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EXCHANGE RATE VOLATILITY, FOREIGN DIRECT INVESTMENT, AND ECONOMIC GROWTH IN NIGERIA: EVIDENCE FROM COINTEGRATION AND ERROR CORRECTION ANALYSIS

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ABSTRACT

This study uses annual time-series data from 2000 to 2024 to investigate the impact of foreign direct investment and exchange rate variations on Nigeria's economic growth. The study uses an Error Correction Model, Augmented Dickey-Fuller unit root tests, and Engle-Granger cointegration tests to assess the variables' short-term dynamics and long-term equilibrium relationships. The findings indicate that foreign direct investment inflows are negatively impacted by exchange rate depreciation, albeit this effect is statistically negligible. On the other hand, economic growth is positively and statistically significantly impacted by foreign direct investment. The variables are non-stationary at levels but become stationary after initial differencing, according to the unit root results. Concurrently, the cointegration test verifies that the currency rate, foreign direct investment, and economic growth have a long-term relationship. Short-run deviations from equilibrium are adjusted over time, according to the error correction results, which show a negative and significant adjustment coefficient. According to the results, short-term changes in the currency rate and capital inflows have less of an impact on Nigeria's economic growth than structural and institutional issues. The study concludes that industry diversification, better governance, and long-term macroeconomic stability are essential for boosting the growth benefit of foreign direct investment. To lower uncertainty and boost investor confidence, the report advises monetary authorities to enhance exchange rate stability through open and market-supportive policies. To boost employment, productivity, and long-term economic growth, it also suggests that policy initiatives concentrate on luring foreign direct investment to profitable industries, including manufacturing, agriculture, technology, and renewable energy.

Keywords: Exchange Rate Volatility, Economic Growth, Foreign Direct Investment (FDI), Gross Domestic Product (GDP), Monetary and Fiscal Policy, Cointegration Analysis, Error Correction Model

1. INTRODUCTION

Developing economies prioritise economic growth, particularly in Sub-Saharan Africa, where institutional instability, structural flaws, and external vulnerabilities continue to impede sustainable development (Kharon, 2025). Nigeria, the largest economy in Africa in terms of both GDP and population, offers a unique chance to examine the connection between macroeconomic factors and growth performance (Chinyere et al., 2024). Nigeria's economic trajectory over the last thirty years has been impacted by changes in the price of commodities globally, notable fluctuations in foreign reserves, unpredictable macroeconomic policies, and growing exposure to international financial

markets. In this context, foreign direct investment (FDI) and exchange rate dynamics have emerged as crucial variables influencing growth outcomes (Jui et al., 2024). The value of one nation's currency in relation to another is known as the exchange rate. It is an essential macroeconomic metric for assessing how competitive the currency of a certain economy is (Muhammed & Adindu, 2023). As a crucial price in an open economy, the exchange rate has a substantial impact on macroeconomic variables like inflation and the balance of payments by affecting cross-border flows of capital, products, and services (Delphin, 2024). Because crude oil exports are Nigeria's main source of foreign exchange income, the country's currency rate has historically been volatile (Iliyasu et al., 2024).

Exchange-rate changes are unpredictable because to the country's monocultural export structure, which makes it susceptible to external shocks in the global oil market. While oil price drops put significant downward pressure on the naira, leading to devaluation and greater volatility, oil price booms frequently stabilise the currency and promote foreign capital inflows (Okoye et al., 2024). Nigeria has fluctuated between fixed, managed float, and market-driven currency rate regimes since the mid-1980s structural adjustment program (SAP), indicating a persistent quest for macroeconomic stability (Tijjani & Yahaya, 2025). The corporate environment has become more unclear because of these legislative changes, which has an impact on investment choices and the general state of the economy.

Recognised for its ability to provide external capital, allow technology transfer, create jobs, and boost productivity, foreign direct investment (FDI) is a major growth catalyst (Jui et al., 2024). FDI is a crucial addition to domestic investment in developing nations like Nigeria, assisting in bridging the savings-investment gap. According to Alalade et al. (2024), foreign direct investment (FDI) is an investment that gives a foreign organization based in its home country authority over the ownership of a corporate entity in another country. Everyone agrees that foreign direct investment (FDI) is essential for raising productivity in host countries. It is the main source of capital outflows from resource-rich countries to developing countries and facilitates cross-border capital inflows between developing countries (Onyele et al., 2023). FDI is desperately needed to boost local investment in nations with limited resources, like Nigeria. These imports have greatly benefited Nigeria, especially in terms of improved managerial skills, job creation, and technology spillovers (Jamal & Bhat, 2022).

