
Moderating Role of Exchange Rate Volatility on The Effect of Foreign Direct Investment on Economic Growth in Nigeria

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Abstract

This study examined the moderating role of exchange rate volatility on the effect of foreign direct investment on growth in Nigeria. Specifically, the study sought to determine the effect of foreign direct investment and foreign portfolio investment on economic growth as moderated by exchange rate volatility in Nigeria. With Ex post Facto research design, the study employed secondary quarterly time series data from the Central bank of Nigeria Statistical bulletin (2023) for the period of 2002 to 2022. The study adopted GARCH model, descriptive statistics, unit root test, co-integration test and Autoregressive descriptive Lag (ARDL) to establish the moderating role of exchange rate volatility on the effect of foreign direct investment on economic growth in Nigeria. With the aid of ARDL analysis, foreign direct investment had insignificant effect on economic growth in Nigeria. While, foreign portfolio investment had a positive significant effect on economic growth in Nigeria. The study recommended that there is need for government to create a friendly environment with improved security conditions and also the CBN should provide forex liquidity in the financial system to respond to demands for foreign exchange and for foreign investment, economic stability and positive investor's confidence in the economy. Government should also evolve sound foreign exchange policies by removing barriers to capital account transactions with every sense of objectivity, economic management dexterity in line with global best practices that would strengthen the attraction of foreign portfolio investment.

Keywords: Foreign Direct Investment, Foreign Portfolio Investment, Exchange Rate Volatility, Economic Growth.

1. Introduction

Foreign Direct Investment (FDI) has long been regarded as a key driver of economic growth in Nigeria, a developing economy with abundant natural resources and a growing market. The relationship between FDI and economic growth is generally positive, as FDI serves as a critical source of capital inflow, technology transfer, and managerial expertise. FDI contributes to the development of infrastructure, industrialization, and job creation, which are essential for sustained economic growth (Kartikasari, 2017). However, the relationship between FDI and economic growth in Nigeria is often moderated by institutional quality, macroeconomic stability, and policy frameworks. Factors such as political instability, corruption, inadequate infrastructure, and security challenges have limited Nigeria's ability to attract and fully utilize FDI for economic growth. Furthermore, the concentration of FDI in the oil sector has created imbalances, reducing its potential to spur growth in non-oil sectors (Iheanachor & Ozegbe, 2021).

In Nigeria, sectors such as oil and gas, telecommunications, and manufacturing have benefited significantly from FDI inflows. These investments not only increase the productivity of local industries but also enhance export capacity and improve the balance of payments. Additionally, the inflow of FDI fosters competition and innovation, driving the overall efficiency of the economy (Adjei, 2021). However, foreign direct investment (FDI) in Nigeria has shown fluctuations over time. According to data from the Central Bank of Nigeria, FDI inflows have varied from as low as 154,189 USD million in 1999 to a peak of 484,264 USD million in 2012. The trend indicates an overall increase in FDI over the years, with some fluctuations in different periods. However, recent data from the second quarter of 2023 shows a decrease of 73.32 USD million compared to the previous period, highlighting a recent decline in FDI in Nigeria (Afolabi, 2022).

There is no consensus among scholars on the effect of FDI on economic growth. Therefore, there is growing evidence that suggests a direct relationship between foreign direct investment and economic growth in Nigeria (Manasseh et al., 2019; Ogunbiyi & Abina, 2019). On the other hand, other scholars hold view of the inverse nexus between foreign direct investment and economic growth in Nigeria (Orji et al., 2021, & González, 2019). The novelty of this study is the adoption of exchange rate volatility as a moderating variable. Therefore, this study serves to bridge the gap to analyze the classical economist theory model with the perspective of economic growth and foreign direct investment. This study will contribute to existing literature to produce an acceptable conclusion regarding the trade-growth relationship. Nigeria have now liberalized exchange rate regime by adopting I&E window, which might have implications for the trade-growth relationship. This study examined the moderating effect of exchange rate volatility on foreign direct investment on economic growth to develop policy implications in Nigeria.

