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The Effect of Interest Rates on Foreign Direct Investment (FDI) in Nigeria

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Abstract
This study investigated the influence of interest rates on foreign direct investment (FDI) in Nigeria, providing important insights into the dynamics of major economic variables such as exchange rates, real interest rates, and inflation rates. The study used quantitative approach, specifically econometric modelling in analysing the relationship between FDI and Interest rate. The results showed a substantial long-run cointegrating relationship between these variables, implying that they are interrelated and that changes in one might have long-term consequences for the others. Specifically, the analysis finds that higher exchange rates have a negative impact on FDI, whereas real interest rates have a modestly negative impact on investment decisions. Furthermore, the study showed that, while inflation rates have a favourable but minor long-term influence on FDI, they considerably diminish foreign investment in the near run. This emphasizes the significance of macroeconomic stability in attracting foreign investment, as excessive inflation can cause uncertainty, discouraging potential investors. The error correction model showed a speedy return to long-run equilibrium following short-run shocks, underlining the strength of the long-run correlations among the variables. In the light of these findings, the study emphasized the importance of consistent economic policies that stable currency rates and interest rates in order to create a more appealing investment climate in Nigeria.

Keywords: ARDL; Exchange Rate, Foreign Direct Investment, Inflation, Real Interest Rate.

1.0 Introduction

Interest rate talks in Nigeria have become hot topics, attracting the attention of the government, investors, and even ordinary citizens. This is due to the fact that interest rate variations have a wide-ranging influence on the economy. The Central Bank of Nigeria (CBN)'s primary monetary goal is to target inflation, so the need to influence interest rates is usually one of the major decisions made at each Monetary Policy Committee (MPC) meeting, as it is believed that price gyrations can be controlled by influencing domestic interest. The fragile nature of interest rates has resulted in policy adjustments aimed at stabilizing them over time.

As highlighted by Idoko *et al*., (2020), previous to the implementation of the Structural Adjustment Programme (SAP) in 1986, interest rates were regulated by the CBN and adjusted periodically based on the priorities of each sector of the economy. However, beginning in August 1987, banking sector reforms

included interest rate liberalization. Since 2004, the MPC has been in charge of setting interest rates in accordance with economic trends. Prior to 2007, the Minimum Rediscount Rate (MRR) was an important monetary policy instrument used by the CBN to influence lending rates. However, the Monetary Policy Rate (MPR) was introduced and adopted on December 11, 2006, thereby replacing the MRR. The MPR is the CBN's official interest rate, and it acts as the benchmark for all other interest rates in the economy.

Investment capital is a significant source of financial resources for businesses and economic sectors in society as they invest, consume, and grow the economy. Foreign direct investment can be viewed as a significant supplemental source of funds to compensate for deficiencies in local capital and savings. When domestic savings rates are low, developing and growing countries require investment money for infrastructure, industry, business, and economic development, thus foreign savings are a first choice. Furthermore, attracting foreign capital flows provides a country with additional money for economic development (Kellard *et al*. 2022).

FDI provides several other economic benefits to the host nation (Le *et al*. 2022). For starters, FDI money is frequently accompanied with high technical content, innovation, high productivity, and superior management abilities, resulting in several benefits to economic progress. Secondly, foreign direct investment frequently promotes interaction and technology transfer between FDI businesses and domestic enterprises, assisting domestic enterprises in improving productivity and efficiency. Thirdly, foreign direct investment frequently improves the country's ability to meet local demands as well as export, therefore enhancing commerce with the rest of the globe.

The financial system, particularly the central bank's monetary policy, has a crucial influence in attracting foreign direct investment (Karahan & Bayır, 2022). When the central bank adopts expansionary monetary policy, interest rates fall and firms may access money at reduced rates, which benefits both local and international enterprises. In this sense, monetary policy can help to encourage economic growth. Monetary policy may stabilize prices, limit inflation, and promote economic growth (Karahan & Bayır, 2022).

Many researchers have explored the link between monetary policy and foreign direct investment. According to Karahan and Bayır (2022), monetary policy affects foreign direct investment by either increasing or decreasing it. Albulescu and Ionescu (2020) also claimed that monetary policy uncertainty has a detrimental impact on FDI inflows. Other study suggests that the host country's financial situation may impact FDI businesses' investment decisions (Kellard *et al*. 2022). The differential in domestic and international interest rates influences the choice to invest in the host country. The relationship between interest rates and foreign direct investment has been the subject of numerous studies both in Nigeria and abroad. These studies have looked at the dynamics of foreign private capital flows into Nigeria by concentrating on the effects of interest rate differential and currency rate movement, as well as the impact of currency rate volatility on the lack of direct foreign investment in Nigeria over the period of 1981 to 2018. The relationship between the currency rate, interest rate, inflation, gross fixed capital creation, gross domestic product, and direct foreign investment in Nigeria was also studied by others. They also looked at the effects of interest rate differentials and exchange rate movement on the dynamics of Nigeria's international private capital flows, among other things. However, the breadth and variables that make up this study are unique, including interest rates, currency rates, inflation rates, and foreign direct investment. Therefore, this study investigated the influence of interest rates, currency rates and inflation rates on FDI in Nigeria.

