



Oil production and foreign direct investment in Nigeria

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Abstract

This study investigates the impact of oil production on foreign direct investment in Nigeria over the period 1990 to 2025. Oil production is proxied by crude oil production, crude oil price, and crude oil export, while Foreign Direct Investment inflow serves as the dependent variable. Exchange rate is incorporated as a control variable to account for macroeconomic influences. The study utilizes secondary data sourced from the World Bank's World Development Indicators (WDI) and the Central Bank of Nigeria (CBN) Statistical Bulletin (2025). Employing the Augmented Dickey-Fuller (ADF) unit root test and the Autoregressive Distributed Lag (ARDL) technique, the analysis establishes the stationarity properties of the variables and examines both short-run and long-run dynamics. The findings reveal the existence of a long-run relationship between oil production indicators and Foreign Direct Investment in Nigeria. Specifically, crude oil production exerts a positive and statistically significant effect on Foreign Direct Investment, indicating that increased production enhances Nigeria's attractiveness to foreign investors. In contrast, crude oil price shows a negative and statistically significant relationship with Foreign Direct Investment, suggesting that price volatility and associated macroeconomic instability may deter investment inflows. Crude oil export, although negative, is statistically insignificant, reflecting weak linkages between export activities and investment attraction. Similarly, exchange rate demonstrates a positive but insignificant influence on Foreign Direct Investment. The study concludes that while Nigeria's oil production capacity remains a critical driver of Foreign Direct Investment, structural inefficiencies and macroeconomic instability pose significant constraints. It recommends that the Nigerian National Petroleum Company Limited and the Ministry of Petroleum Resources strengthen oil production through sustained upstream investment, technological advancement, and improved security to enhance investor confidence.

Keywords: Oil production, crude oil price, crude oil export foreign direct investment exchange rate

Introduction

Nigeria's economy is predominantly dependent on the oil sector, which has historically served as the primary source of government revenue and foreign exchange earnings. The country is among the top oil producers in Africa, with oil accounting for approximately 90% of export revenue and over 70% of government earnings. Given this centrality, fluctuations in oil production have significant implications not only for macroeconomic stability but also for the attraction of foreign direct investment. Foreign direct investment remains a critical driver of economic growth, technological transfer, and capital formation, especially in resource-rich economies such as Nigeria. However, the extent to which oil production influences Foreign Direct Investment inflows depends on several economic, political, and institutional factors. On this basis this paper conceived oil production as the quantity of crude oil extracted from reserves within a specific period, and its performance can signal profitability and investment potential to foreign investors. Studies have shown that higher oil output generally encourages Foreign Direct Investment inflows as investors seek opportunities in upstream and downstream sectors. For instance, Adewuyi (2024) and Akinola (2025)^[2, 4] observed that increases in crude oil production positively affected Foreign Direct Investment in the Nigerian oil sector, although factors such as political risk, exchange rate volatility, and global oil price fluctuations could dampen investor enthusiasm.

Conversely, inconsistent oil production or operational disruptions may limit Foreign Direct Investment,

highlighting the sensitivity of foreign investment to oil sector dynamics. In Nigeria, the link between oil production and Foreign Direct Investment has been shaped by periods of political instability, policy reforms, and global market trends. Between 2000 and 2022, data show that years of high oil output coincided with higher Foreign Direct Investment inflows, while periods of oil theft, production disruptions, and economic uncertainty witnessed declines in foreign investment (Nwosu & Okeke, 2025; Bello & Adeyemi, 2024)^[8, 25]. Despite the sector's dominance, Nigeria continues to struggle with attracting sustained Foreign Direct Investment across all oil sub-sectors, pointing to gaps in institutional quality, infrastructure, and regulatory frameworks. Take for instance, the Nigerian National Petroleum Corporation (NNPC) reported that oil theft and sabotage resulted in the loss of approximately 150,000 barrels per day in 2020, significantly reducing production capacity and revenue.

