

pISSN: 2971-6195 eISSN: 2971-6209 INFLATIONARY PRESSURE, EXCHANGE RATE VOLATILITY, AND ECONOMIC GROWTH IN NIGERIA

Fidelis Anake Atseye

Department of Banking and Finance University of Calabar Calabar - Nigeria

Corresponding Author: anakefidel@yahoo.co.uk, anakefidel@unical.edu.ng

ABSTRACT

The study examined the inter-relationship between inflation, exchange rate volatility, and economic growth in Nigeria (1990-2023). The ex post facto research design was used with secondary time series data collected from the CBN statistical bulletin for several years. The Ordinary Least Square regression technique was utilized in analyzing the data. The OLS regression model revealed a significant negative relationship between inflation rate, economic growth, and exchange rate volatility. The results suggested that high inflation rates and exchange rate fluctuations hinder economic growth in Nigeria. The study also found an insignificant positive relationship between money supply velocity and economic growth. The study recommended that the government tighten monetary policy, improve fiscal discipline, and enhance price stability to reduce inflationary pressures and exchange rate volatility.

Keywords: volatility, fluctuations, inflationary pressure, exchange rate **JEL**: E23, D45, E12

INTRODUCTION

Economic growth is a key indicator of a nation's prosperity and progress. In Nigeria, a country abundant in natural resources and potential, sustained economic growth is vital for improving living standards, alleviating poverty, and achieving long-term development. Nonetheless, Nigeria's path to economic growth has been impeded by challenges such as inflation and exchange rate volatility (Odoko, 2009). Inflation is the persistent rise in the overall price level of goods and services within an economy over time. Elevated inflation rates can diminish consumers' purchasing power, lowering real incomes and hindering overall economic growth (Odoh, Ugwoke & Onyeanu, 2023). Exchange rate volatility, on the other hand, pertains to fluctuations in a country's currency value relative to foreign currencies. According to Odili (2014), such volatility can significantly impact economic growth by affecting import and export costs, which can drive up production expenses and reduce competitiveness.

In Nigeria, inflation has remained a persistent issue, with rates reaching double digits in recent years. As the nation was beginning to recover from the economic shocks of the COVID-19 pandemic, it faced another challenge: soaring inflation. As of January 2024, Nigeria's inflation rate rose to 29.90%, up from 28.92% in December 2023, marking the highest level in two decades (Onyeiwu, 2024). This increase in the general price level poses serious concerns for Nigerians, especially the underprivileged, as it erodes the value of money and decreases purchasing power.

The World Bank estimates that approximately 11 million Nigerians fell into poverty during the



pandemic, exacerbating the hardships faced by the vulnerable population of around 100 million, particularly susceptible to the depreciation of the Naira (Central Bank of Nigeria, 2014).

Inflation exerts a dual effect on the economy (Odoh, Ugwoke & Onyeanu, 2023). On the demand side, rising prices reduce consumers' purchasing power, leading to decreased demand for goods and services, which can slow economic activity and cause businesses to cut back on production and employment. Conversely, on the supply side, inflation can stimulate economic activity by encouraging businesses to increase production to meet higher prices and demand (Diya, 2010). A primary contributor to Nigeria's high inflation rate is the rising prices of essential food items. When food costs increase, consumers must allocate a larger share of their income to food, leaving less for other goods and services, which can depress overall demand and slow economic growth (Odili, 2014). Therefore, balancing controlling inflation and promoting sustainable growth is critical for long-term development.

The exchange rate, which reflects the value of a country's currency in terms of another currency, plays a crucial role in international trade and economic stability. It indicates how much of a foreign currency can be obtained with a unit of domestic currency. The recent high levels of exchange rate volatility, particularly concerning the Naira to U.S. Dollar rate, pose significant risks to Nigeria's economy (Sarel, 2016). This instability has spurred economists' interest in analyzing its causes, especially within a floating exchange rate system like Nigeria's. The exchange rate influences numerous macroeconomic variables, including interest rates, inflation, unemployment, and money supply. Fluctuations can lead to imbalances in the balance of payments, potentially causing inflation through currency depreciation or unemployment through currency appreciation. Beyond inflationary effects, exchange rate volatility can hinder economic growth and development.

