International Journal of Operational Research in Management, Social Sciences & Education | IJORMSSE
p-ISSN: 2536-6521 | e-ISSN: 2536-653X
Volume 10 Number 2 November, 2024

Impact of Selected Macroeconomic Variables on Foreign Direct Investment Inflows to Nigeria: 1986-2023

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Article DOI: 10.48028/iiprds/ijormsse.v10.i2.12

Abstract

Foreign aid, foreign direct investment, and portfolio investments are major sources of capital inflows for developing nations like Nigeria. These influxes give the much-needed funding for industrialization, infrastructure, and overall growth. Nonetheless, Nigeria has implemented a number of reforms and policies in an effort to draw in international investment. When compared to the amount of investments made by investors from other regions of the world, Nigeria still receives a comparatively small amount of foreign direct investment annually, despite the efforts of numerous administrations. Therefore, using time series data from 1986 to 2023, an empirical assessment of the factors driving foreign direct investment inflows to Nigeria is conducted, considering important macroeconomic variables like real gross domestic product growth rate, inflation rate, interest rates, and exchange rate. The Fully Modified Ordinary Least Squares (FMOLS) Regression was employed as main analytical technique. Three out of the four explanatory variables used in this paper have statistically significant influence on FDI inflows to Nigeria in the long run The RGDP growth rate, INTR rate and EXR rate, which by implications are important determinants of FDI inflows to Nigeria throughout the sample period. The study discovered that the real gross domestic product growth rate is significant and positively correlated with FDI inflows based on a variable-by-variable analysis. Also, the estimated impact of inflation rate on FDI inflows is positive and insignificant in the long run. This implies that inflation rate does stimulates FDI inflows. On the other hand, the findings indicated that interest rates appear to affect FDI inflows significantly and positively in the long-run. While, the results indicated that exchange rate affects FDI inflows positively and significantly in the long run. Therefore, the paper suggested that the Federal government should focus on infrastructure development, human capital investments, and high-growth industries to promote economic growth. Also, policymakers should prioritize prudent fiscal policies and supply-side cost-cutting measures to control inflation and maintain macroeconomic stability among other recommendations.

Keywords: *FDI; Growth Rate; Exchange Rate; Inflation Rate; Interest Rate; FMOLS*

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Background to the Study

Developing economies like Nigeria rely heavily on foreign capital inflows such as foreign direct investment (FDI), foreign aid, and portfolio investments for economic development. These inflows provide the much-needed capital for infrastructure, industrialization, and overall growth. Understanding the determinants of these investments is crucial for formulating policies that can enhance FDI inflows. Theoretically, the Gravity Model (Tinbergen, 1962) and Dunning's Eclectic Paradigm (1988), certain macroeconomic variables such as market size (GDP growth), trade openness, inflation rate, and exchange rate serve as critical determinants of FDI flows. However, Nigeria, in its quest to attract foreign investments has engaged in several reforms and policies over the years, the most prominent are the industrial policy of 1989, enactment of Nigerian Investment and Promotion Council (NIPC) in the early 1990s, deregulation of the economy, and the signing of bilateral investment treaties (BITs) which took place in the late 1990s (World Bank, 2022). With the coming of the present democratic dispensation Nigeria witnessed yet another economic reform aimed at complementing the existing reforms earlier mentioned. These reforms and policies led to the establishment of the economic and financial crimes commission (EFCC), the independent corrupt practice and related commission (ICPC) Bureau of Public Enterprises (BPE), and a host of other latent reforms geared to woo investors locally and internationally (Fagbemi & Bello, 2020).

A most recent policy effort aimed at attracting foreign investments to Nigeria is the Economic Recovery & Growth Plan (ERGP, 2017). The ERGP was a medium-term plan (2017-2020) to revive the Nigerian economy from the 2016 economic recession. The Economic Recovery & Growth Plan has three main objectives to drive inclusive and sustainable growth. One of the objective relevant to this study is that the ERGP aims to build a globally competitive economy by increasing investment in infrastructure (Power, Rails, and Roads amongst others), stimulating favorable business environment to attract investors and promoting digital-led industry growth. Despite all these efforts by successive administrations, foreign direct investment (FDI) annual flows to Nigeria when compared with the size of investments from other parts of the world is still relatively small. Hence, empirical assessment of the drivers of foreign direct investment (FDI) inflows to Nigeria considering key macroeconomic variables such as market size, captured with real gross domestic product growth rate, inflation rate, interest rates and exchange rate as top of the traditional determinants of FDI flows. Specifically, this paper systematically scrutinized some of these variables in order to provide a comprehensive analysis of how they affect FDI inflows to Nigeria.

