

# **The Drivers of Foreign Direct Investment in Nigeria**

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*The study seeks to explore and present the macroeconomic factors that drive Foreign Direct Investments (FDI) in Nigeria. It employed least square methods with model diagnostic tests and Granger causality processes on 1986–2020 Nigerian yearly data. The results show that interest rate, currency rate, and level of economic activity (represented by growth in real GDP) influence the flow of FDI into Nigeria. FDI is neither driven by inflation nor by market openness. The policy implications are that when considering policies aimed at attracting foreign direct investors to Nigeria, government and monetary authorities should give priority to such factors as interest rates, exchange rates, and the growth rate of the economy. It is suggested that reduced loan rates and slight Naira depreciation should be encouraged and promoted.*

*Keywords: macroeconomic factors, foreign direct investment, interest rate, inflation, causality, Nigeria*

## **BACKGROUND TO THE STUDY**

Foreign direct investment (FDI) is an economic activity in which non-indigenous citizens invest in foreign assets like currency, credits, rights, benefits, or property to produce goods and services for domestic or international sale (Wasseja & Mwenda, 2015). FDI is an investment to acquire an enduring managerial stake (usually 10% of voting shares or more) in a business operation in a nation other than the investor's residency (World Bank, 2016). Portfolio investments are under 10%. Foreign direct investment (FDI) inflow would be seen as the capital outlay that foreign investors provide to corporate bodies in foreign lands (UNCTAD, 2020).

Most emerging nations like Nigeria seek FDI for industrialization. FDI is a long-term investment in the host country and should boost gross fixed capital creation. FDI boosts economic growth. Due to the perceived benefits of FDI inflows, many host nations employ financial incentives such as tax breaks and assistance grants to encourage FDI. Foreign enterprises may boost productivity, growth, skill upgrading, employment, and innovation in the industries they enter. However, FDI may decrease or replace local savings and investment, transfer low-level or unsuitable technology for the host country's factor proportions, largely target the host country's domestic market, and impede indigenous business expansion, thus limiting growth. Foreign enterprises may not assist the host nation in improving its dynamic competitive advantages by focusing on inexpensive local labor and raw supplies. Business and labor regulation can mitigate FDI's negative effects (UNCTAD, 2015; UNCTAD, 2016; Wasseja & Mwenda, 2015).

Nigerian authorities have adopted several policies and taken several strategic actions to attract foreign direct investment, including the structural adjustment program of 1986 and its privatization exercise, the industrial policy of 1989, which welcomed foreign investors to the industrial sector, the deregulation of the economy, the provision of tax relief and other incentives to investors and equity owners in all industries, the signing of bilateral investment treaties, and others (Ndem, Okoronkwo & Nwamuo, 2014, Oladipo, 2013, and Uwubanmwun & Ajao, 2012). Nigeria's Economic and Financial Crimes Commission (EFCC) and Independent Corrupt Practices Commission (ICPC) were also daring moves to encourage foreign direct investment. Over time, government strategic options re-ordered macroeconomic, political, institutional, industrial, and ethical aspects affecting foreign direct investment inflow to manage and control Nigeria's investment climate.

Foreign Direct Investments (FDIs) have grown and continue to rise, adding to the GDP of many economies. Despite Nigeria's significant attempts to attract FDI, there is no substantial result in the increase of FDI in the country. Although many key investment authorities have targeted many developed nations by marketing and/or extending their services, their coverage has remained small. Significant work is needed to attract FDIs, which will help enhance sustainable development. Due to lack of adequate resources, many investment agencies are not sufficiently and effectively marketing and reaching the countries that could invest in Nigeria. Nigeria lacks focused, comprehensive, and consistent assistance for FDI upward mobility. Due to those mentioned above, foreign direct investment determinants may always be micro and informal, restricting FDI and some support services. Globalization and competitiveness further aggravate this problem.

It is always taken for granted that FDI boosts developing and emerging nations' economies (Ngowi, 2000). Despite its size and progress, foreign investments in Nigeria are still low compared to expectations. The country's protracted political instability, security difficulties, poor infrastructure, and unfavorable social climate have all hindered investment. Since 2010, however, Nigeria has received the most FDIs in Africa. Chinese mining and hydrocarbon investments caused this growth. What then attracts or repels FDIs in Nigeria? Some macroeconomic indicators have been fingered: inflation, interest rates, exchange rates, taxes, economic growth, trade openness, political instability, social issues like crime, insecurity, and disturbances? It is unclear whether of these forces attract or repel FDIs in Nigeria in a considerable fashion. No doubt, some research works have been done in the region, but they have not revealed the full picture. Thus, this analysis would help Nigeria identify the key causes of foreign direct investment and choose which policy factors to focus on to attain its nominated macroeconomic goals.

This study investigates the factors that influence Nigeria's foreign direct investment. Researchers have indeed studied FDI in Africa, however, Nigeria lacks robust studies (in their quantum) on foreign direct investment drivers. To remedy this absence, this study applies the causality techniques to annual Nigerian data to identify and recommend policies that could enhance or attract FDI. Furthermore, this study seeks to contribute to Nigeria's FDI determinants. The specific goals of this research are: (i) To assess how Nigeria's trade openness (exports-to-import ratio) attracts FDIs. (ii) To determine how real interest rates encourage or discourage FDIs in Nigeria. (iii) To examine how inflation affects Nigerian FDIs. (iv) To evaluate the extent to which the exchange rate affects FDIs. (v) To explore how economic growth influences FDI.