2. Literature Review

Foreign direct investment is a direct investment into production or business in a country by an individual or company of another country, either by buying a company in the target country or by expanding operations of an existing business in that country. Jhingan (2014) conceptualized FDI as investment that is made to acquire a lasting management interest (usually 10% of voting stock) in an enterprise and operating in a country other than that of the investors (define according to residency) the investors purpose being an effective voice in the management of earning either long term capital or short-term capital as shown in the nations balance of payments account statement (Khaliq & Noy, 2017). Therefore, foreign direct investment includes mergers and acquisitions, building new facilities, reinvesting profits earned from overseas operations and intra company loans. However, the operationalised definition of foreign direct investment refers to building new facilities, job creation, infrastructure development, and technological transfer, as well as on productivity over time, has been a major driver of economic growth.

Foreign portfolio investment is an aspect of international capital flows comprising of transfer of financial assets: such as cash; stock or bonds across international borders in want of profit. It occurs when investors purchase non-controlling interests in foreign companies or buy foreign corporate or government bonds, short-term securities, or notes (Kostoulis, 2023). This type of investment has contributed significantly to the world economy over the past three decades and an important source of fund to support investment of both developed and developing countries. The need for foreign capital to supplement domestic resources is being felt by the developing economies, in

view of the growing dissimilarity between domestic capital stock and capital requirements (Iheanachor & Ozegbe, 2021). However, this study will consider foreign portfolio investment as the international capital flows of transfer of stock or bonds across international borders.

According to Ugochukwu and Oruta (2021), economic growth can be defined as the increase in output of an economy capacity to improve the welfare of the citizens of the country. Dahliah (2021) posited that economic growth is the development of economic activities that cause increased goods and services produced in society. Other factors that influence economic growth include financial system efficiency, investment and savings rates, migration of labour as well as fiscal and government budgetary policies (Boldeanu & Constantinescu, 2015). The rate of regional economic growth is usually used to assess regional development's success over a certain period. The regional economic growth can be addressed by increasing GDP (Gross Domestic Product) or (Gross Domestic Regional Gross). To achieve high economic growth, expanded fiscal policy is required by increasing government spending and investment. This study will define economic growth rate as the annual proportion of the value of GDP growth rate at market prices based on constant local currency. Thus, the ultimate goal of economic growth is to make the people better off.

Nwaogwugwu (2018) illustrated that exchange rates are highly volatile in the short run and are very responsive to political events, monetary policy and changes in expectations. In the long run, exchange rates are determined by the relative prices of goods in different countries. Exchange rates have become more volatile in recent years due to the abandonment of the fixed exchange rates, which have resulted in a massive volume in foreign exchange transactions. These transactions have grown faster than international trade and international investments flows of capital. The risk associated with foreign exchange transactions and trading at the foreign exchange market has increased but so has also the awareness and knowledge about the subject Exchange rate volatility, according to Mlambo et al (2013) is the domestic price of foreign money. It is the price of one currency in terms of another currency or the domestic price of foreign money. This study will define exchange rate volatility as the risk associated with unexpected movements in the exchange rate. The volatility of exchange rate is the source of exchange rate risk and has the implications on the volume of international trade

Empirical Review

Jamsheed (2024) using panel data for a large period (1980 to 2020) as obtained from the World Bank, examined the relationship between foreign direct investment (FDI), foreign debt and economic growth in the South Asia and discovered an inverse relationship between FDI growth rate and growth rate of economic output. While Jamsheed suggested a reduction in foreign debt to attract FDI, the article fails to understand that the reduction in foreign debt may not necessarily increase FDI as in the case of Nigeria. Conversely, Fazaaloh (2024) employed sectoral data in Indonesia over a period 2010 – 2019 to assess the nexus between FDI and economic growth; the result of the GMM System estimation showed that, in Indonesia, FDI overall has significant positive impact on economic growth and that the Manufacturing Sector has considerable impact on economic growth than other sectors of the economy. The major drawback of this study is that there is a gap in the data used for the study; data for at least 3 years 2020 to 2022 would be available at the time of conducting the research which could have influenced the outcome of the estimation.