The following research questions guided the research:

i. What impact does real gross domestic product growth rate have on foreign direct investment inflows to Nigeria?
ii. How inflation impact foreign direct investment inflows to Nigeria?
iii. To what extent does interest rate impact on foreign direct investment inflows to Nigeria?

iv. What is the impact of exchange rate on foreign direct investment inflows to Nigeria?

Research Objectives

The broad objective of this study is to examine the Impact of Selected Macroeconomic Variables on Foreign Direct Investment Inflows to Nigeria from 1986-2023. The specific objectives are to:

i. Examine the impact of real gross domestic product growth rate on foreign direct investment inflows to Nigeria;
ii. Analyse the impact of inflation on foreign direct investment inflows to Nigeria;
iii. Evaluate the impact of interest rate on foreign direct investment inflows to Nigeria;
iv. Assess the impact of exchange rate on foreign direct investment inflows to Nigeria.

Literature Review

Conceptual Review

Foreign Private Investment is made up of both Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI). In the Nigerian context, FDI forms the largest part of foreign inflow of capital and in many quarters, it is regarded as foreign private capital. This is primarily because of the place of Multinational Corporations in the economic and political development of the country. Generally, FDI takes place when an investor establishes foreign business operations or acquires foreign business assets, including establishing ownership or controlling interest in a foreign company (Chitadze, 2022). Foreign Direct Investment (FDI) is defined by the World Bank (2010) as investment to acquire a lasting management interest (10 per cent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of private equity capital, reinvestment of earnings, other long-term capital and short-term capital as shown in the balance of payments.

Economists and decision-makers utilize macroeconomic variables as indicators to evaluate the general state and performance of an economy. They support the formulation of economic policies as well as the study of economic patterns and future economic activity. Muhammad (2020) infers that the macroeconomic environment is the overall aspects and working of the national economy, such as income, output, and interrelationship among diverse economic sectors. Adegbemi (2018) posits that macroeconomic variables deal with the performance, structure, behaviour, pattern and decision-making of an economy as a whole, rather than individual markets. Macroeconomic variables provide a summary of the success of an economy. Macroeconomic variables are like an economic report score card and governments are judged to be successes or not to a large extent based on this report card.

Among the most important macroeconomic variables are: gross domestic product, inflation rate, unemployment rate, interest rates, exchange rates, balance of payments,

government budget deficit/surplus, money supply; with GDP been the most important flow variable in macroeconomics. However, real gross domestic product growth rate, inflation rate, interest rates, and exchange rates macroeconomic variables were adopted in this paper. Real Gross Domestic Product growth rate measures how fast the economy is growing. It does this by comparing one quarter of the country's GDP to the last. While GDP is the market value of all final goods and services produced within an economy in a given period of time (quarter, year). Inflation Rate is commonly defined by various economists as continuous rise in prices. Inflation refers to the sustained rise in the general level of prices of goods and services in the economy over a period of time (McLean *et al*. 2016). Inflation is the persistent increase in the general price level within the economy which affects the value of the domestic currency (Fatukasi, 2012).

The interest rate is the fee that a borrower incurs for the funds borrowed for business or other transactional purposes. Investors obtain loans from banks and other financial entities and the impact of interest rates on investment expenses is highly sensitive and is a key consideration in financial analysis (Abdul, 2016). While, exchange rate refers to the rate at which one country's currency is exchanged for another country's currency. It may also be seen as the price of one country's currency in relation to another country's currency (Anyanwu *et al*. 2017). Currency exchange rates in a country can either increase (appreciate) or decrease (depreciate). Appreciation in the exchange rate occurs if less unit of domestic currency exchanges for a unit of foreign currency while depreciation in exchange rate occurs if more unit of domestic currency exchanges for a unit of foreign currency (Oniore *et al*., 2016).

Empirical Review

Using quarterly data, Tyoga *et al*. (2024) investigated the macroeconomic factors influencing foreign portfolio investment in Nigeria between 2011 and 2022. Applying OLS modeling after confirming variables were integrated at levels and first differences, results showed exchange rates, inflation, and GDP significantly influenced foreign portfolio investment flows. Specification tests validated model stability. Analysis revealed exchange rate fluctuations substantially drove capital inflow and divestment decisions. Suggesting exchange rate uncertainty discourages long-term foreign portfolio investment, findings imply the need for fiscal policies supporting security and business environment certainty to attract foreign investors. Additionally, raising benchmark interest rates above inflation could ensure positive real returns and promote investments. Overall, creating macroeconomic stability through coordinated fiscal, monetary, and exchange rate policies appears critical for Nigeria to reap the development benefits of sustained foreign portfolio inflows. It therefore, suggested that, Fiscal Authority should create an enabling environment, especially by providing adequate security in the country in order to attract and retain foreign investors in Nigeria.