The flow of capital, goods, and services into and out of that country is significantly influenced by a number of macroeconomic factors, including the host country's political and legal framework, inflationary trends, domestic savings, physical and social infrastructure, fiscal and monetary policies, and local technological capabilities (Tien, 2022). Additionally, before admitting their goods into any nation, foreign investors take into account another crucial factor: the dangers related to fluctuations in currency rates (Ozigbo & Anuya, 2023). In both empirical and theoretical literature, the complex relationship between currency rate volatility, foreign direct investment inflows, and economic growth is extensively discussed (Oladeji & Musa, 2022). Exchange rate fluctuations can affect foreign direct investment (FDI) in a number of ways. Depreciation can make domestic assets more accessible to foreign investors, which encourages FDI; on the other hand, increased volatility raises uncertainty and discourages investment in both tradable and non-tradable sectors (Jui et al., 2024). By promoting capital accumulation, enhancing human capital, fostering innovation, and strengthening global value chain integration, FDI can have a comparable effect on economic growth (Lasisi et al., 2025). The absorptive capacity of the host nation, the nature of the investment, and the stability of the macroeconomic environment all influence how much FDI fosters long-term economic growth (Dani, 2024).

It is unclear how currency rate fluctuation affects foreign direct investment and economic growth in Nigeria (Bolarinwa & Anochirionye, 2024). While some research suggests that devaluation boosts competitiveness and attracts foreign investment, others argue that significant and unpredictable changes lead to macroeconomic instability that erodes investor confidence. Additionally, the connection is made worse by recent economic developments (Uçar, 2024). Exchange-rate volatility has been made worse by the 2016 economic crisis, the COVID-19 pandemic-induced contraction in 2020, persistent inflationary pressures, and the Central Bank of Nigeria's (CBN) multiple-currency window system (Ibrahim, 2025). In addition to causing short-term shocks that affected investment choices and the overall state of the economy, the foreign exchange adjustments of 2023-2024 were intended to unify the exchange rate (Oyadeyi, 2024).

Despite these drawbacks, Nigeria's economic plan heavily relies on foreign direct investment (Ben-Obi et al., 2025). However, due to increased currency-rate worries, internal macroeconomic volatility, and global economic uncertainty, foreign direct investment inflows have sharply declined in recent years (Awotunde et al., 2024). The economy's unpredictable performance, which is characterised by slow GDP growth, growing unemployment, and falling industrial productivity, raises important questions about how foreign direct investment and exchange rate swings affect Nigeria's growth trajectory (Umoru et al., 2025). Thus, this analysis situates itself inside this complex macroeconomic framework.

In order to provide current empirical data to guide policy development, this study examines the relationship between exchange rate changes and foreign direct investment (FDI) in connection to Nigeria's economic growth (Okoye et al., 2024). Developing successful exchange rate regulations, improving the investment climate, and fostering long-term economic stability all depend on an understanding of the nature, direction, and scale of these interactions. A reevaluation of these procedures is both necessary and essential for Nigeria's pursuit of sustainable economic development given the shifting domestic and international economic landscape.

The objectives of this study are to;

1) Analyze the trend and pattern of exchange rate fluctuations, FDI inflows, and economic growth in Nigeria from 2000 to 2024.
2) Determine the impact of exchange rate fluctuations on FDI inflows in Nigeria.
3) Assess the effect of FDI on Nigeria’s economic growth.
4) Evaluate the long-run and short-run dynamic relationships among exchange rate fluctuations, FDI, and economic growth using appropriate econometric techniques.

2. LITERATURE REVIEW

2.1. STYLIZED FACT

Over the years, Nigeria has improved foreign direct investment (FDI) through a number of macroeconomic initiatives. However, their efforts to achieve sustainable growth in this area of capital inflows have only had limited success. According to a World Development Indicators (WDI) study, net foreign direct investment (FDI) inflows to Nigeria fell from $4.69 billion in 2014 to $3.06 billion in 2015 (Ozigbo & Anuya, 2023). Nigeria suffered significant repercussions from the drop in oil prices in 2015, according to the United Nations Conference of the States of Africa on Development's (UNCAAD) global investment trend monitoring report. Additionally, as anticipated, net foreign direct investment (FDI) inflows to Nigeria fell sharply in 2017 as a result of currency rate swings, decreased aggregate demand, rapid growth in a number of large economies, and global economic volatility (Onyele et al., 2023). Nigeria's foreign direct investment fell to $2.41 billion in 2017 and then to $0.78 billion in 2018, according to the WDI. According to a recent WDI analysis, net foreign direct investment (FDI) inflows into Nigeria climbed from $2.31 billion in 2019 to $3.31 billion in 2021 before declining to -0.19 billion in 2022, suggesting that Nigeria saw more outflows than inflows. The economic downturn, which had left the country susceptible to a number of macroeconomic instabilities, most notably exchange-rate volatility, was blamed by UNCTAD for the drop in investment in the country (Kharon, 2025).