Indeed, when domestic interest rates exceed overseas interest rates, foreign investors increase their investment in the host country in quest of returns. In contrast, when local interest rates are lower than international interest rates, foreign investors reduce their investment in the host country. Furthermore, monetary policy has the greatest impact on domestic interest rates; when the Central Bank adopts expansionary monetary policy, interest rates rise, resulting in increased domestic investment. Interest rates decrease when the Central Bank pursues contractionary monetary policy, which reduces domestic investment.

2.0 LITERATURE REVIEW

2.1 Conceptual Review

This section discussed various concept related to the study. They are discussed as follows:

2.1.1 Concept of Interest Rate

The interest rate is the percentage-based amount of interest payable on a loan, deposit, or borrowing. The total interest on the amount borrowed or lent is determined by the principal amount, interest rate, compounding frequency, and length of the loan, deposit, or borrowing. Interest rates are an important monetary policy instrument that is used to address issues such as unemployment, inflation, and FDI. National Central Banks routinely cut interest rates to stimulate investment and consumption within their own economies.

In emerging economies, interest rate changes are typically performed to keep inflation within a target range for the health of economic activity, or to limit interest rates concurrently with economic growth to maintain economic momentum. Keynes (1936), one of the first researchers to describe interest rates, defined them as the cost of borrowing money for a set period of time. Devereux and Yetman (2002) defined interest rates as the cost of borrowing money or capital that the borrower does not own. Typically, the supply and demand function of capital determines interest rates. Furthermore, the monetary policy of a country determines interest rates in that economy.

When capital is in high demand, interest rates rise. In contrast, less demand for capital will result in lower interest rates. However, the government can use its monetary policy to raise or lower interest rates in order to meet certain macroeconomic goals. For example, during periods of excessive inflation, the government may raise interest rates to lower the money supply.

According to Ngugi (2001), interest rates are an excellent prediction of future inflation as well as any expected change in money's buying power. Borrowers' desire for loans or money has an impact on interest rates. Interest rates, like other prices, serve as a market clearing mechanism, limiting the quantity of credit accessible. Interest rates are established on the credit or debt markets in the same manner that stock prices are determined on the NSE (Kasemo, 2015).

2.1.2 Foreign Direct Investments

Foreign Direct Investment is chosen over other kinds of foreign funding due to its non-debt creation, non-volatile nature, and reliance on project success for rewards. According to Singh (2005), FDI promotes international trade and technology transfer.

According to the World Bank (1996), Foreign Direct Investment is defined as an investment undertaken to gain a long-term management stake (typically 10% voting shares) in a business operating in a country other than the investor's residence. This sort of investment is divided into two categories: 'Greenfield' investment (also known as 'mortar and brick' investment) and mergers and acquisitions, which include the purchase of existing interest rather than fresh investment. A direct investment connection in a firm requires ownership of at least 10% of the ordinary shares or voting stock. Less than 10% ownership can be considered portfolio investment (Macaulay, 2007).

Foreign direct investment may be defined as the level of ownership of productive assets such as land, mines, and factories. Increased foreign investment has resulted in greater economic integration and globalization. For many years, direct foreign investment has taken the shape of machinery, buildings, and equipment. Furthermore, multinational businesses account for a significant portion of foreign direct investment (Uremadu *et al*., 2016).

Countries can host FDI projects in their own country while simultaneously taking part in international investment efforts. The inbound FDI position includes hosted FDI projects, whereas the outbound FDI position includes foreign-owned FDI projects. In the near run, a higher mix of inbound and outward FDI positions may make the domestic economy more exposed to economic disruptions overseas.

According to Macaulay (2012), foreign direct investment in Nigeria was the product of colonial overlords seeking to exploit the Nigerian economy in order to expand their own economy. In this aspect, the colonial overlords made minimal foreign investment after discovering oil in Nigeria, and foreign investment in Nigeria has been volatile ever since. The Nigerian government has implemented all tactics to promote inflows of FDI into the nation, recognizing the importance of FDI to economic growth. Lall (2002) assert that privatization in Nigeria was among other measure that was adopted to promote Foreign Direct Investment inflow. The privatization in the area of manufacturing, agricultural production and social amenities companies were partially or completely owned by private individuals in the country.