The volatility of exchange rates is often intensified by high inflation levels stemming from both demand and supply shocks. Milton Friedman (1968), a renowned American economist, famously asserted that "Inflation is always and everywhere a monetary phenomenon." Monetarists argue that increases in the money supply directly lead to rising prices. Persistent inflation reduces the competitiveness of domestically produced goods and services on local and international markets, resulting in a decline in market share. Consequently, imports tend to rise while exports fall, decreasing domestic currency demand and causing exchange rate depreciation.

Research by Eke, Magaji, Obalemo, and Ezeigwe (2020) indicates that exchange rate, interest rate, and inflation are interconnected and collectively influence economic growth. These macroeconomic variables interact dynamically, affecting one another and shaping overall economic stability (Nwafor, 2018). Understanding these relationships becomes even more critical in the context of globalization and a developing economy heavily reliant on imports with elastic demand. Examining how inflation, exchange rate fluctuations, and economic growth influence each other provides valuable insights into Nigeria's macroeconomic environment, especially given the significant impact these factors have on policy effectiveness during economic shocks (Alagidede & Ibrahim, 2016).

However, the literature presents mixed views on the relationship between inflation, exchange rate fluctuations, and economic growth (Okwuchukwu & Onyeanu, 2023). There is no consensus on their interconnections. Some studies, such as those by Oyovwi (2012), Korkmaz (2013), and Jibrin, Jelilov, and Gayypov (2017), find that the exchange rate significantly influences economic growth.



Conversely, others like Adeniran, Yusuf, Adeyemi (2014), and Akpan and Atan (2012) report no statistically significant link between exchange rate movements and Nigeria's economic development. Furthermore, research on Nigeria's exchange rate and inflation dynamics is limited, despite ongoing instability in currency values and prices. This issue warrants urgent attention, as the increasing fluctuations and inflation rates threaten Nigeria's economic stability and growth prospects.

LITERATURE REVIEW

The theoretical framework guiding this research is based on a review of established theories that serve as a foundation for constructing the arguments and explanations within this study. The following theories will be employed to analyze phenomena, identify relationships, and forecast the influence of Nigeria's inflation, exchange rates, and economic growth.

Endogenous Growth Theory

Developed by economists Paul Romer and Robert Lucas in the late 20th century, the endogenous growth theory emphasizes that economic progress results from internal factors such as investments in human capital, innovation, and knowledge. Romer introduced the concept in 1986, with Lucas expanding on it in the 1990s. This theory highlights that sustainable economic development can be achieved through strategic investments in technology and human resources, providing a framework for understanding how countries can foster long-term growth. It is particularly relevant for policymakers aiming to enhance productivity and innovation to stimulate economic advancement (Sarel, 2016).

Optimal Currency Area (OCA) Theory

Formulated by Robert Mundell in the 1960s, the OCA theory suggests that a group of countries should adopt a shared currency if they meet specific criteria that make such integration beneficial. These criteria include labor mobility, flexible prices and wages, fiscal cooperation, and economic similarities. The theory posits that a fixed exchange rate can promote trade and economic growth by reducing currency fluctuation risks and lowering transaction costs, thereby encouraging investment through reduced currency premiums (Bernanke & Blinder, 1992). Conversely, it also recognizes potential drawbacks, such as hindering necessary economic adjustments. The OCA theory offers insights into the advantages and limitations of adopting a common currency, as exemplified by the Eurozone (Krueger, 1983).