Abadata and Ze (2024) explored predictors of the foreign investment from China coming into Rwanda. From literature and based on the availability of data, market size, trade openness, infrastructure, and human capital were measured as predictors of Chinese FDI.

The data is analyzed using Linear Regression. The finding of the study showed that variables have a positive effect on FDI from China, and it found that though FDI had an effect on overall economy of Rwanda, the effect was not statistically significant. The study suggested that Rwanda's policy on foreign investment should aim to attract and encourage Chinese investment to increase the economy of Rwanda. To encourage more FDI, the Rwandan government can offer Chinese investors greater ownership, locational, and internalization benefits. It also should continue to strengthen economic policy transparency since it lowers transaction costs and hence improves incentives for foreign investment.

The macroeconomic and environmental elements that might eventually draw foreign direct investment (FDI) into the Gulf Cooperation Council (GCC) nations are examined by Alharthi *et al*. (2024). Additionally, the study explores the causal relationship between these factors and FDI inflows. The Panel Autoregressive Distributed Lag (ARDL) approach to co-integration is the primary analytical technique used, utilizing long time-series data from six GCC countries, including Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE) during the period 1990–2019. The empirical results indicate that, in the long run, almost all independent variables significantly influence FDI in GCC countries. Variables such as GDP growth (GDPG), inflation (INFL), carbon dioxide emissions (CO2), and urbanization (URB) are found to be highly significant ($p<0.01$) in their impact on FDI. Moreover, unemployment (UNEMP) also positively and significantly influences FDI in these countries in the long run. Based on the key findings, strategies aimed at reducing persistently high unemployment rates, maintaining population growth, viewing FDI as a driver for GDP growth, and continuing with infrastructure development and urbanization are expected to attract more FDI inflows into GCC countries in the long run. Additionally, fostering both long-term economic incentives and creating a conducive business infrastructure for investors are vital for attracting inward FDI into any nation, including those in the GCC. This research would benefit various stakeholders, including governments, local businesses, investors, academia, and the local society, by providing valuable knowledge and informing decision-making processes related to economic development, diversification, and investment promotion.

Sabuur and Ismaila (2023) analysed the impact of certain macroeconomic variables in attracting foreign capital flow into Nigeria. The study represents the variables with domestic monetary policy rate, exchange rate and industrial production index using ARDL with quarterly data set spanning from 2010 to 2021. The outcome of finding gave evidence on the significance impact of industrial production index and exchange rate in attracting capital flows into the country both in short run and long run. However, while the impact of industrial production index was positive, that of exchange rate was negative. Study finding is robust given the choice of alternative monetary policy variable. This, thus, goes to say that necessary attention must be accorded to these macroeconomic variables while making policies to attract foreign capital.

Key determinants influencing Nigeria's inward foreign direct investment were examined by Akinwalere and Chang (2023). Data were collected from UNCTAD (1970-2014) and analyzed by Auto-Regressive Distributed Lag test (ARDL). A comprehensive theory-based model was developed accounting for many variables, such as the interest rate, external debt, oil rents, the Gross Domestic Product (GDP) growth rate, trade and exchange rate volatility. Findings indicate that the interest rate, external debt, oil rents, and GDP growth are all important determinants, possessing a long-run effect on FDI. Different from the literature, however, trade and exchange rate volatility are barely important to FDI. The study recommended that there should be concerted efforts to boost the performance of the non-oil sector in Nigeria through more investments in the agricultural and industrial sectors making the growth of the economy spread across other sectors and, in turn, encouraging inward FDI in such areas.

Narain *et al*. (2023) studied the impact of inflation rate, GDP growth rate, trade openness, and real interest rate on FDI in India. Using data on the aforementioned variables collected for the years 1978-2021 from the open-source database of the World Bank, the paper focused on finding a correlation between FDI and each macroeconomic variable considered in this paper. Further, the paper used a multiple linear regression model and the results of the study show a correlation between the FDI and the macroeconomic variables and the econometric rules out GDP growth rate from this model.