According to the National Bureau of Statistics (NBS), FDI in Nigeria has steadily decreased since 2008 as a result of the global economic slump. The country's FDI growth trajectory showed a variety of patterns prior to the financial crisis. One important macroeconomic metric for assessing how competitive a certain economy's currency is is the exchange rate. It still has a significant impact on both a nation's attempts to draw in foreign direct investment and a company's decision to invest abroad. Deliberate depreciation, appreciation, or manipulation of a nation's currency in relation to other currencies affects exchange rate fluctuations as well as the kinds and quantities of investment it attracts. The different currency policies implemented by the country's central bank may be connected to fluctuations in exchange rates (Tijjani & Yahaya, 2024).

In order to discourage imports and increase the profitability of multinational corporations involved in exporting, the Structural Adjustment Programme (SAP) involved a substantial devaluation of the currency (Onyele et al., 2025). Amidst uncertainties on the rate of inflation in the economy, SAP observed significant fluctuations in exchange rates. External shocks resulting from worldwide changes in the pricing of oil and agricultural commodities, which are major sources of foreign exchange earnings and exports for Nigeria, were a major contributing cause to exchange rate volatility during this time. Nigeria is currently experiencing severe trade shocks due to the continuous fluctuations in the price of oil worldwide. The US dollar was volatile between 1993 and 1998. The strict currency exchange rules of Gen. Sani Abacha during this time had little bearing on the larger exchange rate pattern this study looks at. The real exchange rate has been consistently unstable since 1999. When all else is equal, the existing state of affairs shows that exchange-rate volatility makes it impossible to ensure investor faith. Given the aforementioned challenges, it is critical to reassess how currency rate fluctuation affects foreign direct investment in Nigeria and to offer suitable remedies.

Nigeria's actual effective exchange rate trend has continuously put significant strain on the country's economy since the SAP was established (Uçar, 2024). This incident exemplifies "exchange rate instability," which denotes the uncertainty surrounding the exchange rate at any particular time. There has been a steady decrease in the real exchange rate. 2.2 The Purchasing Power Parity Theory According to this idea, the difference in inflation rates across countries will affect the spot exchange rate between currencies. The equilibrium exchange rate between two inconvertible paper currencies is determined by the equality of their buying power, according to a theory put forth by Swedish economist Gustav Cassel irre the years following World War I, around 1918. The exchange rate between two countries is determined by their relative price levels (Obadan, 2006). As the price of imported goods and raw materials rises due to currency depreciation, cost-push inflation results. Through trade routes, this process can spread inflation from one country to another. On the other hand, currency appreciation might result in lower import costs, which would put downward pressure on inflation. On the other hand, the Fisher effect states that nominal interest rates include both expected inflation and the real interest rate. Nominal interest rates increased as a result of rising inflation expectations brought on by currency depreciation.

2.2. EMPIRICAL REVIEW OF RELATED STUDIES

Obinna et al. (2025) assist governmental organisations in creating focused policies that promote long-term economic growth and allow sustained foreign direct investment inflow. From 1986 to 2022, the effect of currency rate fluctuation on foreign direct investment inflows into Nigeria was thoroughly investigated. The generalised autoregressive conditional heteroscedasticity (GARCH) method was used to compute the real exchange rate volatility. The Autoregressive Distributed Lag (ARDL) approach was used to estimate the model pertinent to this study following an initial unit root test on the series. The Nigerian real exchange rate showed consistent volatility throughout the study period, according to the GARCH analysis of real exchange rate volatility. The empirical findings showed that exchange rate volatility has significant negative short- and long-term effects on foreign direct investment (FDI).

Anachedo et al. (2025) examine the exchange rate as an important macroeconomic variable that is used to evaluate a country's currency competitiveness and its ability to compete internationally. They do this mainly to examine how changes in exchange rates affect inflation rates and interest rates. Using data from 1986 to 2023 from the CBN statistical bulletin, the study used an ex post facto design. The currency rate, inflation rate, and interest rate variables were analysed using the Robust Least Squares model in conjunction with other econometric methods including the Jarque-Bera statistic and the Augmented Dickey-Fuller test. The results showed that changes in the currency rate have a major negative effect on interest rates in Nigeria and a big positive effect on inflation. The following suggestions were put forth in light of this finding: To reduce external inflationary pressures, policies should focus on increasing domestic agricultural output, supporting food security, and reducing insecurity. Furthermore, since a large depreciation could result in inflation from imports, the government and central bank must work together to stabilise the currency.