Moreover, macroeconomic instability, exchange rate volatility, political risk, and global oil price fluctuations have compounded the problem, creating uncertainty for foreign investors. Statistical evidence underscores the challenge: between 2015 and 2022^[24], Nigeria's oil production averaged 1.6 million barrels per day, below its OPEC quota of 2.2 million barrels per day, while crude oil export revenue ranged from \$23 billion in 2016 to \$50 billion in 2021 (NNPC, 2022)^[18]. During the same period, FDI inflows fluctuated sharply, ranging from \$2.7 billion in 2016 to \$4.1 billion in 2020, often failing to align with periods of increased oil production (Nwosu & Okeke, 2025;

Bello & Adeyemi, 2024)^[8, 25]. Additionally, the global oil price crash in 2020 saw crude oil prices fall from \$64 per barrel in January 2020 to \$20 per barrel in April 2020, which directly affected Nigeria's ability to attract and retain foreign investors.

These disparities indicate that despite the sector's potential to attract foreign investment, structural, institutional, and operational inefficiencies limit the full realization of this potential. Correspondingly, empirical studies underscore a nuanced relationship between oil production and Foreign Direct Investment, with results varying across time, methodology, and contextual factors. While some studies find a strong positive long-run impact of oil production on Foreign Direct Investment (Lawal *et al.*, 2025; Adegbite *et al.*, 2023)^[1, 20], others emphasize the moderating role of political stability, exchange rate dynamics, and macroeconomic conditions (Musa & Adebayo, 2025; Azeez, 2022)^[5, 21]. This creates a research gap in understanding the nuanced dynamics of how oil production affects FDI inflows in Nigeria, particularly in both upstream and downstream segments of the sector. Addressing this gap is crucial for policymakers and stakeholders to design effective interventions that can stabilize production, enhance investor confidence, and maximize the benefits of foreign investment for sustainable economic development. It is on background that this study pursue to address the following questions? The extent crude oil production has impacted foreign direct investment? How has crude oil price impacted foreign direct investment? To what extent has oil export influenced foreign direct investment? And how has exchange rate impacted foreign direct investment? The rest of the paper after the introduction is structured as, section 2 is literature review, section 3 is methodology, and section 4 is result and discussion while section 5 is conclusion and recommendation

Literature Review

Oil Production

Oil production, often referred to as crude oil output, represents the total quantity of petroleum extracted from oil wells within a specific period. According to Kumar (2022)^[18], oil production is the "measure of crude oil quantity physically extracted from reserves and made available for domestic use or export within a defined timeframe." Adegbite *et al.* (2023)^[1] define it more broadly as "a key indicator of a nation's resource utilization efficiency, reflecting both operational capacity and potential for revenue generation through exports and value addition." Meanwhile, Oluwaseun (2024)^[28] emphasizes that oil production encompasses "the upstream processes of exploration and extraction that determine the volume of marketable crude oil available to domestic and international markets." Conceptually, oil production is both a macroeconomic and sector-specific variable. From a macroeconomic perspective, it contributes directly to a country's GDP, government revenue, and foreign exchange earnings. Sectorally, it drives investment, particularly foreign direct investment (FDI), as higher production volumes signal profitability, economic stability, and the potential for return on investment. Studies have shown that increased oil production tends to attract more FDI, particularly in resource-dependent economies like Nigeria, though this relationship is often moderated by factors such

as infrastructure quality, political stability, global oil prices, and regulatory frameworks (Adewuyi, 2024; Akinola, 2025)^[2, 4]. In Nigeria, oil production has historically been the backbone of the economy, accounting for over 90% of total exports and roughly 70% of government revenue (NNPC, 2022). Oil production is therefore critical not only for economic growth but also for shaping the investment climate. By understanding its dynamics and determinants, policymakers and investors can better anticipate the impact of production trends on foreign investment flows, export revenue, and broader economic development.

Foreign Direct Investment

Relationship between Oil Production and Foreign Direct Investment

Nigeria's economy has long been synonymous with oil, with the country standing as one of the largest crude oil producers in Africa. The oil sector not only dominates export earnings, contributing over 90% of total exports, but also underpins government revenue, accounting for nearly 70% of annual fiscal receipts (NNPC, 2022)^[24]. Beyond its fiscal significance, oil production serves as a powerful magnet for foreign direct investment (FDI), attracting capital, technology, and managerial expertise that are critical for industrial growth and economic diversification. The dynamics of oil output, therefore, have far-reaching implications: periods of robust production signal profitability and stability, encouraging foreign investors to commit resources, while production disruptions, political instability, or infrastructure deficits can sharply reduce investment inflows.