Saha (2023) employed the benchmark impact of foreign direct investment (FDI) on labor productivity (LP) as well as the interactive effects of FDI and productive capacity index (PCI) while dynamic panel threshold technique is used to determine the threshold level of PCI. Later to check the sensitivity test, pooled mean group (PMG) methodology is applied. Using panel data from 88 countries from 2000 to 2018. The study examined the effect of FDI on LP contingent on the level of PCI across two economic sectors: tradable and nontradables. Applying novel PCI, the findings demonstrate that initially FDI exacerbates LP in the above two sectors, and the improvement in PCI from FDI diminishes this detrimental impact until a threshold of PCI, and then beyond that level, FDI enhances LP. Meanwhile, the latter benefit is larger in the tradable sector than in the non-tradable sector, and this beneficial effect is amplified by increased FDI inflows. A set of robustness tests were performed to corroborate the findings. Notably, the internal mechanism of PCI's eight indicators moderates the influence of FDI on LP. The study has a significant disadvantage as it spans 19 years (from 2000 to 2018). Since PCI data is not accessible before 2000 and after 2018, the study has limited the investigation to this time period. The study applied novel PCI, a wide category index, to assess the host countries' absorption capacity. Furthermore, according to our knowledge, this is the first attempt to assess the impact of FDI on LP in tradable and non-tradable sectors, as well as to determine the PCI threshold level at which the effect of FDI switches direction.

Orji et al. (2021) studied FDI's impact on economic growth in Nigeria, Africa's largest economy, from 1981 to 2016. This study employed OLS and ADL modelling to examine the data and found that FDI has significant impact on economic growth. According to the findings and recommendations of the study, the government of Nigeria needs to create policies that encourage greater FDI across all sectors of the economy, especially, in the service and manufacturing sectors to boost the country's productive capacity, increase employment opportunities, and enhance the quality of life for its citizens. Last but not least, there is a requirement to enhance the educational policy of the country to increase the stock of human capital in the country, which will produce effective policies for the attraction for productive FDIs in the country.

Iheanachor and Ozegbe (2021) investigated FDI effect on the long-term growth of the economies of Nigeria and Ghana. As a result of mounting evidence that increased FDI inflows over the past two decades have done little to further either country's commitment to sustainable development, research was launched to determine why. Using annual times series data from 2000 to 2018 gleaned from both countries' World Development Indicators (WDI), the study tested the impact of FDI inflows on sustainable development indicators during the time frame spanning the Millennium Development Goals (MDG) era and the early stages of the United Nations' Sustainable Development Goals (SDG) (UN). Based on the indicators used, the study found that Ghana had greater social sustainability than Nigeria. Nigeria, on the other hand, performed better in terms of environmental and economic sustainability. There is a 0.30% boost in economic growth and a 0.30% increase in economic sustainability for both countries for every percentage point rise in FDI. However, research has shown that the effect is too little to be noticed statistically. This shows that FDI is not to blame for the discrepancy between the two economies' rates of growth and their ability to remain economically stable.

Kulu et al. (2021) looked at how institutions and FDI affect the growth of the economy in Ghana. The Auto Regressive Distributed Lag (ARDL) method was used to look at secondary data that was

collected between 1995 and 2019. The Economic Freedom Index from the Heritage Foundation was used as a source of information for the Institutional Quality Index. The ARDL model shows that FDI constructs have a bigger effect on a country's economic growth when they work together than when they work alone. The study recommends that if the government wants to boost production growth, it should focus on attracting FDI and making institutions and rules stronger.

Li and Cantwell (2021) described the theoretical overview of FDI, explaining the main drivers that lead firms to undertake this type of investment and countries to attract them. Furthermore, the project analyses the recent trends, observing the increasing role of developing countries in influencing FDI flows. Later on, the author will investigate the role of FDI and its relevance focusing on a case study, the Italian economy. During the investigation, the author pointed out the national background, demonstrating the regional and sectoral divergence of FDI in Italy. Concluding the case study, the author shows some findings on the actual and feasible partnership among Italy and developing countries in terms of foreign investments, as in the case of the Belt and Road Initiative. In closing, the author will examine the potential pandemic's impact on FDI, analysing the UNCTAD and OECD predictions about the consequences of Covid-19 for FDI.