## CONCEPTUAL AND THEORETICAL REVIEW

Foreign direct investment (FDI) occurs when a foreign investor buys 10% or more voting shares in a firm (OECD, 1998; Ojong, Arikpo & Anthony, 2015). Direct investors invest in a target country to control the enterprise. It might involve investing in Greenfield or Brownfield business stock capital, reinvesting earnings, or short-term intra-company loans (Jeffrey & Spaulding, 2005). Whatever is implicated, FDI is seen to be crucial to attaining economic goals (Ojong, Arikpo & Anthony (2015). Foreign direct investment provides employment, knowledge and skills transfer in management and technology, access to international markets and finance, international trade integration, human capital formation, risk and product diversification, favorable competition among businesses, and product diversity (Ngowi, 2001, Nwankwo, Ademola & Kehinde, 2013; Ebiringa & Emeh, 2013). Countries worldwide want to attract foreign direct investment by maintaining a favorable investment climate.

Some authors have identified unfavorable and unstable taxation regimes, fiscal and monetary policies irresponsibility, infrastructural inadequacy, high levels of corruption, political instability, poor access to world markets, slow pace of public policies, the inadequacy of intellectual property protection, high volatility in exchange rates, high cost of production arising from high-interest rates and inflation as determinants of investments (Ngowi, 2001; Lall, 2004; Sachs, 2004). This study empirically elects to dwell on the link between FDI and selected macroeconomic determinants in Nigeria, namely trade openness, exchange rates, inflation, level of economic activities, and interest rate.

Some theories have been proposed for FDI; however, capital market theory, dynamic macroeconomic theory and the eclectic theory of FDI will guide this empirical study.

### **FDI Capital Market Theory**

The capital market hypothesis states that the host country's financial institutions' interest rates determine FDI. Capital market theory, a portfolio investment theory, posits three reasons for FDI in developing nations like Nigeria. The devalued exchange rate lowers host country production expenses. Less developed countries have cheap currencies. Multinationals invest in certain nations to take advantage of cheap production costs. Second, the unstructured security market of LDCs helps multinational businesses invest in FDI rather than portfolio investments. Finally, the capital market hypothesis assumes foreign investors know little about host nation's securities and favors FDI to control the host country's assets (Morgan & Katsikeas, 1997).

### **Dynamic Macroeconomic FDI Theory**

Multinational corporations' long-term strategy drive FDI. This theory states that macroeconomic factors - GDP, domestic investment, real exchange rate, productivity, capital creation, and openness - determine investment timing.

### **Eclectic Theory**

Two sorts of engagement are examined to determine a country's foreign relations. The first participation involves leveraging national resources to produce goods and services for international markets. Second, national economic actors use foreign resources to manufacture products and services for international markets. Dunning (1988) claims the first engagement fits the traditional international trade paradigm. The second is international production and FDI. He claims they are related. He says one must explain why and when foreign markets are supplied through FDI and international production rather than production and exports. This method tries to determine ownership, locational, and internalization benefits (known as OLI advantages).

Eclectic methods combine such benefits and apply them to worldwide trade and production. Enterprise-specific ownership benefits (such as technology, marketing and production skills). A business may overcome and compensate for foreign manufacturing facility expenses if this advantage is maximized. This also allows the company to cover overseas manufacturing facility expenditures. This advantage helps the company beat local competitors in a familiar context. Foreign investor-friendly nations have the locational

advantage (L). Large markets, government policies, the country's trade policy, and better infrastructure are covered. The company gains more by internalizing ownership and locational advantages (I). Firms internalize because technology and knowledge marketplaces are flawed. The (0) and (1) advantages are firm-specific, while the (L) benefit is host-country-specific and critical to FDI influx. FDI need both benefits.

## LITERATURE REVIEW

The empirical drivers of FDI in developing nations literature is vast, though research on sub-Saharan Africa's FDI drivers is incomplete. FDI determinants have no unifying theory. Instead, the theoretical literature contains ideas that use imperfect competition and market failure theories to explain FDI. A more practical classification of host-country FDI drivers includes business facilitation measures, the policy environment, and economic factors. Investment incentives, steps to reduce corruption and administrative inefficiencies, and social amenities facilitate foreign business entry and operations. FDI policy factors would include political stability, friendly FDI laws, favorable international agreements, privatization, trade openness, and tax policies. Market-seeking, resource-seeking, and efficiency-seeking are the economic determinants that theory has been tinkering with. Theorists and scholars have also discussed FDI influx determinants. Yan (2012), Ntim and Emilia (2013), Ali al-Sadig (2014), Svetlana (2015), Ezirim (2020) have showcased fragmentary shreds of evidence for such macroeconomic factors as tax, exchange rate, interest rate, inflation, rate of economic growth, trade openness, capital market activities and performance.

Some academics believe that tax determines FDI inflows. Tax burden affects capital allocation decisions. Countries set tax rates. Tax cuts attract international investment and boost competitiveness. Investors examine tax rates to identify the country with the lowest costs and maximum profit. They invest in low-tax nations. Investors also consider the effective average tax rate (EATR), which incorporates write-off rules, tax relief, and tax stimulation (Mihóková, Andrejovská & Martinková, 2018; Habimana, 2021; Delgado, Fernández-Rodríguez, Martínez-Arias & Presno, 2019; Andrejovska & Glova, 2022). Taxes affect international investment (Andrejovska & Glova, 2022). Corporate tax rates may lower return on investment and salaries (Pomerleau, 2016). EATR and legal tax base affect investors' investment decisions, according to Karpenko et al. (2022). FDI has little effect on the effective tax rate, according to Gechert & Heimberger (2022).