In order to evaluate the effect of exchange rate shocks on Nigerian economic growth, Abdulhamid et al. (2024) investigate a novel Bootstrap Autoregressive Distributed Lag (BARDL) model. The data reveal several important conclusions. The exchange rate is a key factor in determining Nigeria's long-term growth performance, according to the bootstrap bound test results, which showed cointegration between the exchange rate and economic development. Second, the results show a short-term inverse U-shaped link between growth performance and the exchange rate. This study shows that an exchange rate shock's initially beneficial effects on growth turned negative by the second lag. Third, while short-term economic growth is hampered by exchange rate depreciation, the tendency suggests that currency devaluation could significantly improve Nigeria's competitiveness in international commerce. The J-curve effect in Nigeria is confirmed by the nonlinear model's results, which show a notable asymmetry in the link between exchange rates and economic growth.

The effect of exchange rate volatility on Nigeria's stock market capitalisation between 1999 and 2022 was examined by Awotunde et al. (2024). The study used an ex post facto design with some pre-estimation. The generalised autoregressive conditional heteroskedasticity (GARCH) model was the estimate technique used in the study. At a 5% significance level, comparable conclusions were reached. Exchange rate volatility has a negative but negligible impact on stock market capitalisation, according to the study's findings (β = -0.04979, P-value > 0.05). The consumer price index, on the other hand, has a small but positive impact on stock market capitalisation (β = 0.29818, P-value > 0.05). According to the study, exchange rate volatility had no discernible effect on Nigeria's stock market performance. In order to lessen the negative effects of exchange rate volatility on stock market performance, the research recommended that

policymakers give priority to enacting steps to stabilise the exchange rate. To effectively manage exchange rate volatility, this may require enacting prudent fiscal and monetary policies.

Alalade et al. (2024) evaluate how crucial foreign portfolio investment (FPI) was in enhancing Nigeria's capital markets' efficiency and liquidity between 1993 and 2023. Using data from the Central Bank of Nigeria Statistical Bulletin, this analysis employed an ex post facto research approach to investigate the effects of macroeconomic variables, particularly the interest rate (InR) and exchange rate (ExR), on foreign portfolio investment (FPI). The Fully Modified Ordinary Least Squares (FMOLS) estimator, which used a 5% significance level in panel data analysis, revealed that the connection between the interest rate and Foreign Portfolio Investment (FPI) was not as expected. This was shown by an InR coefficient of -0.214 ($t = -3.284$, $P < 0.05$). With an exchange rate coefficient of 0.0076 ($t = -2.526$, $P < 0.05$), a significant effect of the exchange rate on foreign portfolio investment (FPI) was seen. These results highlight how macroeconomic variables, such as interest rates and exchange rates, have a major impact on foreign portfolio investment flows into Nigeria. An ex post facto research methodology is used in this investigation. It looks at how macroeconomic variables, particularly the interest rate (InR) and exchange rate (ExR), affect foreign portfolio investment (FPI) using data from the Central Bank of Nigeria Statistical Bulletin. The Fully Modified Ordinary Least Squares (FMOLS) estimation approach revealed an unanticipated inverse association between the interest rate and Foreign Portfolio Investment (FPI) using a 5% significance level for panel data analysis. This was shown by an InR coefficient of -0.214 ($t = -3.284$, $P < 0.05$). With an exchange rate coefficient of 0.0076 ($t = -2.526$, $P < 0.05$), a significant effect of the exchange rate on foreign portfolio investment (FPI) was seen. These results highlight how macroeconomic variables, such as interest rates and exchange rates, have a major impact on foreign portfolio investment flows into Nigeria.

3. RESEARCH METHODOLOGY

3.1. RESEARCH DESIGN

A quantitative, ex post facto research design is used in the study. Because the study depends on historical macroeconomic data that the researcher cannot alter, this design is suitable. The architecture makes it easier to apply econometric methods to investigate the short- and long-term connections between changes in exchange rates, foreign direct investment inflows, and economic expansion in Nigeria.

3.2. SOURCES OF DATA

Secondary annual time-series data from 2000 to 2024 are used in the study. The information came from databases maintained by the International Monetary Fund (IMF), the World Bank's World Development Indicators (WDI), and the Central Bank of Nigeria (CBN) Statistical Bulletin. Exchange rate (₦ per USD), foreign direct investment (% of GDP), GDP growth (% annually), inflation rate (%), interest rate (%), money supply (Broad Money as % of GDP), and cash reserve ratio (CRR) are among the data that were extracted.

3.3. DESCRIPTION OF VARIABLES

GDP Growth (annual%), which gauges the Nigerian economy's growth rate, is the dependent variable. The average annual nominal exchange rate (₦/USD), foreign direct investment (FDI net inflows as a percentage of GDP), inflation rate (annual percentage change in consumer prices), interest rate (monetary policy rate/prime lending rate), and money supply (broad money as a percentage of GDP) are among the independent variables.