2.1.3 Nigeria and Foreign Direct Investment FDI

Sales strategy and FDI Nigeria's ability to attract other countries to invest has only been successful due to the massive reserves of oil and gas (OECD, 2019). FDI from 2013-2020 totaled USD11.03 billion and will continue to increase due to continuous infrastructure development particularly power and transportation. Although conducting business in Nigeria poses serious risks, the Nigerian Government has been successful in putting in place laws that incentivize and ultimately secure FDI from China and global businesses at large.

2.1.4 Eclectic Paradigm Theory

Dunning (1993) advanced the hypothesis that combine the three distinct but interrelated theories. The OLI is used to elaborate on the ways the variables influence the fluctuations in foreign direct investments. The advantages allied to ownership are those delivered by immaterial resources. The asset should be owned and administered exclusively by the firm and are movable to other companies at a higher rate of profit. In his point of view, Dunning (2005) maintains that once all other variables are constantly maintained, a business with a sophisticated level of modest lead comparative to its opponents has an upper chance in advancing its general production. Henceforth increasing its international footprint.

According to Denisia (2010), differentiating economies powers and opportunities can be determined by use of the location advantages. The most promising nation is chosen for the undertakings of international companies. Connection amongst location and ownership benefits is where an international company is able to establish itself in most appealing economy, it will take part in the utilization of its ownership allied capitals, hence resulting in the company participating in foreign investment. Globalization sets out guidelines for the firm to be in a position to have a market in every market where the firm sells its merchandize. The organization must put in place avenues in which it intends to diversify and benefit through production in foreign entities instead of relying on inadequate fees that are gotten from actions such as shipping and licensing.

As Dunning (2005) has observed, MNC’s are guaranteed to get greater yields when they involve themselves in foreign production as instead of extending their production rights to other nations or non-controlling holdings. The eclectic model promotes the creation of production capabilities by a company by utilizing its competitive position and tactical locations. In this way, the businesses are not only benefiting from FDIs but also outdoing their competitors.

2.3 Empirical Literature Review

This section review various empirical literature related to the study. They are discussed as follows:
According to Karahan and Bayır (2022), contractionary monetary policy might hinder developing nations' capacity to attract FDI. As a result, monetary policy has failed to attract international capital flows, particularly given that many nations maintained this approach during the recent COVID-19 outbreak. Concerns over the stock market's impact on the economy and increasing interest rates led to the continuation of contractionary monetary policy. The nations need more appealing policies to attract FDI inflows to compensate for the negative financial impact of contractionary monetary policy in the context of the pandemic shock, which afflicted many economies.

Bao *et al*. (2022) stated that trade policy uncertainty has a substantial impact on global FDI flows. China, for example, engages in significant foreign commerce with the United States. As trade policy uncertainty lessens, FDI inflows into China grow, as does FDI in high-exporting industries. Thus, trade liberalization provides several benefits to the host country. Furthermore, FDI businesses have the potential to dominate the worldwide market and increase exports. Similarly, Singapore has a high level of commercialization while also generating significant FDI inflows.

Okonkwo *et al*., (2021) tried to explore the influence of currency rate volatility on the absence of Foreign Direct Investment in Nigeria over the period 1981-2018. The authors employed many statistical approaches, including the Unit Root Test, Stationarity Test, Multi-Collinearity, Co-integration Relationship, Error Correction Model (ECM), and Granger Causality Analyses. Their findings show that foreign direct investment and both real and nominal exchange rates are positively connected. As a result, the authors claim that in order to attract foreign investment, the central bank should provide an adequate flow of forex in the foreign currency market and maintain ongoing stability in the exchange rate.

Onabote *et al*. (2022) used the Autoregressive Distributive Lag (ARDL) approach to study the link between currency exchange rates, direct foreign investment, and economic development from 1981 to 2018. The currency rate, direct foreign investment, and economic development all have a long-term relationship. According to the findings, Foreign Direct Investment stimulates economic growth, and the rate of adjustment is considerable (78.46%). The research recommends, among other things, that the Nigerian government create an environment that encourages the growth of private firms. The authors also propose that the government should take efforts to boost investor confidence and attract large international investment. Inflationary impacts are another factor that influences the connection between interest rates, currency rates, and foreign direct investment. An inflationary shock will affect both interest and exchange rates, as the nominal interest rate and currency exchange rate are influenced by expected inflation and the relative rates of home and international inflation. In principle, inflation shocks should cause the "nominal" interest rate and the currency exchange rate to diverge.

Nguyen (2023) examined the role of monetary policy in attracting Foreign Direct Investment. We used data from typical Southeast Asian countries from 1997 to 2020 to evaluate differences in monetary policies over time, using regression of Ordinary least squares (OLS), Fixed Effects Model (FEM), and Random Effects Model (REM), as well as a cross-sectional dependence test based on Panel-Corrected Standard Errors (PCSE) and Driscoll-Kraay standard errors. The findings demonstrate that expansionary monetary policy discourages Foreign Direct Investment, whereas contractionary monetary policy encourages the flow of international capital into Southeast Asian countries. The study also indicated that trade liberalization and the quality of human resources had a good influence on attracting Foreign Direct Investment. However, there was no influence on Foreign Direct Investment from urbanization rate, population size, or visitor numbers.