Yasin (2005), Benbe-Nahende (2002), Fedderke and Romm (2004), are among the researchers that examined market size and growth as FDI determinants. They argue that nations with stable macroeconomic characteristics and large markets should attract more foreign direct investment than erratic economies. Market size and natural resources promote FDI, according to Elbadawi, & Mwega (1997). They concluded that the labor force, excellent infrastructure, political stability, and minimal corruption affect FDI more. Bhinda, Griffith-Jones & Martin (1999) found that the insufficient market deters enterprises from investing in the domestic market. Jordan (2004) concluded that nations with large markets and excellent buying power will attract more FDI due to better capital returns and company profits. In econometric analyses, Artige and Nicolini (2005) found that GDP per capita or GDP is the strongest FDI predictor. Morisset (2000) states that FDI might be attracted by more than natural resources and the local market. African nations must strengthen their business climate and support economic growth-boosting measures.

Lemi and Asefa (2003) studied FDI flows in Africa with economic and political uncertainties. According to a panel analysis of 29 nations from 1987 to 1999, political uncertainty influences FDI in Africa. Using fixed and random models for 29 African nations from 1975 to 1999, Onyeiwu and Shrestha (2004) concluded that FDI is more affected by international reserves, economic growth, openness, natural resource availability, and inflation. N'guessan & Zambe (2010) discovered that openness is crucial in explaining output growth in Ivory Coast. Equally, Yan (2012) and Zaheer (2011) have shown that openness attracts FDI. Liberal trade policies increase FDI, as in Cuadros and Alguacil (2004) and Neumayer (2005), institutional quality and FDI in Nigeria for Ntim and Emilia (2013) demonstrated a substantial relationship. Foreign investors choose nations with adequate transportation, communication, and distribution infrastructure, according to Asiedu (2002).

Some studies investigated the effects of corruption on FDI. For instance, Ali al-Sadig (2014) used an econometric technique using panel data from 117 countries from 1984 to 2004 to find that host country corruption negatively impacts FDI inflows. Svetlana (2014) concluded that corruption and fiscal policies are key FDI attractants. Dar, Presley, and Malik (2004) examined the causation and long-term link between Foreign Direct Investment (FDI), economic development, and socio-political factors. Over 1970–2002, most FDI drivers in Pakistan have the theoretically-predicted indications with two-way causation. Anyanwu (2012), on FDI determinants from 1996 to 2008, found that GDP growth increased FDI inflows to Nigeria. Hubert and Phanindra (2004), in their empirical evidence from EU member countries, discovered that openness to trade, host nation risk, host economy size, and labor costs attract FDI. Bissoon (2012) concluded that political stability and corruption control boost FDI attractiveness.

Yapatake, Riti & Anning (2015) examined foreign direct investment deterrents and attractants using yearly secondary data from 25 African francophone nations from 2004 to 2012. (FDI). The approach includes minority investor protection and Doing Company Website business startup days. They employ six empirical FDI determinants: GDP growth, exports, official exchange rate, domestic lending to private sectors, internet users, political stability, and lack of violence. Hausman tests suggested fixed effect models. Regression using time and country fixed effects shows that FDI is more influenced by exports, internet users, official exchange rate, political stability and lack of violence, and firm startup time. Private sector development can address FDI attraction. Crediting sustainable private firms in Francophone nations is recommended.

For Wasseja & Mwenda (2015), FDI is one of the most essential linkages between developing and industrial nations and increasingly among developing countries. It facilitates globalization and technology transfer like trade. Kenya struggles to attract and maintain foreign direct investment at levels that allow domestic investment to benefit from capital inflows. Thus, Wasseja & Mwenda (2015) experimentally investigated Kenya's FDI drivers. Saskia Wilhelms' institutional FDI fitness theory underpins the approach. The research selected 1980–2013 data since development began after independence (1963). The Ordinary least square model interpreted the results (OLS). According to the calculated linear regression model, Kenyan foreign direct investment inflows are largely influenced by economic development. Open economies, inflation, and currency rates also affected FDI.

Ojong, Arikpo & Anthony (2015) analyzed Nigerian FDI inflow factors. It examined how market capitalization, trade openness, gross fixed capital creation, and economic activity impact Nigerian foreign direct investment. Study design was ex-post facto. Time series data from the CBN statistics Bulletin were acquired via desk survey and analyzed using ordinary least square multiple regression. ADF and PP unit root were used together to assess time series stationarity. The variables' relationships were examined using a correlation matrix. The OLS showed that market capitalization and gross fixed capital creation negatively affect FDI inflow in Nigeria. Over-liberal trade policies discourage foreign direct investment in Nigeria. Finally, economic growth boosts FDI in Nigeria. ADF and PP tests showed all variables were stationary at first difference. The correlation matrix showed that all variables were significantly associated except market capitalization, gross fixed capital creation, and economic activity, which were weakly related to FDI. Based on these data, the paper promotes growth-promoting strategies. The government should also boost credit, infrastructure, power, and roads. Training and improving Nigerian Customs and Immigration should prevent border mismanagement and porosity. Finally, Nigeria should discourage social unrest, corruption, and macroeconomic instability and establish an investment-friendly atmosphere to inspire investors.

