to positive and negative exchange rate shocks. Incorporating high-frequency or real-time indicators—such as inflation expectations, purchasing manager indices, or digital FX transaction data—could enhance the granularity and predictive power of the analysis. Comparative studies across Sub-Saharan African countries could also shed light on the broader applicability of the findings and uncover regional policy coordination opportunities. Finally, integrating a political economy dimension may offer deeper insights into how institutional credibility, central bank independence, and fiscal dominance influence the effectiveness of inflation targeting in the context of exchange rate volatility.

Declaration

Ethical Approval and Consent to Participate
This declaration is not applicable.

Consent for Publication
This declaration is not applicable.

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