Nwagu (2023) determined the effect that specific macroeconomic factors have on the amount of foreign direct investment (FDI) flowing into Nigeria. The ex post facto research design was adopted, and it used exchange rate, inflation rate, monetary policy rate (MPR), and gross domestic product growth (GDP) rate as the macroeconomic variables. The quantity of inflow between 1986 and 2020 was made up of FDI (dependent variable). Because the model variables were integrated in a mixed order of both level and first difference, the Autoregressive Distributed Lag (ARDL) technique was used. The selected macroeconomic variables and FDI were bound by a long-run connection, according to the results of the ARDL bounds test for cointegration. The calculated short-run coefficients showed that GDP growth rate and monetary policy rate were the primary macroeconomic variables that considerably increased FDI inflow in Nigeria, whereas inflation and exchange rate were the major macroeconomic variables that significantly decreased FDI inflow. In the long term, the GDP growth rate and the exchange rate had a beneficial influence on FDI influx, whereas the monetary policy rate had a large negative effect. According to these empirical findings, it is advised that Nigeria's monetary authorities should support strong GDP growth, exchange rate stability, and efficient monetary policy rates in order to draw FDI into the country and create efficient foreign exchange policies that will attract foreign investors.

Using ARDL models as pooled means group (PMG), means group (MG), and dynamic fixed effects (DFE), Shaari *et al*. (2023) examined the factors influencing foreign direct investment (FDI) in ASEAN nations (China, South Korea, and Japan) during the years 1995–2019. According to the results of the long run ARDL-PMG model, more

infrastructure of mobile cellular subscriptions led to higher FDI. Moreover, CO2 emissions increased with FDI levels significantly, and hence decreased the quality of environment at the same time. In contrast, a negative and significant correlation was found between corruption (measured by the corruption perception index) and FDI, which means that higher levels of corruption discourage foreign investors from expanding their businesses. Outcomes from the long run ARDL-DFE model propose that market size (GDP), infrastructure of mobile cellular subscriptions and corruption increase FDI significantly. On the other side, trade openness impact FDI significantly and negatively. Finally, the results from the long run ARDL-PMG model show that FDI and inflation have a significant but negative relationship.

The study of AlShammari *et al*. (2023) explored the effects of macroeconomic and environmental variables on FDI for 120 countries for the period 2000–2014. The study utilized OLS and fixed-effects regressions to analyze the data. The outcome of this study reveals that some macroeconomic variables (GDP per capita, trade openness, and real GDP growth) have significant and positive relationships with FDI. Moreover, higher secondary school educational attainment ratio increased FDI significantly. Regarding environmental factors, environmental performance has a significant and positive association with FDI.

The parameters influencing foreign direct investment in China from 2003 to 2019 were estimated by Huang and Li (2023). The data in the study were analyzed using REM and FEM. The findings reveal that FDI levels increased through higher individual income (GDP per capita). In addition, trade openness has a positive impact on FDI as foreign investors prefer to invest more over the periods of increasing imports from and exports to China. The correlation between FDI and tax revenue is significant and positive as they found. Furthermore, the higher number of population and residents supports FDI rates significantly. On the contrary, they found the association between FDI and financial development significant and negative. Nguyen and Ahmed (2023) evaluated the variables that affect FDI in 172 countries for the period 2003–2019 employing GMM regression technique. The findings of GMM reveal that a higher number of branches for commercial banks results in having more FDI levels. Also, the government consumption level supports FDI significantly as more governmental spending increases FDI. In addition, the correlation between population density (calculated as mid-year population divided by land area in square kilometers) and FDI is found significant and positive. In contrast, any types of sanctions on any country affected FDI rates significantly and negatively. A systematic literature review (SLR) of the FDI drivers of 112 empirical research published between 2000 and 2018 was conducted by Islam and Beloucif (2023). The result indicated that the size of the host market is the most robust determinant, followed by trade openness, infrastructure quality, labour cost, macroeconomic stability, human capital, and the growth prospect of the host country. Market size is highly significant in virtually all studies. This partly reflects the fact that most of the world's FDI are market-seeking.

Khan and Rehman (2017) examined the impact of macroeconomic variables on foreign direct investment in Pakistan from 1990 to 2015). The study analyzes the relationship between the FDI and the chosen independent variables such as exchange rate depreciation, inflation rate, unemployment rate, and average taxes imposed on the economy. Multiple regression was used to statistically examine the relationships amongst the variables. The main findings of the study were unemployment has extremely strong relationship with FDI inflows, if unemployment increases by one percent, the FDI will increase by 32 percent. Average tax rate has positive but insignificance relationship. Similarly, an insignificant relationship was observed between inflation and FDI during the study period. Thus, the study suggested that the government should keep strict vigilance on the exchange rate depreciation, unemployment rates, taxes imposed on the economy.

Theoretical Framework

The theoretical underpinning of this paper is the Ownership-Location-Internalization (OLI) Eclectic Theory, proposed by Dunning (1988). The theory focuses on three forms of international growth: licensing, exports, and FDI. This model supports managers in choosing appropriate strategies for expansion, emphasizing the importance of proper understanding. Before entering foreign markets, managers must make decisions such as screening the market, deciding whether to export, screen the product, enter a joint venture, or take control in a brown-field investment.