Ebiringa & Emeh (2013) examined Nigerian FDI determinants. Time series econometrics, including stationarity test, co-integration, error correction mechanism, and variance decomposition analysis, showed that the exchange rate negatively impacts FDI flows in Nigeria. Danish & Adiq (2012) found that FDI, trade openness, and real production are strongly related in Nigeria using error correction model. Serven & Solimano (1992) examined economic adjustment and FDI success in fifteen developing countries using cross-sectional time series data from 1975 to 1988. The study evaluated the investment equation using exchange rate and inflation as proxies for instability, measuring instability by the coefficient of variance of relevant variable across three years. Both policies negatively impacted investment.

Asiedu (2003) examined political risks, institutional framework, and government policy on FDI flows in 22 sub-Saharan African nations from 1984 to 2000. The dependent variable was net FDI flows to GDP, while the independent variables were natural resource intensity, market attractiveness, infrastructure development, macroeconomic instability, openness to FDI, host nation institutions, and political instability. He found that macroeconomic stability, effective institutions, political stability, and adequate regulatory framework boost FDI. The conclusion suggests that natural resources do not entirely drive FDI to Africa and that governments may promote FDI to less developed regions. Nigerian FDI influx was examined by Ohazulike (2012). OLS multiple regression, unit root, co-integration, and Granger-causality tests showed that exchange rate fluctuations and infrastructure had positive but negligible correlations with FDI in Nigeria, whereas inflation was negatively but significantly associated. Inflation and FDI also have a one-way link.

Olukoyo (2012) tested the impacts of foreign direct investment on Nigeria's economy from 1970 to 2007 using ordinary least square regression and the Cochrane-Orcutt iterative approach to compensate for autocorrelation. Regression research did not indicate a strong relationship between and Nigerian economic development. Foreign direct investment affected the Nigerian capital market, according to Adaramola & Obisesan (2015). ADF unit root and Johansen co-integration tests showed no co-integration between FDI and market capitalization. Thus, the study used OLS to show a positive and substantial link between FDI and Nigerian market capitalization.

Nwankwo, Olukotun, and Olorunfemi (2013) examined the impact of globalization on FDI in Nigeria using descriptive narrative approaches. The study found that while FDI has benefited Nigeria in terms of employment, technological transfer, local enterprise growth, etc., there are several barriers to its full fulfillment. Ndem, Okoronkwo & Nwamuo (2014) examined the link between currency rate, market size, infrastructural investment, openness, political risk, and FDI in Nigeria. Using the OLS and the co-integrated error correction technique (ECM), market size, openness, and currency rate had a big impact on FDI inflow. Still, political risk and infrastructure investment had little effect.

Lautier & Moreaub (2012) used 68 developing nations using GFCF as a proxy for domestic investment to assess domestic investment and FDI using the OLS technique. The study found that domestic investment (GFCF) strongly affects FDI in less-developed nations. Soumyananda (2010) empirically examined Nigerian FDI variables. FDI flow to Nigeria is influenced by trade intensity, natural resource endowment, macroeconomic risk factors, including inflation and currency rates, and co-integration. The study also found that market size does not affect FDI to Nigeria over time. Obida & Abu (2010) analyzed Nigerian FDI factors. Market size, deregulation, political instability, currency rate depreciation, and foreign direct investment were analyzed using error correction. Foreign direct investment in Nigeria is driven by market size, deregulation, political instability, and currency rate depreciation.

Adefoso & Agboola (2012) examined Nigerian FDI determinants. Residual-Based Engel-Granger Dickey-Fuller Co-integration and unit root tests for variable time series attributes. Market size, openness, ICT, oil industry, tax, tourism, phone penetration, and long-term FDI in Nigeria were all linked. The study also found that currency rate, CPI, infrastructure, and foreign debt affected FDI outflow from Nigeria. Enu, Havi & Attah-Obeng (2013) evaluated Ghana's foreign direct investment determinants. This study examined the key macroeconomic factors of foreign direct investment in Ghana from 1980 to 2012. Since all variables were integrated in first order, Johansen's cointegration technique was applied, indicating that the variables were not cointegrated. The vector autoregressive model was estimated. The initial year of foreign direct investment, the final two years of the exchange rate, and trade openness were statistically significant. Our findings suggest encouraging foreign direct investment, moderate exchange rate depreciation, and trade openness.

Legese (2018) conducted a thorough review of Ethiopian FDI determinants. Legese (2018) lists market size, economic growth rate, real GDP growth, infrastructure, natural resources, political situation, and other host nation factors as FDI determinants. The author said Ethiopia recently improved the investment climate and offered incentives to attract FDI. Legese (2018) examined Ethiopia's FDI drivers. Real growth domestic product, liberalization, exchange rate depreciation, and trade openness positively correlate with FDI influx in Ethiopia. In contrast, inflation, insufficient infrastructure, volatility, and high lending interest rates

negatively impact foreign direct investment. Finally, the paper suggests government action through infrastructure development and solid fiscal and monetary policies to regulate inflation, interest rates, and other macro factors.

Mohapatra (2014) states emerging nations need FDI to prosper economically. As international loans and government development aid decline, the gap between domestic savings and investment is rising in most African states, notably Sub-Saharan Africa. Thus, these nations have learned that FDI can re-finance development. Ethiopia and other African nations liberalized in the 1990s. The consequence of is yet unrealized. FDI is linked to liberalization.