Sarker and Khan (2020) investigated the relationship between foreign direct investment (FDI) inflows and economic growth in host countries is a heavily debated issue. Although some studies have found evidence of the positive impact of FDI on economic growth, others have revealed the opposite result. Studies that examined the causality between FDI and gross domestic product (GDP) also have found evidence of unidirectional causality and, in some cases, a bidirectional causality. This study investigated the causal nexus between FDI and GDP in Bangladesh by employing standard time-series econometric tools, namely, augmented Dickey-Fuller, augmented Dickey-Fuller generalized least square, Kwiatkowski-Phillips-Schmidt-Shin, and Lee-Strazicich unit root tests to check stationarity, augmented autoregressive distributed lag (augmented ARDL) bounds testing approach to check cointegration, and Granger causality to explore the direction of causality. The augmented ARDL model found a long-run relationship between FDI and GDP. In addition, the error correction model and Granger causality results indicated the presence of a unidirectional causality running from GDP to FDI.

Hashmat (2018) looked at how FDI affected domestic investment in two countries in Sub-Saharan Africa (SSA). These countries were Kenya and South Africa. Our Pooled OLS analysis of annual series data from 1972-2011 demonstrated that FDI has no effect on local investment in sub-Saharan African countries. Using time series analysis, FDI had no influence on local investment in Kenya over either the short- or long-term, but that it does have a crowding-out effect in South Africa during the latter. However, domestic investment in SSA countries was significantly influenced by economic growth, inflation rate, trade openness, and exchange rate.

The article by Mamingi and Martin (2018) investigated the connection between FDI and GDP expansion in OECS member states (OECS). To do so, the research employs panel data consisting of annual data from 1988-2013 for 34 nations, including the six OECS economies. Empirical evidence indicates that FDI contributes to economic expansion, but has a negligible effect when viewed separately from other factors. That is to say, its major impact is felt less directly. When it comes to boosting economic growth, FDI and infrastructure development work hand in hand, yet

the former tends to displace the latter due to FDI's competitive nature. These results have important policy consequences.

Theoretical Framework

Trade liberalization theory was propounded by Edgeworth (1894), Scitovsky (1942) and Meade (1952). The theory states that by reducing trade barriers, such as tariffs and quotas, can lead to increased trade, investment, and economic growth. It emphasizes the importance of liberalizing trade policies to reap the benefits of globalization.

Trade liberalization theory also refers to the economic concept that advocates for reducing barriers and restrictions on international trade, such as tariffs, quotas, and other trade barriers. The theory posits that by promoting free trade, countries can benefit from increased efficiency, specialization, and economic growth. Proponents argue that trade liberalization can lead to a more competitive global market, lower consumer prices, increased investment, and improved overall economic welfare. However, critics point out potential drawbacks, including job displacement and negative impacts on certain domestic industries. Trade liberalization is a complex and debated topic in economics and international relations (Malefane et al 2018). Given this assumption, Adelowokan and Maku (2013) also argued that trade liberalization often benefits developed countries more than developing countries as the agreement could in some cases lead to greater exploitation of the environment e.g., greater production of raw materials and trading toxic waste to countries with lower environmental laws.

Emphatically, trade liberalization has been a central topic in international trade and economic policy discussions for many years. The theory is based on the principle of comparative advantage, which suggests that countries should focus on producing goods and services in which they have a lower opportunity cost and import goods they are less efficient at producing. This allows for specialization and the efficient allocation of resources globally (Iyoha & Okim, 2017). One of the most significant trade liberalization agreements is the World Trade Organization (WTO), which was established in 1995 to regulate and promote international trade. The WTO aims to reduce trade barriers and establish rules to govern trade relations among member countries. Trade liberalization has been implemented through various mechanisms, such as multilateral negotiations, regional trade agreements (RTAs), and bilateral trade agreements. RTAs, like the North American Free Trade Agreement (NAFTA) and the European Union (EU), seek to enhance trade integration within specific regions.