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Okonkwo *et al*., (2021) sought to explore the influence of currency rate volatility on the absence of Foreign Direct Investment in Nigeria, using 1981-2018 as the research period. The authors employed statistical approaches such as the Unit Root Test, Stationarity Test, Multicollinearity, Cointegration Relationship, Error Correction Model (ECM), and Granger Causality Analyses. Their findings show that FDI and real and nominal exchange rates are positively connected. As a result, the authors believe that in order to attract

foreign investment, the Central Bank should provide an acceptable flow of forex in the foreign currency market while also maintaining continuous exchange rate stability.

Inflationary impacts are another factor that influences the relationship between interest rate, currency rate, and foreign direct investment. An inflationary shock will have an impact on both interest and exchange rates since the nominal interest rate and currency exchange rate are determined by predicted inflation and the relative rates of domestic and international inflation, respectively. In theory, inflation shocks should cause the "nominal" interest rate and the rate of currency exchange to diverge.

Benetrix *et al*. (2023) used several baseline estimation approaches to investigate selected developed and low-income nations from 1990 to 2009. Their research found that FDI has a favorable relationship with economic growth in countries with large global value chains but low beginning levels of human capital accumulation and financial development. The study concluded that human capital and financial development have a critical influence in attracting FDI to poor countries.

Ofori and Asongu (2022) used the Generalized Method of Moments (GMM) estimator to estimate panel data in Sub-Saharan Africa from 1990 to 2020. As a consequence, FDI was able to promote economic growth in both the long and short term. The research did, however, emphasize that the majority of the beneficial effects will be determined by the country's governance dynamics. The study showed that a nation with good institutional and governance quality will benefit more from FDI inflows, resulting in economic growth.

Nguyen (2024) investigates Asia, while Okello and Badj (2023) study Kenya, using the ordinary least squares approach from 1970 to 2019. The study sought to evaluate the link between growth and FDI. The data suggested that there is a negative relationship between FDI and economic development. The negative outcome was linked to Kenya's history as an import-substituting economy, as well as the counter-effect of trade policies designed to stimulate economic growth in Asian countries.

The research by Naftaly and Edwin (2024) explored the association between FDI and Kenyan economic development using extensive regression analysis and causality testing. Theoretical literature contends that FDI inflows can provide significant benefits to the host nation; nevertheless, empirical studies demonstrate that the benefits of FDI vary substantially between countries. Kenya has long been one of Africa's top receivers of FDI, with foreign investors providing intangible assets to help native enterprises run smoothly. However, Kenya has recently experienced a drop in FDI. Despite growing empirical attention to the relationship between foreign inflows and the economy, little is known about FDI's role in Kenya's nexus. The Autoregressive Distributed Lag (ARDL) regression approach and causality tests were employed in the study to evaluate the impact of foreign direct investment on Kenyan economic development. The empirical research was based on secondary time series data for Kenya. The time series runs from 1990 until 2021. The results suggest that increasing FDI inflows will promote economic development. Furthermore, the findings indicate that trade openness and climate change are major factors in growth. Notably, the results show that short- to long-term foreign direct investment promotes economic growth.

Francis (2023) investigated the link between FDI, the rate of exchange, and interest in Nigeria from 1980 to 2020. We developed a linear model of FDI using the least squares technique. Since the 1980s, a significant discovery has been that the currency rate and interest rate have substantial influences on FDI. We demonstrated that the exchange rate has a significant positive relationship with the amount of FDI, whereas the interest rate has no significant impact on FDI.

Interest rates also have a negative impact on FDI, which is consistent with previous findings. The maximum likelihood technique developed by Johansen and Juselius (1988) demonstrates that currency and interest rates eventually have an impact on FDI. However, it has been shown that currency and interest rates are essential in determining foreign investment in Nigeria. As a result, it is advised that Nigeria, a developing country, communicate trade and monetary policies that would increase foreign investment inflows while also aligning with an optimum interest rate policy in Nigeria.

Isiaka *et al*. (2022) examined the link between interest rates and FDI in selected Sub-Saharan African nations from 1990 to 2019. Data on FDI, interest rates, and currency rates were obtained from World Bank Development Indicators, and asymmetric or nonlinear ARDL was used in the research. It was shown that, while interest rates and real exchange rates have a considerable long-term influence on FDI in the symmetric model, they are inconsequential in the short run. Furthermore, the interest rate and exchange rate have a negative association with foreign direct investment in the short term, but the interest rate is positive with foreign direct investment in the long run, while the exchange rate is negative. It was discovered that while positive increases in interest rates encourage foreign direct investment in the near term, they alter and lower foreign direct investment in the long run. However, a drop in interest rates tends to attract foreign direct investment in the near term but not in the long run. The ECM indicated that the short-run mistake will be corrected in the long run by 94.5% and 88%, respectively. The report advises that monetary authorities raise loan rates in a short period of time to attract international investors, but the exchange rate must rise.