Additionally, the host nation's macroeconomic characteristics affect FDI. Empirical research emphasizes the impact of GDP, gross capital creation, infrastructure availability, trade openness, export, import, external debt, startup costs, and more. These influence FDI inflows. The article analyses prospective FDI determinants in Ethiopia from 1992 to 2012. We utilized UNCTAD's econometric model to identify these FDI equity inflow drivers. Data availability dictates a 20-year analysis timeframe. The econometric model shows that most explanatory factors promote FDI in Ethiopia. The analysis matches most empirical findings.

Using data on FDI, unemployment rates, and GDP from 1993 to 2015, Garang, Yacouba & Thiery (2018) examined the relationship between FDI, unemployment, and economic growth in Uganda. There is insufficient statistical proof that FDI helps to reduce unemployment and spur economic growth, both in the short- and long-term, since, according to the study's findings, there are no causal relationships between the variables. The report makes suggestions regarding the requirement to revive home industries. Re-strategizing FDI comprehensive regulatory frameworks to give domestic businesses a competitive edge is essential to attracting FDI at a rate compatible with the growth objective stated for the countries' local industries.

Teka (2012) surveyed international enterprises to determine FDI's primary drivers and barriers. The study found that local and regional market-seeking, political and social stability, and investment incentives drove FDI in the nation. Exchange rate volatility, corruption, and a lack of clear policies and regulatory obstacles might dissuade international investment in Ethiopia. From the above review and many studies in the literature, it is easy to see that FDI's importance in economic growth has prompted several empirical research. Many of these studies also examined the influence of FDI on economic growth, while others examined its drivers. Thus, this research effort focuses on evaluating FDI determinants.

## **METHODOLOGY**

This study uses ex-post facto causal-comparative design. The research cannot control the variables because they have already occurred. Hence this design was chosen. Instead, it aids the study's cause-and-effect analysis. The main sources of data for this research are the Central Bank of Nigeria (CBN) and Federal Bureau of Statistics (FBS), which published time series data on Foreign Direct Investment and its drivers, including inflation, interest rate, currency rate, trade openness, and economic activity, from 1985 to 2018. All data represent ratios or rates of change. The study's purposes and hypotheses were considered when extracting variable data from publications using the desk survey method. The CBN and FBS sources provide data dependability, trustworthiness, and correctness.

Simple statistical and comparative studies employing descriptive statistics and graphics are employed. Ordinary least square multiple regression and interpretation are utilized. Regression analysis is extensively used because it reduces sum of squares error, has low variation, efficiency, unbiasedness, and consistency, and is straightforward to grasp. The diagnostic tests also assess the model's suitability for analysis. To beef-up the causal analytical power, which regression lacks and is very incidental to this work, the study used Granger causality methods to analyze the effects of the correlates on FDI.

## The Model

This study hypothesizes that FDI is a function of trade openness (OPN), the level of economic activity represented by the real GDP growth rate (RGDP), interest rate (INT), inflation (INF), and exchange rate (EXR) on the dependent variable of foreign direct investment (FDI). Functionally,

$$FDI = F(OPN, RGDP, INT, INF, EXR)$$

This expression produces an explicit expression in the form of:

$$FDI = a_0 + a_1OPN + a_2RGDP + a_3INT + a_4INF + a_5EXR + Et$$

where:

FDI = Foreign Direct Investment

OPN = Trade openness (export to import ratio or net export ratio, NEXPR)

RGDP = real GDP growth rate = level of economic activity (LEA).

INT = Interest Rate

INF = inflation

EXR = exchange rate

Et = stochastic error,  $a_0$  = Intercept;  $a_{is}$  = coefficients.

Log-linearizing the linear model above, we have:

$$LnFDI = b_0 + b_1LnOPN + b_2LnRGDP + b_3LnINT + b_4LnINF + b_5LnEXR + Ut$$

The intercept, coefficients, and error term are  $b_0$ ,  $b_{is}$ , and  $Ut$  respectively. The study anticipates trade openness, economic activity, interest rate, inflation, and exchange rate to be positive, a priori.

## ANALYSIS OF DATA AND RESULTS

The raw FDI, INT, INF, EXR, GDP, and OPN data are transformed into natural logarithms. The transformation makes the data very closely amenable for estimation. This also make for easy comparison of the variables. The study started the data description with the descriptive statistics of the variables as summarized in Table 4.1. The variability as indicated by the standard deviation, stood at 2.35 for FDI, 0.20 for INT, 0.999 for INF, 1.57 for EXR, 2.31 for GDP, and 0.32 for OPN. From all indication, INT varied least, while FDI varied most.

**TABLE 1**  
**DESCRIPTIVE STATISTIC OF VARIABLES**

Statistic	LNFDI	LNINT	LNINF	LNEXR	LNGDP	LNOPN
Mean	4.539899	2.923852	2.601558	3.826693	8.447280	0.396595
Median	4.824442	2.887590	2.492379	4.711600	8.576850	0.378323
Maximum	7.215534	3.454738	4.287716	5.723912	11.64142	1.039410
Minimum	-0.916291	2.298577	-1.514128	-0.116534	4.975561	-0.220972
Std. Dev.	2.352888	0.201628	0.995376	1.573536	2.305176	0.316509
Skewness	-0.794710	-0.169621	-1.797968	-0.832674	-0.163263	0.066046
Kurtosis	2.564075	5.218583	10.18366	2.668312	1.593764	2.642717
Jarq-Bera	3.621716	6.926144	88.73657	3.964678	3.213016	0.199512
Probability	0.163514	0.031333	0.000000	0.137747	0.200587	0.905058

All the variables are negatively skewed except trade openness (OPN). Only two variables, namely INT and INF, have their kurtosis higher than 3, representing the kurtosis of a normal distribution. All others have their kurtosis lower than 3. It is no wonder that all other variables are normally distributed except INT and INF. They are confirmed normally distributed by their Jarque-Bera statistics that they have probability greater than the critical alpha probability of 0.05. In contrast, those that are not normally distributed have their Jarque-Bera probability lower than 0.05.