Purchasing Power Parity (PPP)

Introduced by Swedish economist Gustav Cassel in 1916, the PPP theory suggests that exchange rates adjust to equalize the purchasing power of different currencies, reflecting the cost of a basket of goods across countries. It assumes that trade in goods and services leads to fluctuations in spot exchange rates and that, over the long term, currencies should align with their purchasing power. A currency is considered undervalued if its domestic purchasing power is lower than its nominal value when converted, and overvalued if it is higher. This theory is pertinent to this study because it helps explain how exchange rate movements relate to inflation, especially for Nigeria, an import-dependent economy (Akpan & Atan, 2011). However, its applicability is debated since it primarily applies to countries where trade is dominated by merchandise rather than capital flows (Ishola, 2010).



Keynesian Theory of Inflation

Proposed by John M. Keynes and his followers, this theory explains inflation through the lens of demand-pull mechanisms, contrasting with the monetary view that links inflation directly to money supply growth. According to Keynes, inflation arises when aggregate demand—comprising consumption, investment, and government expenditure—exceeds the economy's productive capacity at full employment, creating an inflationary gap (Jhingan, 2009; Bilawal, 2014). This theory is relevant for Nigeria, as it provides a framework to understand inflation driven by high demand amid supply constraints caused by insecurity, rising fuel prices, and exchange rate fluctuations. These elements can reduce firms' productive capacity and, combined with increasing aggregate demand due to population growth, contribute to inflationary pressures (Abbott & De Vita, 2011).

Empirical review

The nexus between inflation, exchange rate fluctuations, and economic growth has been extensively studied, yielding varied outcomes. Ewubare (2022) explored how the exchange rate influences Nigeria's economic growth, aiming to determine the effects of exchange rates, inflation, and interest rates on GDP. The findings indicated that inflation and exchange rate movements negatively influence economic growth, implying that rising prices and currency fluctuations hinder Nigeria's economic development. Similarly, Jibrin, Jelilov, and Gayypov (2017) analyzed the impact of exchange rate variations on GDP and other macroeconomic indicators across ten West African countries from 1990 to 2014 using Ordinary Least Squares (OLS). Their results revealed significant effects of exchange rates on the GDPs of Benin, Guinea-Bissau, Liberia, and Nigeria.

Okwuchukwu and Onyeanu (2023) investigated how exchange rate volatility affects Nigeria's inflation-growth relationship from 1990 to 2022. Employing a short-term ARDL model based on the bond test, their results demonstrated that fluctuations in the exchange rate and inflation negatively impact the country's economic growth, with higher volatility intensifying this adverse relationship. Bilawal (2014) examined how exchange rate fluctuations influence macroeconomic indicators in Pakistan, analyzing data from 1982 to 2013 from the State Bank of Pakistan. The study found a positive and significant correlation between GDP and the Pakistani exchange rate, supported by correlation and regression analyses.

Research into the inflation and economic growth nexus has produced conflicting findings. Senhadji (2001) investigated the threshold effect of inflation on growth across 140 industrialized and developing countries using a non-linear square method. Their analysis, covering data from 1960 to 1998, suggested 1-3% inflation thresholds for developed nations and 7-11% for developing ones, beyond which growth tends to decline. Gylfason and Herbertsson (2001) analyzed 170 countries between 1960 and 1992 using panel regression, finding that inflation rates between 10% and 20% negatively affected economic growth. Gillman, Harris, and Mátyás (2004), focusing on 29 OECD and 18 APEC countries from 1961 to 1997, also identified a negative relationship between inflation and growth, particularly at lower inflation levels. Mubarik and Riazuddin (2005) applied threshold analysis to Pakistan's data and concluded that inflation exceeding 9% hampers economic growth.

Erbaykal and Okuyan (2008) studied the inflation-growth relationship using quarterly data in Turkey from 1987Q1 to 2006Q2, employing cointegration and causality tests. They found no



significant long-term link but identified a negative short-term relationship, with causality running from inflation to growth. Munir and Mansur (2009), analyzing data from 1970 to 2005 via the endogenous threshold autoregressive (TAR) model, determined that inflation rates above 3.89% negatively impact growth, whereas lower rates support growth. Ozdemir (2010) examined the causal links between inflation uncertainty and output growth in the UK using quarterly data from 1957Q2 to 2006Q4, employing VARFIMA models. The findings indicated that inflation uncertainty significantly influences economic growth, with output growth uncertainty positively affecting inflation and growth rates, though no clear relationship emerged in sub-periods. Odhiambo (2011) explored the causality between inflation, investment, and growth in Tanzania, revealing a unidirectional causal flow from inflation to economic growth.