3.0 Methodology

This section discussed methodology and the model used in the study. They are discussed as follows:

3.1 Introduction

The data used for this study were extracted from Central Bank of Nigeria (CBN) statistical Bulletin, National Bureau of Statistics and World Development Indicators (WDI). In this study, Foreign Direct Investment was used for the dependent variable, interest rate, exchange rate and inflation rate.

3.2. Accelerator Model

A number of investment theories have been put forward in an attempt to show the main determinants of investment in an economy. To develop the model, the flexible accelerator model by Chenery and Koyck (1952) shows that the relationship between investment and output need not to be fixed but can be affected by other variables like the cost of investment funds, that is, interest rates. The model uses lags in the adjustment process between level of output and capital stock. The equilibrium capital stock KE is given as a function of output, the user cost and the price of output.

KE = KE(Y,C,P)…….1

Where;

KE is the Equilibrium capital stock

Y is the Output

C is the User cost

P is the Price of output

Model Specification

For a better and deep understanding of the analysis of this work, mathematics and econometric model was used to evaluable the preposition given in the research work. In examining the Foreign Direct Investment in Nigeria, some macro-economic variables were captured and included in the model to enable the modeling relationship between FDI and interest. The model followed the work of Adamu and Chandana (2019) with some modifications. To measure the relationship between the determinants of capital expenditure, a mathematical expression of the relationship is formulated thus:

LFDI = F (RIR, EXR, INF,) ……(1)

LFDI = F (RIR+ EXR+ INF+ ui) ……(2)

Where:

LFDI = Log Foreign Direct Investment

RIR = Real Interest Rate

EXR = Exchange Rate

INF =Inflation

Unit Root Test

The estimation procedure adopted in this study is in the following sequences. To stem the problem of spurious regression, it is important that the time series properties of the data set employed in estimation of

equation be ascertained. It is reasonable to test for the presence of a unit root in the series using the most general of the models as:

$$\Delta yt = \alpha 0 + Yyti + \alpha 2t + \Sigma\beta j\Delta yt\text{-}1 + et \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3)}$$

Where y is the series t is (trend factor); α0 is the constant term, et is the stochastic error term, β is the lag length. Augmented Dickey Fuller (ADF) unit root test was employed to test the integration level in order to determine the order of integration of the variables. The data indicated different integration level for different variables in the model. This means some variables were stationary at level while some were stationary at first difference. Autoregressive Distributed Lag Bound Testing Approach.

The ARDL approach to co-integration analysis involves estimation of unrestricted Error Correction Model (UECM). Hence the ARDL model for testing the nexus between public debt and educational expenditure is stated as shown below:

After establishing the long-run co-integration, the short-run model of the ARDL can be specified in the following equation:

Stability Test
The stability test of the model is to establish cointegration among variables. This test is necessary but not sufficient condition. Since the study employed the used of stability test designed by Brown *et al*, (1975) known as Cumulative Sum of the residual (CUSUM) and Cumulative Sum of the Square (CUSUMQ) if the graph of CUSUM and CUSUMQ is within the critical bound region 5% level of significance the null hypothesis is that, all the coefficient in the model should not be rejected.

Diagnostic Test
Diagnostic test for serial correlation, hetroskedasticity, normality and Ramsey reset test were carried out for the estimated model.

Breusch Godfrey LM Test for Autocorrelation
Autocorrelation is the relationship between current and past error terms and this most likely to occur in time series data. Compare to DW Test and Durbin's h-test, we choose the Breusch Godfrey LM Test because the DW test will provide inconclusive result and does not take higher order of serials correlation into account and the Durbin h test is unable to use the lagged dependent variable. In the test, there is no autocorrelation problem for null hypothesis; the null hypothesis will be rejected if the P-value of F-statistic is lower than the level of significance.

Breusch Godfrey Heteroskedasticity Test
To ensure that all the residual are randomly scattered throughout the range of the dependent variable, heteroscedasticity test will be used. There variance of the error would be expected to be constant for the value of the control variables, in the present of heteroscedasticity, the disturbances of the parameters are no longer normal. The decision rule is to reject the null hypothesis if the probability of the F-statistic and observer R2 are less than 0.05, meaning heteroscedasticity is present on the other hand if the probability of the F-statistic and observer R2 are greater than 0.05 we do not reject the null hypothesis. This indicates there is no heteroscedasticity. That is errors are homoscedastic.

Jarquee-Bera (JB) Test for Normality
This test is employed to find out whether the null hypothesis of error terms are normally distributed; the null hypothesis will be rejected if the P-value of the JB statistic is lower than the level of significance.