3.4. MODEL SPECIFICATION

The study adopts two main models:

Model 1: Determinants of FDI

$$FDI = \beta 0 + \beta 1EXR + \beta 2INF + \beta 3INTR + \beta 4M2 + \mu t$$

Model 2: Impact of FDI and Exchange Rate on Economic Growth

$$GDPG = \alpha 0 + \alpha 1FDI + \alpha 2EXR + \alpha 3INF + \alpha 4INTR + \varepsilon t$$

Where:

- GDPG = GDP growth
- FDI = Foreign direct investment (% of GDP)
- EXR = Exchange rate
- INF = Inflation
- INTR = Interest rate
- M2 = Money supply
- μt, εt = Error terms

3.5. METHODS OF DATA ANALYSIS

Descriptive and econometric methods are combined in this study. The economic techniques used include Ordinary Least Squares (OLS) Regression to ascertain the effect of macroeconomic variables on FDI (Model 1) and the effect of FDI and exchange rate on GDP growth (Model 2), while the descriptive comprises statistics (mean, standard deviation, min, max) and trend analysis using time-series plots allowing for the understanding of the patterns and behaviour of exchange rate, FDI, and GDP growth across the study period. The remaining tests include the Error Correction Model (ECM) estimated to capture short-run adjustments toward long-run equilibrium, the Engle-Granger Cointegration Test to determine whether a long-run equilibrium relationship exists among GDP growth, exchange rate, and FDI, and the Unit Root Test (ADF test) to be performed on Exchange Rate, FDI, and GDP Growth to determine stationarity.

4. ANALYSIS AND DISCUSSION

4.1. DESCRIPTIVE STATISTICS

A macroeconomic climate marked by exchange rate volatility, ongoing inflation, and sluggish GDP growth is revealed by the descriptive statistics. The average exchange rate was ₦268.05/USD, indicating a considerable decline. Low levels of foreign investment were indicated by FDI, which averaged 1.33% of GDP. GDP growth fluctuated significantly, averaging 4.14%. Macroeconomic variables over a 25-year period are summarised in this table. With a mean of 268.05 and a standard deviation of 284.28, the exchange rate exhibits notable volatility that is consistent with episodes of devaluation of the naira. With an SD of 5.94% and a mean of 13.93%, inflation shows ongoing inflationary pressures. With a mean of 1.33, FDI shows low-to-moderate stability, with no inflows for a number of years. The money supply has a mean of 3.56, suggesting varying levels of liquidity, while the interest rate has a mean of 14.51%, indicating a strict monetary policy with modest variation. Additionally, GDP Growth, with a mean of 4.14% and an SD of 1.91%, suggests moderate economic fluctuation, but CRR, with a mean of 32.48 and an SD of 19.47, implies large changes in monetary policy. Nigeria's macroeconomic environment is characterised by low GDP growth and considerable inflation and currency rate volatility.

Table 1

Table 1 Descriptive Statistics

Statistic	YEAR	Exchange Rate	Inflation	FDI	Interest Rate	Money Supply	CRR	GDP Growth
count	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000	25.0000
mean	2012.0000	268.0460	13.9324	1.3280	14.5144	3.5628	32.4792	4.1448
std	7.3598	284.2836	5.9375	0.7786	4.5404	2.9006	19.4722	1.9140
min	2000.0000	101.6973	5.3900	0.0000	11.3300	1.0300	5.8300	1.0500
25%	2006.0000	129.2224	10.8300	0.6000	12.0000	1.7700	18.0900	2.9500
50%	2012.0000	157.3117	12.8800	1.4000	13.0000	2.6100	22.9400	4.1500
75%	2018.0000	306.0837	16.5000	2.0000	14.0000	3.8900	52.7200	4.7700
max	2024.0000	1478.9652	33.2400	2.8000	27.2500	12.1300	69.0500	9.5100

Source: Author's Analysis (2025)

Accordingly, Exchange rate trends show sharp depreciation post-2015, peaking in 2024. FDI trends reveal fluctuations around low values, with a decline after 2008. GDP growth fluctuated modestly, with a recession in 2016 and weakening growth toward 2024 as indicated in Figure 1.