The OLI framework is an extension of the internalization theory, which originated from the transaction theory. The model was developed to understand FDI worldwide and helps firms select markets that offer prospects for growth and fit strategically with their company. The International Market Selection (IMS) process has three stages: market screening, market identification, and market selection. The theory is deemed appropriate as a theoretical framework owing to its suitability in capturing contemporary trends in international trade. The theory relaxes some of the restrictive assumptions of the classical models (absolute advantage and comparative advantage) of international trade and captured the essential role of factor endowments in determining a country's comparative advantage and international trade position.

Methodology

The paper adopted a time series expo facto research design. Time series expo factor research design is a method of research that can truly test hypotheses concerning cause-and-effect relationships, as well as combines the theoretical consideration with empirical observation. The design of this paper is quantitative as it is meant to collect and analyse given data on the relationships amongst the relevant macroeconomic variables and FDI inflows to Nigeria.

Model Specification

The model for the study is based on the theoretical framework and modified model of Khan and Rehman (2017) who examined the impact of macroeconomic variables on

foreign direct investment in Pakistan from 1990 to 2015). The model applied in the study is of the form;

$$FDI = f(EX, UER, ATR, IR) \quad (1)$$

Where, FDI = Foreign direct investment; ER = Exchange Rate; UER = Unemployment rate; IR = Inflation rate; ATR = Average tax rate and ε = White noise error term

However, the above model was modified by including macroeconomic variables such as real gross domestic product growth rate, inflation rate, interest rates, and exchange rate. Thus, the modified model is presented as follows:

$$FDI_t = \beta_0 + \beta_1 RGDPG_t + \beta_2 INFR_t + \beta_3 IRS_t + \beta_4 EXR_t + \varepsilon_t \quad (2)$$

Where, FDI inflows; RGDPG = Real gross domestic product growth rate; INFR = Inflation rate; IRS = Interest rates; EXR = Exchange rate; β_0 = The intercept or autonomous parameter estimate, $\beta_1 to \beta_4$ = Parameter estimate representing the coefficient of RGDPG, INFR, IRS, and EXR respectively, and ε_t - other variables not explicitly included in the model.

Furthermore, the a priori expectations of the parameters to be estimated are as expressed below: $\beta_1 > 0$; The coefficient of real gross domestic product growth rate is expected to be positive and have a positive impact on FDI inflows;

$\beta_2 < 0$; The coefficient of inflation rate is expected to be positive and have a positive impact on FDI inflows;

$\beta_3 > or < 0$; The coefficient of interest rates is expected to have positive or negative impact on FDI inflows; and

$\beta_4 > 0$; The coefficient of exchange rate is expected to be negative and have a negative impact on FDI inflows.

The paper used the Fully Modified Ordinary Least Squares to examine the impact of macroeconomic variables on foreign direct investment inflows to Nigeria. Thus, the mathematical formulation of equation (2) starts with the cointegrating regression as follows:

$$FDI_t = \beta_0 + \sum_{t=1}^{T} \beta_1 RGDPG_t^* + \sum_{t=1}^{T} \beta_2 INFR_t^* + \sum_{t=1}^{T} \beta_3 IRS_t^* + \sum_{t=1}^{T} \beta_4 EXR_t^* + \varepsilon_t \quad (3)$$

Where $RGDPG_t^*$, $INFR_t^*$, IRS_t^* and EXR_t^* are the transformed variables adjusted for serial correlation and endogeneity. A key strength of the FMOLS lies in its ability to account for

potential endogeneity in the independent variables and serial correlation in the error terms. The FMOLS applies adjustments to mitigate potential biases and serial correlation issues that often arise in OLS estimations when dealing with non-stationary data, that is common in time series analyses of economic variables. Additionally, the FMOLS offers flexibility in terms of the integration order of the variables under study. By implication, whether the variables are integrated or order zero, one, mixed or even fractionally integrated, the FMOLS can be effectively applied. This versatility allows for a rigorous analysis without imposing strict assumptions about the integration properties of time series data.

Variables Description and Measurements

Table 1 gives specific summary of variables description, measurements and source of data.