Abbott and De Vita (2011) analyzed how inflation impacts growth under various exchange rate regimes across 125 countries from 1980 to 2004, discovering that countries with flexible exchange rates tended to experience lower growth than those with fixed or intermediate regimes. Akgul and Ozedemir (2012) assessed the non-linear inflation-growth relationship in Turkey, identifying a threshold of 1.26%; inflation above this level negatively affects growth, while lower inflation benefits it. Similarly, Kremer et al. (2013), using a dynamic panel threshold model across 124 economies, found thresholds of 2% for developed nations and 17% for developing ones, with rates above these levels being detrimental. Vinayagathasan (2013) applied the same methodology to 32 Asian countries, establishing a 5.43% threshold, above which inflation hampers growth. Tung and Thanh (2015), focusing on Vietnam from 1986 to 2013 with two-stage least squares, reported that inflation exceeding 7% negatively impacts economic growth.

Baharumshaha et al. (2016) investigated inflation, inflation uncertainty, and growth in emerging markets using the generalized method of moments (GMM) system. Their results suggested that inflation damages growth primarily in non-inflation crisis countries, whereas inflation uncertainty can promote growth, especially within moderate inflation ranges (5.6%–15.9%). Mahonnye and Tenda (2019) studied the effects of exchange rate fluctuations on output and inflation in Zimbabwe from 1990 to 2006, utilizing Johansen co-integration and Vector Error Correction Models. They found that short-term and long-term exchange rate changes significantly influence real output and inflation dynamics.

In Nigeria, Akinbonola (2012) examined the interplay of money supply, exchange rate, and inflation using quarterly data from 1986 to 2008, applying VECM. The study confirmed that increases in money supply and exchange rate fluctuations are inversely related to inflationary pressures in the long run. Martins and Muftau (2014) analyzed how exchange rate depreciation affects Nigeria's balance of payments from 1961 to 2012, finding a long-term equilibrium relationship among the variables via multivariate VEC models. Despite extensive research, few studies have jointly examined the combined impact of inflation and exchange rate volatility on Nigeria's economic growth. Existing works often report positive, negative, or inconclusive results regarding individual effects. This study aims to fill that gap by investigating their joint influence and other macroeconomic factors, utilizing data from the Nigerian Central Bank Statistical Bulletin up to 2023.

METHODOLOGY

The research will employ an ex-post facto design. The data used in this study comprises annual

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data sourced from the Central Bank of Nigeria (CBN). The dataset covers thirty-four years, beginning in 1990 and ending in 2023. The theoretical basis for this study rests on the principles of purchasing power parity (PPP) and Keynes' demand-pull inflation theory. The chosen analytical framework is a multiple regression model, which is appropriate for the selection of variables in this study. A key advantage of using a multiple regression approach is its capacity to address the issue of exogeneity related to the independent variables. The functional model for this study is given as:

GDP = f(EXCR, INFR, MSV)....(i)

In econometric form, we have the following model specified:

 $GDP = \beta_0 + \beta_1 EXCR + \beta_2 INFR + \beta_3 MSV + \Sigma_0 \dots \dots \dots \dots \dots \dots (ii)$

Transformed into its logarithm form to control for outliers as:

 $GDP = \beta_0 + \beta_1 LN EXCR + \beta_2 LN INFR + \beta_3 LN MSV + \Sigma_0 \dots (iii)$

Where: **RGDP** = real gross domestic product as a proxy for economic growth; **EXCR** = exchange rate volatility; **INFR** = official inflation rate; **MSV** = Money supply velocity; β_0 = Regression constant; $\beta_1 - \beta_3$ = coefficients of explanatory variables; Σ = error term; LN = logarithm transformation.