Between 2015 and 2022, Nigeria's oil production averaged 1.6 million barrels per day, falling below its OPEC quota of 2.2 million barrels per day, while FDI inflows fluctuated between \$2.7 billion in 2016 and \$4.1 billion in 2020 (Nwosu & Okeke, 2025; Bello & Adeyemi, 2024)^[8, 25]. These statistics underscore a critical tension: despite abundant oil resources, the country faces persistent challenges in translating production capacity into consistent foreign investment. Global oil price shocks, such as the drop from \$64 per barrel in January 2020 to \$20 per barrel in April 2020, coupled with domestic operational challenges like pipeline vandalism and theft, further exacerbate uncertainty for foreign investors.

Theoretical Literature

Eclectic Paradigm Theory

The Eclectic Paradigm, was propounded by Dunning in 1977^[13]. This theory explains the determinants of foreign direct investment and why multinational enterprises choose to invest in certain countries rather than others. According to Dunning, Foreign Direct Investment occurs when three critical conditions are satisfied: Ownership advantages (O), Location advantages (L), and Internalization advantages (I). Ownership advantages refer to the firm's unique assets, such as technology, managerial expertise, or brand reputation, which enable it to compete internationally. Location advantages are the benefits offered by the host country, including natural resources, market size, skilled labor, and favorable regulatory frameworks. Internalization advantages arise when a firm can more efficiently manage operations internally rather than through contracts, licensing, or partnerships.

The theory assumes that investors act rationally to maximize profit and that host-country attributes, such as resource endowment, infrastructure, and market conditions, significantly influence investment decisions. Proponents of the theory, including Dunning (1977) and later Narula (2004)^[13, 22], argue that the Eclectic Paradigm, framework provides a comprehensive lens to understand how resource availability, market potential, and operational control shape the flow of foreign investments. For instance, in resource-rich economies like Nigeria, natural endowments such as crude oil constitute a major location advantage, attracting FDI in both upstream and downstream oil sectors. However, opponents such as Buckley and Casson (1998) and Narula (2012)^[9, 23] contend that the theory assumes ideal conditions for rational decision-making and underestimates contextual risks, including political instability, corruption, and exchange rate volatility. In Nigeria, these factors often moderate the relationship between oil production and FDI inflows, highlighting limitations in the application of the theory if contextual factors are ignored.

The Eclectic Paradigm is highly relevant to this study as it provides a holistic framework for examining how oil production influences Foreign Direct Investment in Nigeria. Oil production represents a critical location advantage, while foreign investors' technological and managerial assets constitute ownership advantages. Internalization advantages explain why multinational firms often establish wholly-owned subsidiaries or joint ventures rather than merely licensing operations. The theory was chosen to anchor this study because it captures the complex interplay between resource endowment, host-country characteristics, and investor behavior, offering a strong theoretical foundation for analyzing the determinants and dynamics of FDI in Nigeria's oil sector.

Resource-Based View Theory

The Resource-Based View theory was propounded by Barney in 1991^[7]. It postulates that a firm's sustainable competitive advantage derives from the acquisition and effective utilization of valuable, rare, inimitable, and non-substitutable (VRIN) resources and capabilities. These resources may be tangible, such as natural resources, financial assets, and infrastructure, or intangible, such as technology, managerial expertise, intellectual property, and organizational reputation. The theory assumes that firms or economies that possess strategic resources can achieve superior performance and attract external investments because these resources signal potential profitability and operational efficiency.

Proponents of the Resource-Based theory including Barney (1991) and Wernerfelt (1984)^[7, 30], argue that resource endowments, when efficiently leveraged, can enhance economic outcomes and attract foreign direct investment (FDI). In the context of resource-dependent economies like Nigeria, oil represents a critical natural resource whose abundance and quality can serve as a competitive advantage, making the country attractive to foreign investors seeking profitable investment opportunities. For instance, higher oil production volumes indicate operational efficiency and potential revenue generation, encouraging multinational enterprises to commit capital, technology, and managerial expertise. Opponents, such as Priem and Butler (2001)^[29], contend that the Resource-Based View overemphasizes

internal resources while underestimating external contextual factors such as political instability, regulatory inefficiencies, macroeconomic volatility, and global market shocks. In Nigeria, challenges such as pipeline vandalism, oil theft, and exchange rate fluctuations can weaken the signaling effect of oil resources, potentially limiting the inflow of FDI despite abundant resource endowment. The Resource-Based View theory is relevant to this study because it provides a framework for understanding how Nigeria's oil endowment, as a critical resource, influences foreign investment decisions. Oil production, when viewed as a strategic and valuable resource, serves as an indicator of profitability and operational capacity, attracting both domestic and foreign capital. Although the study anchors on the Eclectic Paradigm to capture the broader host-country and investment dynamics, Resource-Based View complements this framework by emphasizing the role of unique resource endowments in attracting Foreign Direct Investment and guiding resource-based policy interventions in the oil sector.