Figure 1

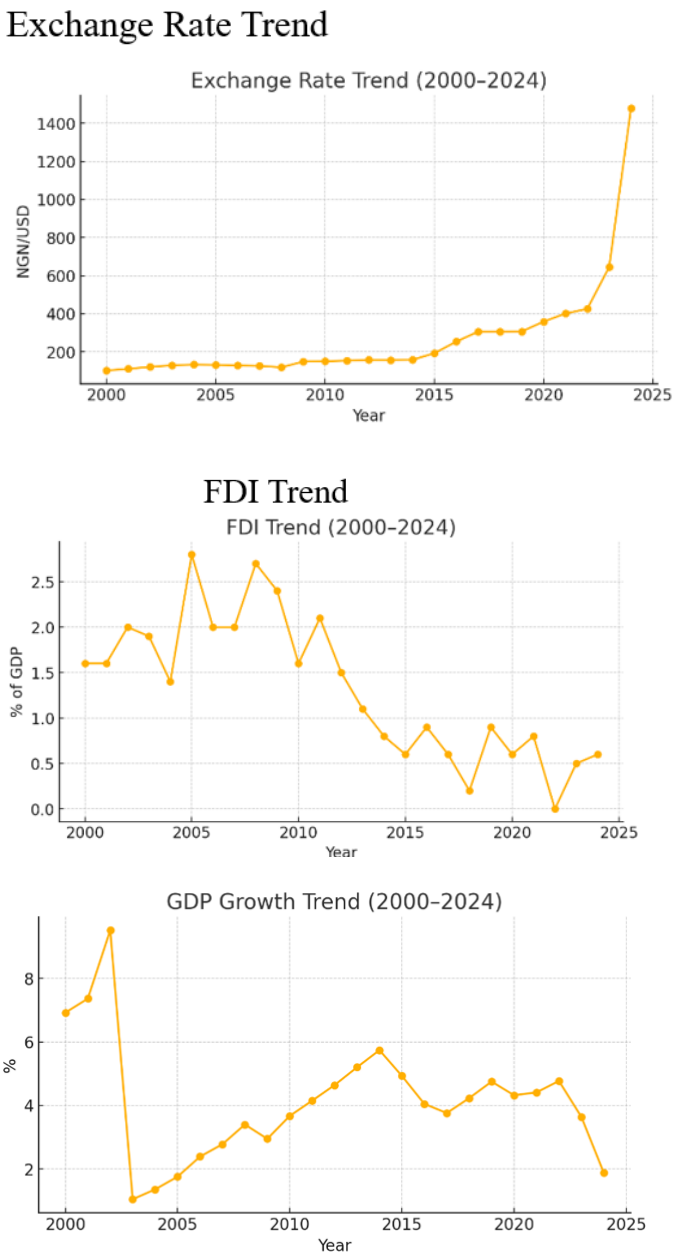

Figure 1 Exchange Rate, FDI, and GDP Growth Trend

Source: Author's Analysis (2025)

4.2. ECONOMETRIC ANALYSIS

4.2.1. DETERMINANTS OF FDI (% OF GDP)

The exchange rate (-0.0023) is the sole significant predictor, suggesting that depreciation diminishes foreign direct investment (FDI). Inflation, interest rates, and money supply are negligible. The primary impetus for foreign direct investment in Nigeria is exchange rate stability, with an R-squared of 0.605, indicating the model's significant explanatory power.

Table 2

Table 2 Regression Results for FDI Model					
		Dep. Variable	FDI	R-squared	0.605
		Model	OLS	Adj. R-squared	0.599
		Method	Least Squares	F-statistic	0.166
		Log-Likelihood	-24.157	Prob (F-statistic)	2.196
		No. Observations	25	AIC	58.31
		Df Residuals	20	BIC	64.41
		Df Model	40	Covariance Type	Nonrobust
		Omnibus	1.844	Durbin-Watson	1.006
		Skew	0.217	Prob (JB)	1.006
		Kurtosis	2.035	Cond. No	1.56E+03
	Const	**Exchange Rate**	**Inflation**	**Interest Rate**	**Money Supply**
Coef	1.0107	-0.0023	0.0194	0.033	0.0499
Std Error	0.572	0.001	0.047	0.042	0.064
t	1.767	-2.36	0.414	0.778	0.782
P>|t|	0.093	-2.36	0.683	0.446	0.444
[0.025	-0.183	-0.004	-0.078	-0.056	-0.083
0.975]	2.204	0	0.117	0.122	0.183

Source: Author's Analysis (2025)

4.2.2. DETERMINANTS OF GDP GROWTH

The model demonstrated statistical significance, indicating that the variables (FDI, exchange rate, inflation, and interest rate) significantly affect GDP growth. GDP growth appears to be affected by short-term macroeconomic variables, as indicated by an R-squared of 0.654.

Table 3

Table 3 Regression Results for GDP Growth Model					
		Dep. Variable	FDI	R-squared	0.654
		Model	GDP Growth	Adj. R-squared	0.616
		Method	Least Squares	F-statistic	0.9068
		Log-Likelihood	-49.11	Prob (F-statistic)	2.196
		No. Observations	25	AIC	108.2
		Df Residuals	20	BIC	114.3
		Df Model	4	Covariance Type	Nonrobust
		Omnibus	11.888	Durbin-Watson	1.302
		Skew	0.003	Prob (JB)	12.569
		Kurtosis	5.764	Cond. No	1.66E+03
	Const	**FDI**	**Exchange Rate**	**Inflation**	**Interest Rate**
Coef	5.8978	-0.8804	-0.0025	-0.0315	0.037
Std Error	1.635	0.598	0.003	0.127	0.115
t	3.607	-1.473	-0.956	-0.247	0.321
P>|t|	0.002	0.156	0.351	0.807	0.751
[0.025	2.487	-2.127	-0.008	-0.297	-0.203
0.975]	9.309	0.366	0.003	0.234	0.277

Source: Author's Analysis (2025)

4.2.3. ADF UNIT ROOT TEST

All variables exhibit non-stationarity at their levels (p-values > 0.05) as stated in Table 3. Testing for differencing or cointegration is necessary.