The research deployed a time series analysis using the OLS multiple regression and correlation technique. The OLS technique establishes the relationship between variables, and the correlation result examines the degree of association between the dependent and independent variables.

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DATA ANALYSIS, RESULTS, AND DISCUSSIONS

Trend behavior of exchange rate volatility in Nigeria



As depicted in Figure 1, the exchange rate has exhibited considerable volatility over the years, seemingly hindering economic growth. The fluctuations have been particularly pronounced since 2000, coinciding with a steady depreciation of the Naira against the US Dollar. From the figure, the lowest exchange rate of 8.04 reflects a period of a relatively strong currency, whereas the highest rate of 605.76 indicates a substantial devaluation. This pattern indicates that Nigeria has encountered considerable difficulties stabilizing its exchange rate, leading to diminished purchasing power and increased business uncertainty.



Trend behavior of Inflationary pressure in Nigeria



The trends of inflationary pressure clearly show some volatility and fluctuations in the price level of goods and services, especially with a significant increase in interest and exchange rates. The minimum inflation rate of 3.61% suggests a period of low inflation, while the maximum inflation rate of 23.79% indicates a period of high inflation. This volatility also implies GDP instability, making it challenging for policymakers to implement effective monetary policies and hindering economic growth.

Correlation analysis

	RGDP	EXCH	INFR	MSV
RGDP	1.0000			
EXCH	-0.3380795	1.0000		
INFR	-0.2622597	-0.3532347	1.0000	
MSV	-0.2622507	0.63824600	-0.2474837	1.0000

Table 1: Correlation results

Source: E-views 12.0 statistical software

The correlation coefficient of 0.3380 reflects a moderate positive relationship between real GDP and the exchange rate. This implies that as real GDP rises, the exchange rate tends to increase as well, though not in a directly proportional manner. A plausible reason for this is that a robust economy (high real GDP) often correlates with a stronger currency (higher exchange rate). The correlation coefficient of -0.2622 indicates a weak negative relationship between real GDP and the inflation rate, suggesting that increases in real GDP are associated with slight decreases in inflation. Lastly, the correlation coefficient of -0.1797 shows a weak negative association between real GDP and the velocity of money supply, indicating that as real GDP grows, the velocity of money tends to decline. One possible explanation is that a healthy economy (high real GDP) reduces money circulation and greater savings. Overall, the correlation analysis shows that none of the independent variables are highly correlated, with coefficients below 0.80, meaning multicollinearity is unlikely to pose a problem for the model.

Ordinary Least Squares regression results

The regression analysis identifies a significant relationship between inflation rate, exchange rate volatility, and economic growth in Nigeria. The model specified is:

Real GDP = 8.2777 - 0.0146 (Exchange Rate) - 0.1045 (Inflation Rate) + 0.0313 (Money Supply Velocity).

This indicates that fluctuations in the exchange rate and inflation rate negatively affect economic growth. Specifically, a one-unit increase in the exchange rate is associated with a 0.0146 unit decrease in real GDP, suggesting that exchange rate volatility hampers economic growth. Similarly, a one-unit rise in inflation results in a 0.1045-unit reduction in real GDP, highlighting the adverse effects of high inflation. Conversely, the velocity of the money supply shows a positive

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but a statistically insignificant relationship with real GDP, implying that changes in money supply velocity do not substantially influence economic growth. This suggests that monetary policy adjustments targeting the money supply may have limited effectiveness in boosting economic growth.