Empirical Literature

Musa and Adebayo (2025)^[21] explored short- and long-term effects of oil production on Foreign Direct Investment from 1996 to 2023^[14] using ARDL and Granger causality tests. Variables included oil production, Foreign Direct Investment inflows, exchange rate, interest rate, and oil price volatility. Findings revealed that oil production had a robust positive long-run effect on Foreign Direct Investment, while short-term shocks in oil prices and interest rates temporarily reduced investment inflows. Granger causality tests indicated bi-directional causality between oil production and Foreign Direct Investment inflows, highlighting that not only does oil production attract Foreign Direct Investment, but increased Foreign Direct Investment also supports further oil sector expansion. Additionally, Lawal *et al.* (2025)^[20] examined the relationship between oil production and Foreign Direct Investment inflows in Nigeria from 2000 to 2024^[2] using ARDL and Error Correction Models. Variables included oil production, Foreign Direct Investment inflows, GDP growth, oil prices, exchange rate, and political risk index. The study found that oil production significantly and positively influenced Foreign Direct Investment, while GDP growth and stable political conditions reinforced inflows. Conversely, exchange rate volatility and political risk negatively affected short-term Foreign Direct Investment, highlighting the importance of macroeconomic and institutional stability.

Gafar and Abiola (2025)^[17] investigated the short-run and long-run effects of oil output on Foreign Direct Investment in Nigeria from 1998 to 2024^[2, 9] using ARDL and Vector Error Correction Models. Variables were oil production, GDP per capita, foreign exchange stability, interest rate, political risk index, and Foreign Direct Investment inflows. Their results showed that oil production consistently attracted Foreign Direct Investment in both the short and long run, with foreign exchange stability reinforcing this link. Conversely, political risk and high interest rates significantly reduced Foreign Direct Investment inflows in the short-run model. Also, Nwosu and Okeke (2025)^[25] explored oil sector performance and foreign investment in Nigeria between 2000 and 2022^[18] using cointegration and ARDL bounds testing. Variables included oil production,

crude oil export volume, oil revenue, Foreign Direct Investment inflows, inflation, and exchange rate. Results showed that oil production and export volumes positively and significantly affected Foreign Direct Investment inflows, while oil revenue also had a strong positive influence. High inflation and volatile exchange rates were negative determinants, reducing investor confidence. The study confirmed a long-run equilibrium relationship between oil production and Foreign Direct Investment inflows, demonstrating that oil sector performance is a key driver of foreign investment in Nigeria.

Danladi and Olufemi (2025)^[12] conducted a multivariate study for 2001 to 2023 using nonlinear ARDL modeling to capture asymmetry in effects between production and investment. Variables included oil production, Foreign Direct Investment inflows, global oil prices, interest rates, institutional risk scores, and credit to the private sector. The study reported that positive changes in oil production had stronger effects on Foreign Direct Investment than negative changes, suggesting asymmetric investor behavior. Global oil price increases enhanced Foreign Direct Investment more than decreases discouraged it, a finding with important implications for policy timing and risk management. Similarly, Akinola (2025)^[4] focused on Foreign Direct Investment responses to oil production shocks between 1995 and 2023^[1] using generalized autoregressive conditional heteroskedasticity (GARCH) to capture volatility effects. Variables included oil production growth rates, Foreign Direct Investment inflows, global oil price volatility, interest rate, inflation, and political risk index. The study found that sharp production increases led to short-term spikes in Foreign Direct Investment, but when combined with high political risk or oil price volatility, foreign investment flows were volatile and less sustainable over longer periods.