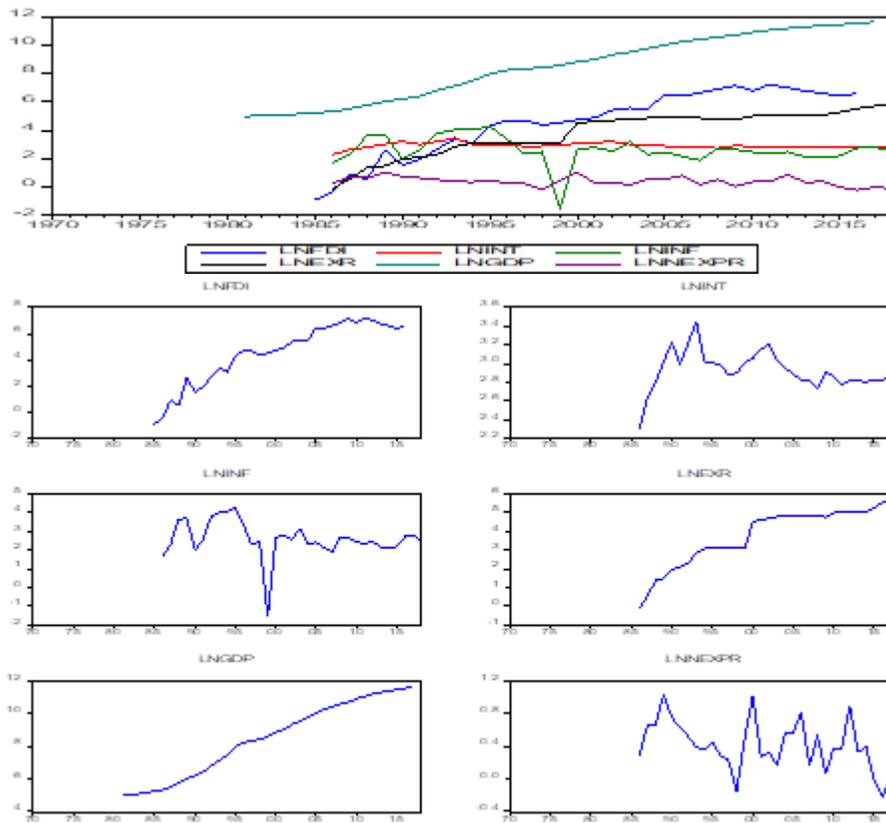
Figure 4.1 shows the variable log-values. The FDI variable showed a rightward-trending rough-hill ascent. GDP had the smoothest distribution, while EXR and FDI followed the same trend. They have a growing trend. Interest rate (INT), inflation (INF), and openness (OPN) or net export ratio (NEXPR) were more volatile.

### **Diagnostic Tests of the Model of FDI and its Determinants**

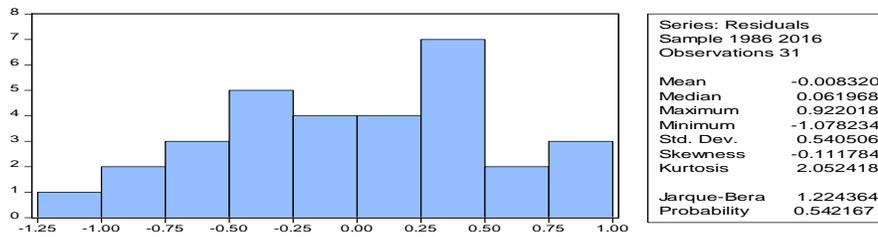
The model specified in the methodology was subjected to tests on whether the model would be useful enough for the analysis indicated in the study and to test relevant hypotheses. The first diagnostic test is the test of normality, i.e., whether or not the variables are jointly normal in their distribution. On an individual note, only four variables were normally distributed; two were not (see Figure 4.1). However, Figure 4.2, which depicts the histogram of residuals, shows that all the variables are jointly normally distributed. This is evidenced by the result of the Jarque-Bera statistic of 1.224 with a probability of 0.542. This probability is greater than the alpha probability of 0.05, and implies that the variables are jointly normally distributed.

The next diagnostic test was the Breusch-Godfrey Serial Correlation LM Test, which attempted to reveal whether or not the econometric problem of second-order auto-correlation is breached. From the result in Table 4.2, the F-statistic of 1.62 has a probability of 0.22. This probability is greater than the critical alpha of 0.05. Again, the Obs\*R-squared of 3.70 has a probability of 0.16, which is also greater than the alpha probability of 0.05. These being the case, the study has no reason to worry about autocorrelation or serial correlation problem. The model is simply free from such problem irrespective of the result of the first-order Durbin-Watson test statistic.