Table 1: Variables Description and Measurements

Variable	Acronym	Description	Measurement	Source
Foreign direct investment	FDI	An investment made by a firm or individual in one country into business interests located in another country.	Annual (Percentages)	World Development Indicators (World Bank, 2023)
RGDP growth rate	RGDPG	This measures how fast the economy is growing. It does this by comparing one quarter of the country's GDP to the last	Annual (Percentages)	National Bureau of Statistics (NBS, 2023)
Inflation rate	INFR	This is used to capture the general price level	GDP deflator (Annual %)	World Development Indicators (World Bank, 2023)
Interest rate	IRS	This is the commercial bank lending rate to private investors	Annual (Percentages)	Central Bank of Nigeria (CBN, 2023)
Exchange rate	EXR	It is the unit of the domestic currency that exchanges for a unit of the United States' Dollar	Annual (₦'/$)	Central Bank of Nigeria (CBN, 2023)

Source: Researchers' Compilation, 2024

Results and Discussions

Descriptive Statistics

Table 2 presents the descriptive statistics for the paper

Table 2: Descriptive Statistics

	FDI	RGDPG	INFR	IRS	EXR
Mean	1.333587	4.128159	19.55000	18.25069	155.0282
Median	1.177898	3.921556	12.95000	17.56916	128.8150
Maximum	4.282088	15.32916	72.80000	31.65000	671.6600
Minimum	-0.039520	-2.035120	5.400000	9.959167	3.760000
Std. Dev.	0.949791	3.807491	17.11427	4.132433	145.3256
Skewness	0.806498	0.546333	1.756591	0.817162	1.559573
Kurtosis	3.638659	3.550660	4.879873	4.629717	5.676794
Jarque-Bera	4.765268	2.370477	25.13758	8.434399	26.74931
Probability	0.092307	0.305673	0.000003	0.014740	0.000002
Observations	38	38	38	38	38

Source: Author's Computation, 2024 (Eviews-12)

All of the variables have positive mean values, as can be seen from the summary statistics shown in Table 2, with EXR and FDI having the highest and lowest mean values, respectively. Also, because an outlier can significantly exaggerate the range of data, the standard deviation of each variable provides a more precise and thorough indication of dispersion. EXR showed the biggest deviation from the mean, whereas FDI showed the lowest. As evidenced by the probability values of each variable's corresponding Jarque-Bera statistics, the null hypothesis is firmly supported for two out of the four variables in their nominal form. Since the accompanying Jarque-Bera probability values of these variables have a significance level larger than 5%, it may be concluded that they have a normal distribution.

Unit Root Test

Time series data frequently display trends that can be addressed with differencing, mainly to determine the data's stationarity. To ascertain the stationarity of the series, an essential step in time series analysis is the Augmented Dickey-Fuller (ADF) unit root test, whose findings are shown in Table 3.

Table 3: Unit Root Test Result

Variable	Method	Level Stat. (Prob.)	First Diff. Stat. (Prob.)
FDI	ADF	-3.898116* (0.0049)	-9.429910*(0.0000)
RGDPG	ADF	-4.0823376* (0.0030)	-10.81274*(0.0000)
INFR	ADF	-4.408880* (0.0065)	-4.145253**(0.0135)
IRS	ADF	-4.515683*(0.0052)	-6.832951*(0.0000)
EXR	ADF	-2.400210 (0.9983)	-6.83295*(0.0000)

*Note: *,** significant at 1%, and 5%*

Source: Authors Computation, 2024 (Eviews-12)

Results in Table 3 revealed that four variables are integrated both at level and first difference. While exchange rate became stationary after the first difference is taken. I (0) and I (1) are hence the integration order.

Cointegration Test

Co-integration makes sure that even non-stationary individual series can have stationary linear combinations, indicating a constant long-term association between them. To determine whether the relevant variables have a long-term relationship, the Engle and Granger (Residual Based) Cointegration Test was employed. Table 4 summarizes the findings of the Co-integration test utilizing the Engle and Granger (Residual Based) Cointegration Test.

Table 4: Result of Engle and Granger (Residual Based) Cointegration Test

Residual		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic @ (Levels)		-5.512829*	0.0000
	1% level	-2.628961	
Test critical values:	5% level	-1.950117	
	10% level	-1.611339	

*Note: * significant at 1%*

Source: Authors Computation, 2024 (Eviews-12)

The results of Engle and Granger Residual Based Cointegration Test" is -5.512829, exceeding the critical value at the 1% significance level of -2.628961, suggesting co-integration. This indicated that the null hypothesis of no cointegration is rejected at the 1% level, meaning that a significant long-term equilibrium relationship exists amongst the variables under review. The estimation of FMOLS regression was then carried out.

Fully Modified Ordinary Least Squares (FMOLS) Regression Results

The Fully Modified Ordinary Least Squares (FMOLS) Regression findings for the model are shown in Table 5 to provide some intriguing insights into the direct influences of macroeconomic variables on FDI inflows to Nigeria from 1986-2023.