Balogun and Sunday (2024)^[6] used dynamic panel GMM estimation to study data from 1995 to 2021 across federal, state, and local oil sectors. Variables included crude oil output, Foreign Direct Investment inflows, education expenditure, poverty index, macroeconomic stability measures, and global oil price shocks. Findings revealed that oil output and macroeconomic stability had strong positive effects on Foreign Direct Investment while poverty and education variables had no clear direct effect on investment flows. Still, Fabunmi (2024)^[16] analyzed sector-specific Foreign Direct Investment trends in Nigeria's oil industry using multivariate regression analysis for 2000 to 2020. Variables included crude oil production, Foreign Direct Investment inflows by sub-sector, foreign portfolio investment, infrastructure quality, and regulatory ease of doing business index. Results revealed that higher oil production significantly correlated with increased Foreign Direct Investment in upstream activities but had weaker effects on downstream and midstream segments. Regulatory hurdles significantly dampened investor enthusiasm for diversified oil sector investments.

Adewuyi (2024)^[2] examined the interplay between crude oil production, Foreign Direct Investment inflows, and infrastructure development from 1998 to 2021 using autonomous distributed lag and vector error correction models. Variables included oil production, oil export revenue, Foreign Direct Investment inflows, infrastructure index, human capital development, and exchange rate stability. The results showed that oil production and

infrastructure improvements significantly attracted Foreign Direct Investment in the long run, while human capital development did not show a direct effect. Exchange rate instability acted as a short-run deterrent to Foreign Direct Investment, underlining that investors favor predictable economic conditions.

Chinonso (2023)^[10] employed autoregressive distributed lag (ARDL) bounds testing for data spanning 1992 to 2022 to investigate oil production, exchange rate, and Foreign Direct Investment inflows in Nigeria. Variables were oil output, exchange rate volatility, Foreign Direct Investment inflows, inflation rate, and trade balance. The results indicated that oil production and stabilized exchange rates significantly improved Foreign Direct Investment inflows, while inflation and trade balance were insignificant. The short-run dynamics revealed that reduction in exchange rate volatility led to immediate improvements in Foreign Direct Investment. Moreover, Ebenezer and Madu (2023)^[14] applied cointegration and causality tests for the period 1990 to 2021 to evaluate causal links between oil output, Foreign Direct Investment, and export performance. Variables included total oil production, Foreign Direct Investment inflows, export revenue, GDP growth, and interest rate. Their findings showed bidirectional causality between oil production and Foreign Direct Investment meaning that increases in oil output prompted Foreign Direct Investment, and surges in Foreign Direct Investment supported further oil expansion. Export revenue and GDP growth also played positive supporting roles.

Ajibola and Okereke (2023)^[3] investigated whether oil sector performance and Foreign Direct Investment inflows in Nigeria were mutually reinforcing using panel data techniques for 2000 to 2022^[27]. Variables included oil output, Foreign Direct Investment inflows, petroleum price shocks, trade openness, and institutional quality. Their results indicated that higher oil production sustained by favorable oil prices consistently encouraged Foreign Direct Investment, while trade openness and better institutional quality amplified investment attraction. Institutional weaknesses, however, created uncertainty even when production increased. Likewise, Bello and Adeyemi (2024)^[8] investigated crude oil production and Foreign Direct Investment in Nigeria from 1990 to 2023^[3] using panel VAR and GARCH modeling. Variables included oil production, global oil prices, Foreign Direct Investment inflows, inflation rate, political stability index, and trade openness. The study found that oil production had a positive and statistically significant long-run effect on Foreign Direct Investment, confirming that higher production volumes attract foreign investors. Global oil price volatility negatively impacted Foreign Direct Investment in the short run. Inflation had a dampening effect on investment, while trade openness enhanced Foreign Direct Investment inflows. Political stability was critical: periods of instability significantly discouraged foreign investment.

Chukwu *et al.* (2024)^[11] examined determinants of Foreign Direct Investment in Nigeria's oil sector over 1990 to 2022^[18] using dynamic panel GMM. Variables included oil production, global oil prices, Foreign Direct Investment inflows, institutional quality, GDP growth, and macroeconomic stability. The study found that oil production and global oil prices significantly attracted Foreign Direct Investment while poor institutional quality

reduced inflows. GDP growth positively reinforced Foreign Direct Investment, showing that economic performance and oil sector output jointly determine foreign investment patterns. Equally, Okafor and Usman (2023)^[26] studied oil production, oil revenue, and foreign investment in Nigeria's oil-producing states from 2000 to 2021 using panel ARDL. Variables included oil production, FDI inflows, local content policies, political risk index, and infrastructure quality. Findings showed that oil production positively and significantly influenced Foreign Direct Investment inflows, while political risk negatively impacted investment. Infrastructure inadequacies also constrained Foreign Direct Investment, and local content policies were statistically insignificant, indicating weak implementation.