**FIGURE 1**  
**LINE GRAPHS OF THE VARIABLES**



**FIGURE 2**  
**HISTOGRAM OF RESIDUALS OF THE VARIABLES**



**TABLE 2**  
**BREUSCH-GODFREY SERIAL CORRELATION LM TEST**

F-statistic	1.624766	Prob. F(2,24)	0.2179
Obs*R-squared	3.696779	Prob. Chi-Square(2)	0.1575

**Table 4.3:** Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.768597	Prob. F(5,25)	0.1560
Obs*R-squared	8.100129	Prob. Chi-Square(5)	0.1508
Scaled explained SS	3.019533	Prob. Chi-Square(5)	0.6970

Again, the study conducted the heteroskedasticity test with the result summarized in Table 4.3. From the Table, the observed F-statistic is 1.77 with probability of 0.156. The Obs\*R-squared is 8.10 with the probability of 0.151, while the observed scaled explained SS statistic is 3.02 has the probability of 0.697. These probabilities are greater than the critical alpha probability of 0.05. Thus, the study accepts that null hypothesis of homoskedasticity. Therefore, no problem of heteroskedasticity or multiple variances exist among the residuals of the variables.

Having these diagnostic results in place, the model is said to pass the global utility tests that pre-qualify it appropriate for further analysis and hypothesis testing.

#### **Normal Technical Relationship Between FDI and Its Determinants**

Regression analysis is suitable for determining the magnitude and direction of normal relationships between a dependent variable and its independent variables. Thus, in order to test the normal or technical relationship between the variables in the earlier specified model, the study estimates the log-linear model and the results are summarized in Table 4.4. The Table shows that the R-squared statistic is observed to be 0.938, while the adjusted R-squared is 0.928. This means that about 92% of the changes in FDI inflows are accounted by the interactions of the independent variable. This high degree of joint relationship between FDI and its determinants is significant as shown by the F-statistic of 4.2[0.0030]. The Durbin-Watson statistic of 1.5 ordinarily suggests first-order auto-correlation, but the result of the second-order test in the model diagnosis above has overruled this first-order case. There is no second-order autocorrelation, as submitted earlier. This confirms that model as displaying goodness of fit. It fitted the data very well. This revealed attribute further confirms the global utility of the model to be used for further analysis and testing of formulated hypotheses.

**TABLE 4**  
**REGRESSION RESULTS OF FDI AND ITS DETERMINANTS' RELATIONS**

Dependent Variable: LNFDI  
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNINT	-0.723469	0.275849	-2.622694	0.0144
LNINF	-0.002091	0.111942	-0.018681	0.9852
LNEXR	0.809096	0.180660	4.478549	0.0001
LNGDP	0.429199	0.131733	3.258113	0.0031
LNOPN	0.090354	0.373018	0.242224	0.8105
R-squared	0.937777	Mean dependent var		4.715905
Adjusted R-squared	0.928204	S.D. dependent var		2.167089
Durbin-Watson stat	1.515053	F-Statistic		4.2[.003]

From Table 4.4, the interest rate variable (lnINT) has a coefficient of -0.723, t-statistic of -2.62 and probability of 0.014. The observed probability is less than the alpha probability of 0.05; the study cannot accept the null hypothesis of no significant relationship between FDI and INT. Also, the revealed sign is negative. This lends to the inference that a significant but negative relationship exists between FDI inflows to and interest rates in Nigeria. This implies that as interest rates go up, FDI reduces; whereas if interest rates go down, FDI increases. This in in line with the precepts of theory that recognizes that investment activities increase with decreasing lending or borrowing interest rates.

The inflation variable (lnINF) posted a coefficient of -0.002091, t-statistic of -0.018681 and probability of 0.985. The observed probability is greater than the alpha probability of 0.05. In which case, the study cannot reject the null hypothesis of no significant relationship between FDI and inflation (INF). Also, the revealed sign is negative. This supports the inference that a negative and non-significant relationship exists between FDI inflows and inflationary spirals in Nigeria. This implies that as inflation rates go up, FDI reduces. On the other hand, where inflation rates go down, FDI increases. This in in line with the precepts of theory that suggests that the prevalence of double-digit hyperinflation does not encourage economic activities, including investments.

The exchange rate variable (lnEXR) displayed a coefficient of 0.809096, t-statistic of 4.478 and a probability of 0.0001. The observed probability is less than the alpha probability of 0.05; thus, the study rejects the null hypothesis of no significant relationship between FDI and EXR. Also, the revealed sign is positive. This indicates a positive and significant relationship between FDI inflows and exchange rates in Nigeria. This implies that as exchange rates go up, FDI inflows increase, and if exchange rates go down, FDI decreases. This in in line with the of theory of exchange rate devaluation that recognizes that investment activities increase when the value of the local currency falls, so that foreign investors can take advantage of the cheap Naira relative to their high-valued foreign currency. They buy more Naira and thus invest more to their advantage, when exchange rates increase to the devaluation of the local currency.

The level or rate of economic activities in the country as represented by the GDP growth rate variable (lnGDP) displayed a coefficient of 0.429, t-statistic of 3.258 and probability of 0.0031. The observed probability is less than the alpha probability of 0.05, thus, the study rejects the null hypothesis of no significant relationship between FDI and GDP. Also, the revealed sign is positive. This indicates that there exist a positive and significant relationship between FDI inflows and the level or rate of economic activities in the country. Thus, as the economy grows, FDIs flow in the more in Nigeria; while the flow reduced when the economy is not growing. Everyone, including investors, like to associate with growth and vibrant economies.