According to the theory, trade liberalization promotes a competitive market environment by exposing domestic firms to global markets. This openness encourages the inflow of FDI as multinational corporations seek to capitalize on the liberalized trade regime by investing in economies with reduced trade restrictions. FDI brings capital, advanced technologies, and managerial expertise that can enhance productivity and innovation in the host economy. In the context of developing countries like Nigeria, trade liberalization can attract FDI by signaling a commitment to market reforms and economic openness. However, the theory also suggests that the benefits of FDI and trade liberalization for economic growth depend on factors such as institutional quality, infrastructure, and the capacity of domestic industries to compete in global

markets. Without these, trade liberalization may lead to unequal growth or overdependence on foreign investors.

3. Methodology

The research design employed in this research work is Ex post facto research design. With the quarterly data from 2002 to 2022, the technique adopted in this research requires the use of empirical analysis of GARCH model, descriptive statistics, unit root test and Auto regressive distribution Lag (ARDL) because it recognizes that different factors not just one can affect or establish the moderating role of exchange rate volatility on the effect of foreign direct investment on economic growth in Nigeria. The following model was estimated.

$$GDP = f(FDI, FPI) \dots\dots\dots(1)$$

$$GDP_t = \alpha_0 + \alpha_1 FDI_t (EXV_t) + \alpha_2 FPI_t (EXV_t) + \mu_{it} \dots\dots\dots(2)$$

Where:

GDP = Gross domestic product

FDI = Foreign Direct Investment

FPI = Foreign Portfolio Investment

EXV = Exchange rate volatility (Moderating variable)

α_0 = intercept (value of Y when X_j is zero)

α_1 and α_2 = Coefficient of variables

μ_t = Error term

Building equations (3) into an ARDL model was stated:

$$\Delta GDP_t = \mu + \alpha_1 GDP_{t-1}(EXV) + \alpha_2 FDI_{t-1}(EXV) + \alpha_3 FPI_{t-1}(EXV) + \sum_{i=1}^{p-1} \lambda_1 \Delta GDP_{t-i}(EXV) + \sum_{i=0}^{q-1} \lambda_2 \Delta FDI_{t-1}(EXV) + \sum_{i=0}^{q-1} \lambda_3 \Delta FPI_{t-1}(EXV) + \mu_t \dots\dots\dots(3)$$

GARCH (TGARCH) Model:

This model proposed introduced independently by Zakoian in 1994 and Glosten, Jaganathan and Runkle in 1993 also accounts for asymmetry. The generalized specification for the conditional variance is given by:

$$\sigma_t^2 = \omega + \sum_{j=1}^q \beta_j \sigma_{t-j}^2 + \sum_{i=1}^p \alpha_i \varepsilon_{t-1}^2 + \sum_{k=1}^r \gamma_k \varepsilon_{t-k}^2 I_{t-k}$$

Where $I_t = 1$ if $\varepsilon_t < 0$ and 0 otherwise

Kuhe and Chiawa (2017) explained that in this model, good news, $\varepsilon_{t-1} > 0$, and bad news, $\varepsilon_{t-1} < 0$, have differential effects on the conditional variance; good news has impact on I_t , while bad news

has an impact of $\alpha_1 + \alpha_2$. If $\alpha_1 > 0$, bad news increases volatility, and we say that there is a effect for the $i - th$ order. If $\alpha_2 \neq 0$, the news impact is asymmetric.

4. Results and Discussions

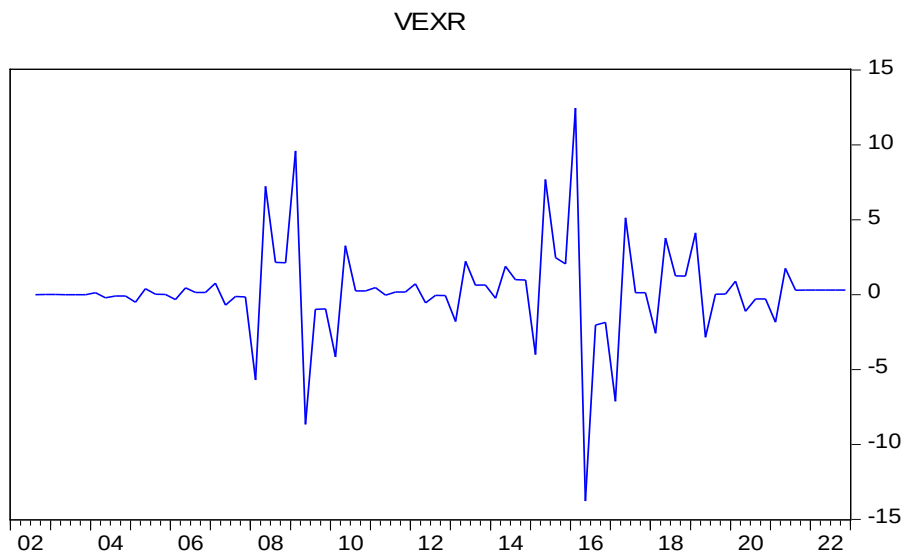
Table 1: Attributes of Estimated GARCH Models