4.0 Results and Discussions

This section discussed results and the findings to the study. They are discussed as follows:

4.1 Descriptive Statistics

Table 1: Descriptive statistics results

	LFDI	EXR	INR	RIR
Mean	1.973502	149.2813	16.92278	24.52969
Median	1.675517	130.5350	10.30663	23.10000
Maximum	5.790847	397.0800	75.40165	36.09000
Minimum	0.634336	9.910000	0.686099	18.36000
Std. Dev.	1.220941	112.9014	15.64308	4.429155

Source: Author's Computation using Eviews (2024)

The descriptive statistics in Table 1 provides an overview of the key variables in this study. The mean values indicate that, on average, Nigeria experienced foreign direct investment of 1.973502 (LFDI), with exchange rate (EXR) of 149.2813, inflation rate (INR) of 16.92278 and real exchange rate (RIR) of 24.52969. The median values suggested that half of the observations had Foreign Direct Investment of 1.675517 (LFDI), with exchange rate (EXR) of 130.5350, inflation rate (INR) of 10.30663 and real exchange rate (RIR) of 23.10000. The standard deviation values indicate significant variability in FDI of 1.220941 (LFDI), with exchange rate (EXR) of 112.9014, inflation rate (INR) of 15.64308 and real exchange rate (RIR) of 4.429155.

Table 2. Correlation Marx

	LFDI	EXR	INR	RIR
LFDI	1			
EXR	-0.5798489615334289	1		
INR	0.1063707936630873	-0.4665435813230146	1	
RIR	-0.2709814709362062	0.4049840012337142	0.02331850331835547	1

Source: Author's Computation using Eviews (2024)

Table 2 presents a correlation matrix, which summarizes the strength and direction of linear relationships between four variables: The diagonal elements (1.000000) represents the perfect positive correlation of each variable with itself. FDI exhibits positive correlation with exchange rate (0.57984896153), interest rate positive and weak correlation (0.1063707936630873) and Real interest rate has negative coefficient value of (-0.2709814709362062).

Table 3. Result of Unite Root Test

Variables	ADF statistics	Critical value	Probability	Order
LFDI	-4.405759	-2.971853	0.0017	I(1)
EXR	-4.074340	-2.963972	0.0037	I(1)
RIR	-7.967814	-3.574244	0.0000	I(1)
INR	-4.006339	-3.580623	0.0203	I(1)

Source: Author's Computation using Eviews (2024)

The Unit Root Test results indicate that, FDI, EXR, RIR and INR become stationary, indicating that they are integrated of order one, I (1). This means that the variables are non-stationary at levels but become stationary after differencing.

Table 4. Selection Criteria
VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-396.7933	NA	11869888	27.64091	27.82951	27.69998
1	-327.2407	115.1214	299552.4	23.94764	24.89060*	24.24296
2	-307.1867	27.66073*	243092.3*	23.66805	25.36538	24.19963*
3	-290.6744	18.22046	283601.6	23.63272*	26.08442	24.40056

Source: Author's Computation using Eviews (2024)

The sequential modified LR test statistic (each test at 5% leve, Final prediction error and Hannan-Quinn information criterion select lag 2 while, Akaike information criterion and Schwarz information criterion selected lag 1. Based on this this result the best model selected is lag 2.

4.2.2 ARDL Bounds Test

F-statistic	**10.96614**	**10%**	**2.37**	**3.2**
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Actual Sample Size	30		Finite Sample: n=30	
		10%	2.676	3.586
		5%	3.272	4.306
		1%	4.614	5.966

Source: Author's Computation using Eviews (2024)

The F-statistic value of 10.96614, as presented in Table 3, indicates the presence of a long-run cointegrating relationship among the variables FDI, EXR, RIR and INR. This suggests that these variables share a common stochastic trend, implying a significant relationship between FDI, exchange rate, real interest rate and inflation rate dynamics in the long run. The critical values, based on Narayan (2005), confirm the significance of the F-statistic value. Specifically, the F-statistic value exceeds the upper bound I(1) critical value at the 1% significance level, allowing us to reject the null hypothesis of no cointegration. This finding implies that foreign direct investment, exchange rate, real interest rate and inflation rate dynamics are interconnected in the long run, and changes in one variable can have a lasting impact on the others. This cointegrating relationship provides a foundation for further analysis, such as error correction modeling, to explore the short-run dynamics and causal relationships among these variables.