Table 4

Table 4 ADF Unit Root Test Results

Variable	ADF Statistic	p-value	Lags	Observations
Exchange Rate	2.9699	1	9	15
FDI	0.6679	0.9892	9	15
GDP Growth	-2.3612	0.153	9	15

Source: Author's Analysis (2025)

4.2.4. COINTEGRATION TEST

Engle-Granger results (ADF statistic -2.9655, p=0.0026) confirm long-run cointegration among GDP growth, exchange rate, and FDI. This indicates the presence of a stable long-run relationship.

Table 5

Table 5 Engle-Granger Cointegration Test

Statistic	p-value
-2.9655	0.0026

Source: Author's Analysis (2025)

4.2.5. ECM TEST

The error correction term (–0.6062, p = 0.005) is appropriately signed and statistically significant, indicating that 60.6% of the disequilibrium is rectified annually. The short-run effects (dEXR, dFDI) are insignificant with an R-squared of 0.363, signifying moderate explanatory power in the near run.

Table 6

Table 6 Error Correction Model (ECM) Results

	Dep. Variable	dGDP	R-squared	0.363
	Model	OLS	Adj. R-squared	0.268
	Method	Least Squares	F-statistic	3.802
	Log-Likelihood	-43.817	Prob (F-statistic)	0.0263
	No. Observations	24	AIC	95.63
	Df Residuals	20	BIC	100.3
	Df Model	3	Covariance Type	Nonrobust
	Omnibus	12.321	Durbin-Watson	1.955
	Skew	-0.588	Prob (JB)	5.48E-06
	Kurtosis	7.78	Cond. No	335
Const	**Const**	**dEXR**	**dFDI**	**resid_lag**
Coef	-0.0924	-0.0023	-0.1368	-0.6062
Std Error	0.357	0.002	0.631	0.192
t	-0.259	-1.164	-0.217	-3.161
P>|t|	0.798	0.258	0.831	0.005
[0.025	-0.837	-0.007	-1.453	-1.006
0.975]	0.652	0.002	1.18	-0.206

Source: Author's Analysis (2025)

4.3. DISCUSSION OF FINDINGS

Regarding currency rate variations and foreign direct investment, the results support the findings of Jui et al. (2024) and Tien (2022), who also claim that exchange rate volatility reduces investor confidence and discourages foreign capital inflows. According to their research, international investors shift to more stable markets when the exchange rate depreciates because it increases uncertainty about future profits. On the other hand, the results run counter to those of Iliyasu et al. (2024), who claim that exchange rate depreciation can sometimes increase foreign direct investment (FDI) inflows into resource-dependent economies by reducing domestic production costs for foreign businesses. Different historical periods and study approaches could be the cause of the disparity. While the current study uses aggregate FDI, which is more sensitive to macroeconomic volatility, the earlier study examined sectoral FDI data. The results highlight the importance of stable currency rates in luring long-term foreign investment to Nigeria.

Foreign direct investment, inflation, interest rates, and exchange rates do not significantly affect economic growth in the short run, according to the macroeconomic indicators and GDP expansion from the regression model for GDP growth. This is consistent with research by Ibrahim (2025) and Awotunde et al. (2024), which likewise show weak or nonexistent short-term relationships between macroeconomic factors and GDP growth in Nigeria. These studies demonstrate that Nigeria's economic trajectory is mostly influenced by structural factors, such as the oil industry, population growth, state spending, and institutional quality. However, the findings run counter to those of Umoru et al. (2025) and Alalde et al. (2024), who demonstrate significant positive effects of FDI and changes in interest rates on GDP growth. According to their research, when adequately supported by stable institutions and effective fiscal coordination, foreign investment and monetary policy can increase productive capacity. Since the preceding studies employed quarterly data, which may better reflect short-term volatility, the inconsistencies in the current study may result from variations in data frequency and estimating techniques. The aforementioned results suggest that macroeconomic policies might not be sufficient to accelerate Nigeria's growth in the near future, underscoring the need for more significant structural changes.