Table 5: Fully Modified Ordinary Least Squares (FMOLS) Result
Dependent Variable: FDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDPG	0.271581	0.057298	4.739770	0.0000
INFR	0.009599	0.013395	0.716596	0.4788
IRS	0.204710	0.063818	3.207740	0.0030
EXR	0.008073	0.001678	4.812613	0.0000
C	-4.931534	1.328217	-3.712899	0.0008
R-squared	0.653727			
Adjusted R-squared	0.598636			
Wald-Fstat	11.01683			
Wald-pvalue	0.0000			
Long-run variance	1.325353			

Source: Authors Computation, 2024 (Eviews-12)

From Table 5, three out of the four explanatory variables used in this paper have statistically significant influence on FDI inflows to Nigeria in the long run. By implications, real gross domestic product growth rate, interest rates, and exchange rate are important in explaining FDI inflows to Nigeria throughout the research period. Furthermore, real gross domestic product growth rate, interest rates, and exchange rate agree with the paper a'priori expectations. However, inflation rate does not conform to the paper a'priori expectations in the long run.

On a basis of variable-by-variable analysis, the paper found that real gross domestic product growth rate is significant and positively correlated with FDI inflows. In other words, real gross domestic product growth rate increases FDI inflows. This can be interpreted that there will be an increase of 0.27% in FDI inflows in case of a 1% increase in RGDP growth rate. This outcome is consistent with the a priori expectations of the investigation and prior studies such as Tyoga *et al*. (2024), Alharthi *et al*. (2024), Akinwalere and Chang (2023) and AlShammari *et al*. (2023) who all observed real GDP growth has significant and positive relationships with FDI.

Also, the estimated impact of inflation rate on FDI inflows is positive and insignificant in the long run. This implies that inflation rate does stimulates FDI inflows. By implication, one percentage change or increase in inflation rate will lead to 0.09% increase in FDI inflows in the long-run. This outcome is consistent with the a priori expectations of the investigation and study of Khan and Rehman (2017) who examined the impact of macroeconomic variables on foreign direct investment in Pakistan from 1990 to 2015, and found an insignificant relationship between inflation and FDI.

On the other hand, the findings indicated that interest rates appear to affect FDI inflows significantly and positively in the long-run. Controlling for other factors, for instance, a 1 percent increase in interest rates will increase FDI inflows by 0.20% in the long run. This outcome aligns with Akinwalere and Chang (2023), who reported that interest rate is an important determinant, possessing a long-run effect on FDI. Furthermore, the results indicated that exchange rate affects FDI inflows positively and significantly in the long run. This means that exchange rate does encourage FDI inflows. In case of a 1% increase in exchange rate, it is foreseen that there may be an increase of 0.08% in FDI inflows. This outcome is consistent with the a priori expectations of the paper and Sabuur and Ismaila (2023) who found significance impact of exchange rate in attracting capital flows both in short run and long run.

The R-squared value of 0.653727 implies that the model is a good fit as over 65% variation in FDI inflows is explained by the explanatory variables. Even after removing the impact of insignificant estimators, the adjusted R-squared value of 0.598636 implies that the model is still very good. Therefore, the paper's conclusions can be relied upon for formulating policy recommendations. The Wald F-statistic of 11.01683, along with a Wald p-value of 0.0000 highlighted the overall reliability and significance of the model. By implications, the selected macroeconomic variables have statistically significant

influence on FDI inflows to Nigeria, hence reinforcing the validity of the model. While, the long-run variance of 1.325353 provided an estimate of the variability of the residuals over the long term. A relatively low long-term variance indicated that the residuals (or errors) in the model are stable over time, suggesting that the model is reliable for predicting the long-term relationship between macroeconomic variables and FDI inflows.

Post-Estimation Diagnostic Checks

Post-Estimation Diagnostic Checks was rigorously conducted to ensure the robustness and validity of the regression results. These diagnostic tests include the Correlogram Q-Statistics test, and Normality test. The Correlogram Q-Statistics test was utilized to identify any potential serial correlation in the residuals of a regression model. Serial correlation can be problematic as it suggests that the model may not be capturing all relevant information, leading to inefficiency in the regression estimates. While, the Normality Test such as the Jarque-Bera test was used to assess whether the residuals of the regression model are normally distributed. The assumption of normality is important for the validity of various statistical tests, including hypothesis tests on the regression coefficients.