Table 6: Results for long-run coefficient

Variable	Coefficient	t-Statistic	Prob.
EXR	-0.004574	-2.008539	0.0583
INR	0.017694	0.995020	0.3316
RIR	-0.106631	-1.823539	0.0832
C	4.639236	4.252110	0.0004

Source: Author's Computation using Eviews (2024)

The results showed the long-run relationships between foreign direct investment, exchange rate, real interest rate and inflation rate, exchange has a negative and significant impact on FDI, suggesting that increased exchange rate reduced FDI in the long run. Inflation rate has a positive and insignificant impact on foreign direct investment, indicating that increased inflation rate increases FDI in the long run. real interest rate has a marginally significant negative impact on FDI, suggesting that increased real interest rate may have a limited negative effect on Foreign Direct Investment.

Table 7. Results for short-run coefficient and Error correction regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXR)	0.000625	0.005625	0.111147	0.9126
D(INR)	-0.035907	0.009282	-3.868438	0.0010
D(RIR)	-0.009300	0.029702	-0.313112	0.7574
CointEq(-1)*	-0.947322	0.116787	-8.111525	0.0000
R-squared	0.750448	Mean dependent var	-0.120835	
Adjusted R-squared	0.698458	S.D. dependent var	1.154374	
S.E. of regression	0.633900	Akaike info criterion	2.103005	
Sum squared resid	9.643899	Schwarz criterion	2.383245	
Log likelihood	-25.54508	Hannan-Quinn criter.	2.192656	
Durbin-Watson stat	1.767397			

Source: Author's Computation using Eviews (2024)

The results showed the short-run coefficients and error correction regression for the relationship between the foreign direct investment and its determinants. The change in exchange rate has a positive coefficient (0.000625), insignificant (p-value = 0.9126), suggesting that increases in exchange rate may have a positive impact on FDI in the short run. The change in inflation rate has a negative coefficient (-0.035907), highly significant (p-value = 0.0010), indicating that increases in inflation rate is significantly reduces FDI in the short run. The change in real interest rate has a negative coefficient (-0.009300), highly insignificant (p-value = 0.7574), suggesting that increases in real interest rate reduces FDI in the short run. One of the important outcomes of this short-run result, is the error correction term coefficient, CointEg (-1) which has the correct sign and as well as significant at 5 percent. The coefficient of CointEg (-1) shows the speed of adjustment back to the long-run equilibrium after a short-run shock. In this case, CointEg (-1) is -0.947322.

Table 8. Diagnostics Tests: Second-Order Testing

Test Statistics	Chi-square/LM Test	Probability Value
Serial Correlation	**0.5820**	**0.7183**
Normality	**0.208604**	**0.900953**
Heteroscedasticity	**0.7058**	**0.7862**

Source: Author's Computation using Eviews (2024)

Note: serial correlation is determined using the Lagrange multiplier test of residual, normality based on skewness and kurtosis and Heteroscedasticity based on squared residuals on squared fitted values.

The diagnostics tests in Table 8 examine the residuals of the model for any potential issues. The results indicate that, No Serial Correlation: The Lagrange multiplier test statistic (0.5820) is not significant (p-

value = 0.5820), suggesting that the residuals do not exhibit serial correlation. This means that the model's errors are not systematically related to each other over time. Normality of Residuals (0.208604) is not significant (p-value =0.900953), indicating that the residuals are normally distributed. This suggests that the model's errors follow a normal distribution, which is a desirable property. No Heteroscedasticity, the test statistic (0.7058) is not significant (p-value = 0.7862), indicating that the residuals do not exhibit heteroscedasticity. This means that the model's errors have constant variance across all levels of the independent variables.

Table 7 Toda-Yamamoto Causality Result

Dependent variable: LFDI			
Excluded	**Chi-sq**	**Df**	**Prob.**
EXR	0.851256	2	0.6534
All	15.74068	6	0.0152
Dependent variable: EXR			
Excluded	**Chi-sq**	**Df**	**Prob.**
LFDI	0.523769	2	0.7696
All	5.369332	6	0.4974
Dependent variable: INR			
Excluded	**Chi-sq**	**Df**	**Prob.**
LFDI	2.198446	2	0.3331
All	21.87755	6	0.0013
Dependent variable: RIR			
Excluded	**Chi-sq**	**Df**	**Prob.**
LFDI	0.676292	2	0.7131
All	9.802068	6	0.1332

Source: Author's Computation using Eviews (2024)

The Toda-Yamamoto Causality Tests examine the causal relationship between FDI, exchange rate, inflation rate and real interest rate. The Toda-Yamamoto causality test results indicate no significant Granger causality from foreign direct investment to exchange rate but there is significant Granger causality from exchange rate to foreign direct investment. Specifically, foreign direct investment does not Granger-cause exchange rate (p-value =0.6534). Exchange rate Granger-cause foreign direct investment (p-value = 0.0152).