S/N	Model	Distribution	Logl	AIC	SIC	HQC
1	TGARCH (1,1)	Normal	-775.90	3.543	3.630	4.578
2	TGARCH (1,1)	Students t	-772.504	3.523	3.625	3.564
3	TGARCH (1,1)	GED	-773.163	3.529	3.630	4.570

Source: Author's compilation from Eviews results

Even though the significance of the coefficients of all GARCH models suggested a high degree of validity for all the models estimated, the selection of the best fit model was based on the value of Schwarz criterion (SIC) as recommended in the study by Kuhe (2018), Using that criterion, the TGARCH (1,1) with Students's t error distribution was adopted for the study (lowest SIC of 3.625). This model also has the lowest AIC and HQC statistics.

Fig 2: Graph of the residuals Exchange Rate Volatility of TGARCH model



The results show that the conditional variance equation for the selected TGARCH (1,1) model is well specified. Since the TGARCH (1,1) model had no evidence of heteroskedasticity or autocorrelation, the residuals are then generated as exchange rate volatility series. Fig 2 depicts the graphical representation of the variable (Volatility of the exchange rate).

Table 3: Descriptive Statistics

	GDP	VFDI	VFPI
Mean	18083803	367310.8	463230.9
Median	68143.50	143.9713	746.3683
Maximum	2.160008	19467681	27294657
Minimum	-27335327	-16161970	-27144553
Std. Dev.	56716529	4052030.	5900029.
Skewness	2.805187	0.901267	0.203839
Kurtosis	9.137394	13.43412	14.79020
Jarque-Bera	242.0037	392.4203	487.1127
Probability	0.000000	0.000000	0.000000
Sum	1.520009	30854103	38911396
Sum Sq. Dev.	2.670017	1.360015	2.890015
Observations	84	84	84

Source: E-Views 10, 2024

Table 3 shows that, GDP, VFDI and VFPI has mean value of 18083803, 367310.8 and 463230.9 respectively, while deviation from the mean (standard deviation) was 56716529, 4052030 and 5900029. The mean of GDP, VFDI and VFPI were normally distributed because the standard deviation value was lower than the mean value. In like manner, GDP, VFDI and VFPI had median of 68143.50, 143.9713 and 746.3683 with Jarque-Bera of 242.0037, 392.4203 and 487.1127 respectively.

Table 4: Correlation Matrix.

	GDP	VFDI	VFPI
GDP	1	-0.029118567741	-0.0251870092
VFDI	-0.02911856771	1	0.8354258434
VFPI	-0.02518700926	0.835425843471	1

Source: Eviews 10, 2024.

From table 4, it explained the relationship between volatility of foreign direct investment and economic growth in Nigeria where the GDP was correlated with VFDI to the extent of -0.029, while, GDP was correlated with VFPI to the extent of -0.025. Also, VFDI was correlated with GDP to the extent of -0.029, while, VFDI was correlated with VFPI to the extent of 0.83. Finally, VFPI was correlated with GDP to the extent of -0.025, while, VFPI was correlated with VFDI to the extent of 0.483. However, the correlation matrix result implies that none of the study's independent variables has multicollinearity.