The openness of the economy variable (lnOPN or lnNEXPR)) posted a coefficient of 0.090354, t-statistic of 0.2422 and probability of 0.8105. The observed probability of 0,8105 is greater than the alpha probability of 0.05. This means the study accepts the null hypothesis of no significant relationship between FDI and openness of the economy (OPN). Also, the revealed sign is positive. This supports the inference that there is a positive but and non-significant relationship between FDI inflows and inflationary spirals in Nigeria. By implication, as the economy opens more to the outside world, FDI flows in but the inflow rate due to the openness is not considerable.

### Causality Tests of and Causal Relations Between FDI and Its Determinants

Whether or not pairwise causality exist between foreign direct investments (FDI) and each of the explanatory variables is tested using the Granger procedure, and the results are summarized in Table 4.5. As can be verified from the Table, except for INF and OPN variables, all the explanatory variables exerted significant causal influence on FDI inflows to Nigeria. For instance, the null hypothesis that INT does not Granger Cause FDI cannot be accepted with the observed F-statistic and associated probability of 5.048 [0.0066]. Thus, INT causes FDIs to flow into the country significantly. There is a dual-causality scenario which is known as causality feedback, since causality also flows from FDI to INT (F-statistic = 6.63495; prob = 0.039). Thus, the situation indicates a bi-directional causality between the variables, INT and GDI.

INF is not seen to Granger-cause FDI with F-statistics of 0.4085 and probability of 0.8001, just as FDI does not Granger-cause INF (with F-stat = 0.48849 and prob = 0.7441). This indicates no a significant causal relationship between inflation and foreign direct investments. Table 4.6 reveals that a null hypothesis that EXR does not Granger Cause FDI cannot be accepted with the observed F-statistic and associated probability of 5.379[0.005]. Thus, EXR causes FDIs to flow into the country significantly. There is also dual causality among these two variables since causality flows from FDI to EXR (F-statistic = 3.899; prob = 0.0183). Thus, there is a bi-directional causality between EXR and FDI.

**TABLE 5**  
**PAIRWISE GRANGER CAUSALITY TESTS RESULTS**

Lags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.
LNINT does not Granger Cause LNFDI	27	5.04891	0.0066
LNFDI does not Granger Cause LNINT		6.63495	0.0018
LNINF does not Granger Cause LNFDI	27	0.40854	0.8001
LNFDI does not Granger Cause LNINF		0.48849	0.7441
LNEXR does not Granger Cause LNFDI	26	5.37917	0.0050
LNFDI does not Granger Cause LNEXR		3.89941	0.0183
LNGDP does not Granger Cause LNFDI	31	4.79220	0.0371
LNFDI does not Granger Cause LNGDP		3.00171	0.0942
LNOPN does not Granger Cause LNFDI	30	0.85750	0.3626
LNFDI does not Granger Cause LNOPN		4.00414	0.0555

Similarly, a null hypothesis that the level or rate of economic activities (GDP) does not Granger Cause FDI cannot be accepted, and thus rejected, with the observed F-statistic and associated probability of 4.792[0.0371]. Thus, GDP causes FDIs to flow into Nigeria, significantly. There is also dual-causality among these two variables, since causality also flows from FDI to GDP (F-statistic = 3.0017; prob =

0.0942), at 10% significance level. Thus, there is a bi-directional causality between GDP and FDI. The null hypothesis that OPN does not Granger cause FDI cannot be rejected, but accepted, with the observed F-statistic of 2.724[0.3626], but the null hypothesis that FDI does not Granger-cause OPN cannot be accepted, but rejected, with F-statistic of 4.00414 [0.0555]. There is thus, uni-directionally between OPN and FDI with causality only flowing from FDI to OPN.

## CONCLUSIONS

The major results of the hypotheses' tests are summarized below:

- Interest rate negatively but significantly relate with FDI inflows in Nigeria. There is significant causality flowing from interest rates (INT) to FDI. Thus, INT causes FDIs to flow into the country significantly.
- Inflation negatively but not significantly related with FDI inflows in Nigeria. No significant causality flows from inflation to FDI; thus, INF does not cause FDI in Nigeria.
- A positive and significant relationship exists between FDI inflows and exchange rates in Nigeria. There is significant causality flowing from exchange rates (EXR) to FDI. Thus, EXR causes FDI inflows to Nigeria, significantly.
- The level or rate of economic activities as represented by GDP growth rate relates positively and significantly with FDI inflows to Nigeria. Significant causality flows from the growth rate of GDP (GDP) to FDI. Thus, the level or rate of growth of the economy causes FDI inflows to Nigeria
- There is a positive but and non-significant relationship between FDI inflows and openness of the economy of Nigeria. No significant causality flows from the openness of the economy (OPN) to FDI. Thus, openness of the Nigerian economy does not significantly cause FDI inflows to Nigeria.

Going by the above findings, it is recommended that when formulating and implementing policies aimed at attracting foreign direct investors to Nigeria, government and monetary authorities should consider factors such as interest rates, exchange rates and growth rate of the economy. First, policies should be implemented to reduce interest lending rates. Second, policies favoring mild devaluation of the Naira should be encouraged. A concerted effort should be exerted to see that the economy and its aggregate outputs continue to grow year in year out.

The findings of this study show that the major determinants of FDI inflows to Nigeria are interest rate, exchange rate, and level of economic activities as represented by growth in GDP. Inflation and openness of the economy to international investors are not key determinants of FDI occurrence in Nigeria. It is suggested that future research should look further into this. It will be interesting to see if these variables actually maintain their observed causation imperatives sustainably in the long run. This is suggested for further study.

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