Discussion of findings

The study's finding of a long-run cointegrating relationship among FDI, Exchange Rates (EXR), Real Interest Rates (RIR), and Inflation Rates (INR) is consistent with the work of Johansen (1991), who established that macroeconomic variables often exhibit long-run relationships due to their interconnected nature. This supports the notion that FDI is influenced by a combination of economic factors, a conclusion echoed in Akinlo (2004), who found similar relationships in the context of Nigeria. The evidence of these variables sharing a common stochastic trend implies that policymakers should consider these interdependencies when formulating economic strategies. The negative and significant impact of exchange rates on FDI aligns with findings from Froot and Stein (1991), who argue that a depreciating currency can deter foreign investment due to increased costs for foreign investors. This relationship is particularly pertinent in Nigeria, where currency fluctuations can significantly affect investment decisions. Conversely, the positive but insignificant short-run impact of exchange rates on FDI suggests that while exchange rates may not be a decisive factor in the short term, they still play a role in shaping investor perceptions, a view supported by Chakrabarti (2001), who found that exchange rate stability is crucial for attracting FDI.

The study's observation that inflation rates have a positive but insignificant long-run effect on FDI, while significantly reducing FDI in the short run, resonates with the findings of Mottaleb and Kalirajan (2010),

who argue that high inflation creates uncertainty, which can deter foreign investment. This is particularly relevant in developing economies like Nigeria, where inflation can lead to volatility in investment returns. The contrasting effects of inflation on FDI in the long run versus the short run highlight the need for stable economic policies that can mitigate inflationary pressures, as emphasized by Ogujiuba *et al*. (2011). The significant error correction term coefficient of CointEg (-1) at -0.947322 indicates a rapid adjustment back to long-run equilibrium after short-run shocks. This finding is in line with the work of Engle and Granger (1987), who introduced the concept of error correction models to analyze the dynamics of cointegrated variables. The rapid adjustment process suggests that while short-term fluctuations may occur, the long-run relationship between these economic variables remains robust, reinforcing the conclusions drawn by Odedokun (1997) regarding the importance of long-term stability in attracting FDI.

Finally, the study's finding of significant Granger causality from exchange rates to FDI, but not vice versa, supports the conclusions of Akinlo (2004) and Ogunleye (2015), who also noted that exchange rates significantly influence FDI decisions in Nigeria. This unidirectional relationship suggests that while exchange rates are a critical determinant of FDI, the influence of FDI on exchange rates is less pronounced, indicating that foreign investment decisions are more reactive to changes in exchange rates than the other way around.

5.1 Summary

The study on the impact of interest rates on FDI in Nigeria revealed several significant findings regarding the relationships between these economic variables. First, the results indicate that both exchange rates and interest rates are critical determinants of FDI in Nigeria. Specifically, the analysis shows that while exchange rates exhibit a considerable positive link with FDI, higher interest rates tend to have a negative impact. This suggests that fluctuations in these rates can significantly influence the attractiveness of Nigeria as a destination for foreign investment.

Additionally, the study highlights the long-run dynamics between FDI, exchange rates, and interest rates. It confirms that these variables are interconnected, with changes in one potentially leading to adjustments in the others over time. The findings supported the notion that a stable exchange rate is essential for attracting FDI, while high interest rates may deter investment due to increased borrowing costs. This relationship underscored the importance of maintaining favorable monetary policies to create a conducive environment for foreign investments.

5.2 Conclusion

This study examined the impact of interest rates on Foreign Direct Investment in Nigeria, revealing critical insights into the dynamics between key economic variables, including exchange rates, real interest rates, and inflation rates. The findings indicate a significant long-run cointegrating relationship among these variables, suggesting that they are interconnected and that changes in one can have lasting effects on the others. Specifically, the study highlights that higher exchange rates negatively impact FDI, while real interest rates also exert a marginally significant negative influence on investment decisions.

Moreover, the analysis demonstrates that inflation rates, although having a positive but insignificant long-run effect on FDI, significantly reduce foreign investment in the short run. This underscores the importance of macroeconomic stability for attracting foreign investment, as high inflation can create uncertainty that deters potential investors. The error correction model indicates a rapid adjustment process back to long-run equilibrium after short-run shocks, emphasizing the robustness of the long-run relationships among the variables.

5.2 Recommendations

In light of these findings, the study underscores the necessity for coherent economic policies that stabilize exchange rates and interest rates to foster a more attractive investment climate in Nigeria. Addressing the challenges posed by currency volatility and high borrowing costs is essential for enhancing the country’s competitiveness in the global market. Ultimately, by implementing targeted policy interventions and ensuring macroeconomic stability, Nigeria can improve its ability to attract FDI, which is vital for driving

economic growth and development. Moreover, the study emphasizes the necessity for Nigeria to implement effective trade and monetary policies that align with the goal of boosting foreign investment inflows. Despite Nigeria's rich natural resources and potential market, the country has struggled to attract adequate levels of FDI, which is attributed to various challenges, including high interest rates and currency volatility. The research suggests that addressing these issues is crucial for enhancing Nigeria's competitiveness in the global investment landscape.

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