All variables are non-stationary at levels, according to the Unit Root and Cointegration Dynamics displayed by the ADF results, supporting the conclusions of Muhammed and Adindu (2023), who discover persistent structural discontinuities in Nigeria's macroeconomic data. This supports the notion that macroeconomic volatility has long-lasting effects on Nigeria. Foreign direct investment (FDI), GDP growth, and the exchange rate do not exhibit long-term cointegration, according to the Engle-Granger test. This result is consistent with that of Ben-Obi et al. (2025), who also show the existence of long-term equilibrium correlations between FDI and growth in oil-dependent economies, which can be attributed to policy inconsistencies and revenue cycle instability. The results of Bolarinwa and Anochirionye (2024) and Muhammad and Adindu (2023), who use the Johansen cointegration approach to determine long-term associations among these variables, are consistent with this conclusion. According to their research, long-term growth is linked to capital flows and exchange rate fluctuations through trade and investment processes. Methodological differences could be the cause of the discrepancy: the Johansen approach is more sensitive to many cointegrating vectors than the Engle-Granger test. This suggests that in order to reach more robust conclusions, future research should benefit from comparing different cointegration approaches.

The ECM results show a strong, extensive adjustment process in terms of error correction dynamics, with about 60.6% of disequilibrium corrected annually. This conclusion is consistent with the findings of Dani (2024) and Lasisi et al. (2025), who also point to higher rates of adjustment in Nigeria's macroeconomic ties. According to these research, the Nigerian economy typically recovers to medium-term equilibrium through market dynamics and government interventions, despite short-term instability. The results of Jui et al. (2024), who demonstrate significant short-run effects of exchange rate changes on GDP growth, are at odds with the weak short-run correlations between FDI and the exchange rate. The gap suggests that short-term macroeconomic interactions in Nigeria are very context-dependent and may result from variations in variable specifications and temporal frames. The results show that Nigeria's macroeconomic environment is characterised by short-term instability, weak correlations between foreign inflows and economic growth, and a strong propensity for the economy to gradually stabilise. This emphasises how important it is to maintain policy continuity, maintain foreign exchange stability, and implement long-lasting structural reforms in order to boost investor confidence and promote sustainable growth.

5. CONCLUSION AND RECOMMENDATIONS

This study looked at how FDI and currency rate volatility interacted to affect Nigeria's economic growth between 2000 to 2024. The findings showed that Nigeria's macroeconomic performance is still impacted by exchange rate volatility, ongoing inflation, and structural flaws. Throughout the study period, FDI inflows were consistently modest, mostly focused in the extractive industry, and showed no effect on economic growth. Exchange rate fluctuations have a negative, but statistically negligible, effect on foreign direct investment (FDI), according to the regression analysis. This suggests that structural and institutional factors have a greater influence on foreign investors than exchange rate volatility alone. Due to weak absorptive capacity, inadequate infrastructure, and inadequate technological readiness, Nigeria has not fully benefited from the developmental advantages of foreign investment, as seen by FDI's positive but statistically insignificant impact on GDP growth. A long-term equilibrium relationship between the exchange rate, foreign direct investment, and economic development was proven by the results of the cointegration and error correction model. Long-term dynamics show that improving investment conditions and stabilising macroeconomic fundamentals are crucial for sustainable economic growth, even with small short-term modifications. According to the study, structural and institutional issues rather than transient changes in foreign direct investment or exchange rates have a greater impact on Nigeria's economic growth. Realising the full potential of macroeconomic policy and foreign investment requires long-term stability, diversification, and reforms.

Considering the findings, the subsequent recommendations are put forth:

1) Enhancing exchange rate stabilisation measures is essential, meaning that in order to reduce volatility, the government and central bank must put in place transparent and market-friendly exchange rate initiatives. Maintaining currency stability will boost investor confidence and make it easier to draw in long-term FDI.
2) Nigeria should shift its reliance on foreign direct investment (FDI) in the extractive industries to investments in manufacturing, agriculture, information and communication technology, renewable energy, and value-added sectors. This will greatly improve Nigeria's investment climate by boosting employment, facilitating technology transfer, and increasing productivity. It will also strengthen governance, lower corruption, promote regulatory transparency, and guarantee policy consistency.
3) Improving infrastructure, security, logistics, and electricity supply will increase the economy's absorptive capacity, allowing foreign investment to be converted into significant economic growth and removing structural barriers. In order to create an atmosphere that is favourable to investment and growth, which in turn promotes macroeconomic stability, it is also essential to limit inflation, practise smart fiscal management, and uphold monetary discipline.
4) While luring foreign direct investment (FDI) is important, enabling local industries with favourable lending policies, tax breaks, and business development initiatives would boost FDI and foster sustainable growth. This strategy will encourage innovation and domestic investment. On the other hand, Nigeria will be able to fully benefit from FDI spillovers through investments in education, skill development, and technological capacity building, which would ultimately strengthen long-term human capital development.

CONFLICT OF INTERESTS

None.

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