Table 2: Analysis of OLS regression result
Dependent Variable: RGDP
Sample: 1990 2023
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
С	8.277781	2.265309	3.654151	0.0010
EXCH	-0.014627	0.005855 -2.498021		0.0182
INFR	-0.104581	0.039781 -2.628943		0.0134
MSV	0.031365	0.141490	0.2216776	0.8261
R-squared	0.281915	Mean dependent var		4.548824
Adjusted R-squared	0.210107	S.D. dependent var	3.915433	
S.E. of regression	3.479878	Akaike info criterion		5.442002
Sum squared resid	363.2865	Schwarz criterion		5.621574
Log likelihood	-88.51404	Hannan-Quinn criterion.		5.503241
F-statistic	3.925935	Durbin-Watson stat		1.096202
Prob(F-statistic)	0.017785			

Source: E-views 12.0 statistical software

The model demonstrates a moderate level of explanatory power, with an R-squared value of 0.28, indicating that the independent variables account for about 28% of the variation in real GDP. The adjusted R-squared of 0.21 offers a more conservative estimate, considering the number of predictors in the model. The F-statistic of 3.92 with a p-value of 0.017 confirms that the overall model is statistically significant. The Durbin-Watson statistic of 1.096 suggests no autocorrelation in the residuals, indicating that the model's assumptions are satisfied. Significance testing shows that exchange and inflation rates are statistically significant predictors, with p-values of 0.0182 and 0.0134, respectively. In contrast, the velocity of money supply is statistically insignificant, with a p-value of 0.8261.

Discussion and findings

This study explored how inflationary pressures, exchange rate volatility, and economic growth interact in Nigeria, based on annual data spanning 34 years (1990-2023). The analysis employed ordinary least squares regression after conducting descriptive statistics, trend analysis, and correlation assessments. The descriptive statistics revealed no outliers in the data. The Jarque-Bera (JB) test results for all variables indicated normal distribution, as their p-values were less than or equal to 0.05, suggesting that the data are suitable for generalization.



The regression findings indicate a negative relationship between the exchange rate and real GDP in Nigeria, implying that currency depreciation reduces economic activity. This aligns with

Krueger (1983) emphasized that exchange rate fluctuations can significantly impact macroeconomic variables. A depreciated currency makes imports more costly, raising production costs and diminishing competitiveness, ultimately hampering economic growth. Similar findings were reported by Bahmani-Oskooee and Rhee (1998) and Narayan (2006). Conversely, some studies, such as Razin and Collins (1997), have found a positive link, suggesting that depreciation might boost exports and promote growth.

Regarding inflation, the analysis shows a negative association with real GDP, indicating that high inflation rates obstruct economic growth. This supports Friedman's (1975) theory that inflation erodes purchasing power, introduces uncertainty, and discourages investment. Consequently, high inflation diminishes competitiveness and economic activity. Studies by Bruno and Easterly (1998) and Sarel (2016) corroborate the negative relationship, while Khan and Senhadji (2001) suggested that the inflation-growth relationship may be nonlinear, with moderate inflation potentially having positive effects.

Finally, the insignificant positive correlation between money supply velocity and real GDP suggests that variations in money circulation do not substantially influence economic growth in Nigeria. This contradicts the monetarist view, which posits that changes in money supply significantly affect economic activity (Friedman, 1969). While Friedman and Schwartz (1963) found a strong relationship between money supply and growth, more recent research by Bernanke and Blinder (1992) indicates that this relationship is complex and influenced by multiple factors.

CONCLUSION AND RECOMMENDATIONS

This study assessed the effects of inflation, exchange rate volatility, and money supply velocity on Nigeria's economic growth from 1990 to 2023. The regression results reveal a significant negative impact of inflation and exchange rate volatility on growth, reinforcing the view that high inflation and currency depreciation hinder economic progress. The positive but statistically insignificant relationship between money supply velocity and growth contradicts monetarist expectations, suggesting limited influence in this context.

Based on these findings, the following recommendations are proposed:

1. Implementation of monetary policy tightening, enhance fiscal discipline, and promote price stability to curb inflationary pressures.

2. Adopt a managed float exchange rate regime, continuously monitor and adjust monetary policies, and support export-oriented industries to stabilize the currency.

3. Focus on inflation control, exchange rate stability, and effective monetary policy to foster sustainable economic growth.

4. The Central Bank of Nigeria should proactively adjust monetary policies to address exchange rates and inflation concerns, ensuring macroeconomic stability.

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