Table 5: Summary of Unit Root Test Results

Variables	ADF Test Statistic	Order of Integration
GDP	-4.845458 (-3.515536)	<i>I</i> (1)
VFDI	-12.16060 (-3.511262)	<i>I</i> (0)
VFPI	-12.50662 (-3.511262)	<i>I</i> (1)

Source: Eviews 10, 2024

From the Table 3, it was discovered that GDP was found stationary at first difference, that is, at order *I*(1). It follows that their ADF test statistic was discovered to be higher than their threshold values. Additionally, VFDI was discovered to be stationary at level, or at order *I* (0). It follows that their ADF test statistic was discovered to be higher than their threshold values. However, at order *I*, the first difference, the VFPI was found to be stationary (1). It follows that their ADF test statistic was discovered to be higher than their threshold values. The long-term relationship between the variables was examined using the ARDL approach.

Table 6: Johansen Cointegration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.623465	108.6812	29.79707	0.0000
At most 1 *	0.243165	29.56480	15.49471	0.0002
At most 2 *	0.082761	6.997365	3.841466	0.0082

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**

None *	0.623465	79.11639	21.13162	0.0000
At most 1 *	0.243165	22.56743	14.26460	0.0020
At most 2 *	0.082761	6.997365	3.841466	0.0082

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

Source: Authors Computation, 2024

The result of Johansen cointegration shows that there is indication of cointegration at 0.05 significance level as shown in its trace statistics of None, At most 1 and At most 2 (29.56480 and 6.997365) are greater than their respective 0.05 critical values (15.49471 and 3.841466), while their p-values (0.0002 and 0.0080) are all below the 0.05 level of significance for this study. Since there is a cointegration in the two criteria of Johansen cointegration test, it implies that there is a long run relationship between GDP and the two variables of FDI and FPI considered.

Table 7: ADRL Estimation

ARDL Bounds Test

Sample: 2002Q4 2022Q4

Test Statistic	Value	k
F-statistic	2.268662	2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	0.606202	0.112047	5.410254	0.0000
D(GDP(-2))	0.240637	0.130047	1.850387	0.0682
C	1236275.	1196590.	1.033165	0.3048
VFDI(-1)	-0.025312	0.504305	-0.050191	0.9601
VFPI(-1)	0.001907	0.346298	0.005508	0.0006
GDP(-1)	-0.069358	0.026590	-2.608397	0.0110
R-squared	0.431089	Mean dependent var	2215804.	
Adjusted R-squared	0.393162	S.D. dependent var	13132727	

S.E. of regression	10230372	Akaike info criterion	35.19081
Sum squared resid	7.85E+15	Schwarz criterion	35.36817
Log likelihood	-1419.228	Hannan-Quinn criter.	35.26197
F-statistic	11.36617	Durbin-Watson stat	2.014595
Prob(F-statistic)	0.000000		

Source: Authors Computation, 2024

Table 7 shows the result of the ADRL bound test for variables used in the study. The result rejects the null hypothesis if the F-calculated is less than the critical value for the upper bound 1(1) and vice versa. From this result, it can be seen that the F-statistics is greater than the critical values at 1(1) and as such, it is concluded that there is the presence of a long-run relationship among the variables.

The ARDL result also reveal the explanatory power of the regression model with an r-squared of 43%. This indicates that 43% of the variation in economic growth (GDP) is explained by the independent variables of foreign direct investment (moderated by exchange rate volatility). The remaining 57% is explained by variables outside this model. The Adjusted R^2 of 398% is close to the R^2 value of 43%, meaning that the model is fit and useful for making generalization within this period.

Foreign direct investment had no significant effect on economic growth as moderated by exchange rate volatility because the p-value was 0.9601 which was more than the 0.05 significant level, indicating that increase in foreign direct investment will not have any increase on gross domestic product in Nigeria. The result of the study revealed a negative coefficient of -0.025312. This is significant at a 95% confidence level. As such, the study accepts the hypothesis that foreign direct investment has no significant effect on economic growth as moderated by exchange rate volatility in Nigeria.