Conclusion and Recommendations

The paper investigated the impact of macroeconomic variables on foreign direct investment inflows to Nigeria using time series data from 1986 to 2023. The Fully Modified Ordinary Least Squares (FMOLS) Regression was employed as main analytical technique. three out of the four explanatory variables used in this paper have statistically significant influence on FDI inflows to Nigeria in the long run. By implications, real gross domestic product growth rate, interest rates, and exchange rate are important in explaining FDI inflows to Nigeria throughout the research period. Furthermore, real gross domestic product growth rate, interest rates, and exchange rate agree with the paper a'priori expectations. However, inflation rate does not conform to the paper a'priori expectations in the long run.

On a basis of variable-by-variable analysis, the paper found that real gross domestic product growth rate is significant and positively related to FDI inflows. In other words, real gross domestic product growth rate increases FDI inflows. Also, the estimated impact of inflation rate on FDI inflows is positive and insignificant in the long run. This implies that inflation rate does stimulates FDI inflows. On the other hand, the findings indicated that interest rates appear to affect FDI inflows significantly and positively in the long-run. While, the results indicated that exchange rate affects FDI inflows positively and significantly in the long run. This means that exchange rate appreciation does encourage FDI inflows. Therefore, the following recommendations were raised from the research findings.

I. In order to promote economic growth, the Federal government should prioritize measures like infrastructure development, human capital investments, and the encouragement of high-growth industries like manufacturing, technology, and agriculture.

ii. To attract international investors seeking higher returns, Nigeria should have stable and investor-friendly interest rates, which is something the Central Bank of Nigeria (CBN) should strive for.
iii. The monetary authorities such as the Central Bank of Nigeria should keep the exchange rate competitive and stable. It has been demonstrated that appreciation of exchange rates influences FDI inflows in a beneficial way, hence policies that reduce excessive volatility are essential.
iv. While the results suggest that FDI is positively but marginally impacted by inflation, macroeconomic stability depends on modest inflation rates. Prudent fiscal policies and supply-side cost-cutting measures should be given top priority by policymakers when it comes to controlling inflation.

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Appendix A: Data Set Used in the Analysi

Year	FDI(%)	GDP Growth (%)	INFR (%)	IRS (%)	EXR (N&$)
1986	0.352544	0.060945	5.7	9.959167	3.76
1987	1.15907	3.200125	11.3	13.96167	4.08
1988	0.762696	7.334025	54.5	16.61667	4.59
1989	4.282088	1.919381	50.5	20.44167	7.39
1990	1.087951	11.77689	7.4	25.3	8.04
1991	1.196726	0.358353	13.0	20.04167	9.91
1992	1.722383	4.631193	44.6	24.75833	17.45
1993	2.371903	-2.03512	57.1	31.65	22.41
1994	2.436852	-1.81492	57.0	20.48333	22
1995	0.238322	-0.07266	72.8	20.23333	81.2
1996	0.268818	4.195924	29.3	19.83667	81.2
1997	0.233794	2.937099	8.5	17.795	82
1998	0.137154	2.581254	9.9	18.18417	83.8
1999	1.699069	0.584127	6.6	20.29	94
2000	1.648321	5.015935	6.9	21.27417	101.7
2001	1.618616	5.917685	18.9	23.43833	111.98
2002	1.971584	15.32916	12.9	24.77083	120.97
2003	1.914621	7.347195	14.0	20.71417	129.36
2004	1.380374	9.250558	14.9	19.18083	133.5
2005	2.836294	6.438517	17.9	17.94833	132.15
2006	2.035753	6.059428	8.2	16.89333	128.27
2007	2.169195	6.59113	5.4	16.93917	117.97
2008	2.413739	6.764473	11.6	15.13583	132.56
2009	2.900249	8.036925	12.5	18.99083	149.58
2010	1.642074	8.005656	13.7	17.585	150.66
2011	2.133118	5.307924	10.8	16.02	153.86
2012	1.523782	4.230061	12.2	16.79167	157.49
2013	1.069539	6.671335	8.5	16.7225	157.31
2014	0.817478	6.309719	8.0	16.54833	165.86
2015	0.621502	2.652693	9.0	16.84917	196.47
2016	0.853396	-1.61687	15.7	16.86802	304.75
2017	0.642183	0.805887	16.5	17.55333	305.5
2018	0.183821	1.922757	12.1	16.9039	306.35
2019	0.485778	2.208429	11.4	15.37659	306.45
2020	0.551894	-1.79425	13.2	13.64202	379.5
2021	0.751569	3.647187	16.9	11.48313	410.7
2022	-0.03952	3.251681	18.8	12.33454	444.64
2023	0.601569	2.860215	24.7	14.01055	671.66

Sources: CBN Statistical Bulletin (2024), National Bureau of Statistics (NBS, 2024) and World Development Indicators (World Bank, 2024)