Foreign portfolio investment had a significant effect on economic growth as moderated by exchange rate volatility because the p-value was 0.0006 which was less than the 0.05 significant level, indicating that increase in foreign portfolio investment will have an increase on gross domestic product in Nigeria. The result of the study revealed a coefficient of 0.001907. This is significant at a 95% confidence level. As such, the study rejects the hypothesis that foreign portfolio investment has no significant effect on economic growth as moderated by exchange rate volatility in Nigeria.

Post Estimation Result

Table 8: Test for Heteroscedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.850220	Prob. F(4,77)	0.1293
Obs*R-squared	10.57537	Prob. Chi-Square(4)	0.1318
Scaled explained SS	159.5637	Prob. Chi-Square(4)	0.1002

Source: E-view 10.

The presence of heteroscedasticity is of major concern when applying the analysis. Therefore, the initial step is to investigate whether the variance of the error term is constant. Heteroscedasticity occurs when the variance of the error term is not constant in that the variance of the error term changes as the values of the independent variables change. The heteroscedasticity test is aimed at interpreting whether the regression model has different residual variances from different observations (Ghozali, 2002). In this study, the Breusch-Pagan Godfrey test was used to examine heteroscedasticity. The null hypothesis for the test is that there is no heteroscedasticity. If the p-value is found to be less than 5 percent, then reject the null hypothesis and conclude that the residuals are heteroscedastic. If heteroscedasticity is established, appropriate measures will be employed. Heteroscedasticity was tested using Breusch Pagan's Test.

Basically, the presence of heteroskedasticity signifies that the variation of the residuals or term error is not constant which would affect inferences in respect of beta coefficient, coefficient of determination (R^2) and F-statistic of the study. Based on the results, it can be concluded that there is no problem of heteroscedasticity as the F-statistics and its corresponding probability stand at 0.1293 and 0.1318 which is insignificant, implying that there is the absence of heteroscedasticity in the model.

Discussion of Findings

Based on the findings, foreign direct investment had insignificant effect on GDP as moderated by exchange rate volatility at 5% significant level, indicating that an increase in foreign direct investment will not have any increase on economic growth in Nigeria. Research works such as; Kostoulis (2023), Okwu et al, (2020) and Afolabi (2022), all support the findings of this study. The insignificant effects of FDI on GDP could indicate structural issues such as poor infrastructure, weak institutions, corruption, or policy instability that limit the effectiveness of FDI in fostering economic growth. Also, investments brought into the country may not be effectively utilized or directed into productive sectors that contribute significantly to economic growth. For instance, FDI might be concentrated in sectors with low GDP contributions, such as extractive industries, without sufficient value addition or linkage effects on the local economy.

Furthermore, foreign portfolio investment had a significant effect on GDP as moderated by exchange rate volatility at 5% significant level, indicating that an increase in foreign portfolio investment will have an increase on economic growth in Nigeria. This work is in line with the findings of Orji et al (2021) and Iheanachor and Ozegbe (2021). A strong relationship between FPI and GDP indicates the high interest rate and how the financial markets play a crucial role in channeling foreign investments into productive sectors of the economy. This underscores the importance of developing and maintaining vibrant capital markets to attract and sustain foreign investments.

Conclusion and Policy Recommendations

The study looked at how exchange rate volatility influenced foreign direct investment's impact on Nigeria's economic growth. There is a nonlinear relationship between foreign direct investment and economic growth in Nigeria, according to the study's empirical results. Although Ijirshar's (2019) empirical evidence has not been definitive, the policy implication indicates that economic theory suggests that foreign direct investment should promote economic growth. While some nations, like Nigeria, have not seen increased economic growth or even faced serious crises, others have profited from financial liberalization.

Drawing from the research findings, the recommendations proffered are as follows:

- i. Due to the insignificant effect of FDI, there is need for the government to create a friendly environment with improved security conditions and also the CBN should provide forex liquidity in the financial system to respond to demands for foreign exchange, in order to bring about economic stability and to boost investor's confidence in the economy.
- ii. Government should evolve sound foreign exchange policies by removing barriers to capital account transactions with every sense of objectivity, economic management dexterity in line with global best practices that would strengthen the attraction of foreign portfolio investment in order to enhance stock market returns, strengthen domestic capital markets, improve market functioning, and lead to a better allocation of capital and resources in the economy.

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