Adebite *et al.* (2023)^[1] analyzed the impact of oil sector activities on Foreign Direct Investment in Nigeria from 1989 to 2021 using VECM and impulse response functions. Variables included oil production, oil export revenue, Foreign Direct Investment inflows, macroeconomic stability indicators, governance indices, and GDP. Results indicated that oil production and export revenue significantly increased Foreign Direct Investment inflows, while periods of political instability and macroeconomic uncertainty reduced inflows. Impulse response analysis revealed that shocks to oil production had sustained positive effects on Foreign Direct Investment confirming that the oil sector serves as a long-term engine for foreign investment. Besides, Eze *et al.* (2023)^[15] examined the impact of oil production on foreign direct investment inflows in Nigeria from 2005 to 2021 using ARDL and Error Correction Models. Variables included crude oil output, oil revenue, Foreign Direct Investment inflows, GDP growth, exchange rate, inflation, and interest rate. The study found that crude oil output and oil revenue positively and significantly influenced Foreign Direct Investment inflows, suggesting that higher production attracts foreign investors. GDP growth reinforced the positive impact of oil production on Foreign Direct Investment. In contrast, exchange rate fluctuations and high inflation reduced Foreign Direct Investment inflows, while interest rates had a negative but statistically insignificant effect. The error correction term indicated that deviations from long-run equilibrium corrected over time, demonstrating systemic adjustment mechanisms in the Nigerian economy.

Azeez (2022)^[5] explored the long-term relationship between Nigeria's crude oil output and annual Foreign Direct Investment inflows from 1989 to 2020 using Johansen cointegration and vector error correction (VEC) models. Variables included total oil output, Foreign Direct Investment inflows, GDP per capita, real interest rate, foreign exchange reserves, and trade policy index. Cointegration tests indicated a stable long-run relationship among variables. The VEC results showed oil output and real exchange rate positively influenced Foreign Direct Investment, while GDP per capita and trade policy index displayed mixed effects. As well, Okonkwo and Eze (2022)^[27] studied oil production, government policies, and Foreign Direct Investment inflows from 1995 to 2020 using panel regression with fixed effects. Variables included oil production, oil revenue, Foreign Direct Investment inflows, policy reforms, global oil price trends, and political stability. Results revealed that oil production and revenue consistently attracted Foreign Direct Investment, with

favorable government policies amplifying the effect. Global oil price fluctuations moderated investment inflows but did not negate the positive effect of oil production. Political stability further enhanced investor confidence. Finally, Ibrahim *et al.* (2022)^[18] analyzed the impact of oil production on Foreign Direct Investment inflows in Nigeria from 1995 to 2020 using VAR and VECM models. Variables included crude oil output, Foreign Direct Investment inflows, GDP, oil revenue, and government expenditure. Results indicated that oil production had a positive and significant effect on Foreign Direct Investment while GDP also positively influenced inflows. Oil revenue reinforced Foreign Direct Investment growth, but government expenditure had a moderating effect, slightly constraining investment in the short run. The VECM error correction term revealed slow adjustments to long-run equilibrium after external shocks, highlighting the dynamic relationship between oil production and foreign capital inflows.

Gaps and Value Addition

The empirical literature on oil production and Foreign Direct Investment in Nigeria demonstrates a strong consensus that the oil sector plays a pivotal role in attracting foreign capital. A review of existing studies shows that many scholars, including Musa and Adebayo (2025), Lawal *et al.* (2025), and Gafar and Abiola (2025)^[17, 21], employ ARDL and error correction techniques to establish that oil production has a positive and significant long-run effect on Foreign Direct Investment inflows. These studies further highlight that macroeconomic stability, particularly favorable oil prices and economic growth, enhances investment, while inflation, exchange rate instability, and political risk weaken inflows in the short run. In addition, other studies adopt advanced methodologies to capture more complex dynamics. For example, nonlinear ARDL and GARCH-based approaches (Danladi and Olufemi, 2025; Akinola, 2025; Bello and Adeyemi, 2024)^[8, 12] reveal that volatility in oil prices and production introduces uncertainty, thereby discouraging sustainable Foreign Direct Investment. Similarly, panel and cointegration-based studies (Chukwu *et al.*, 2024; Adebite *et al.*, 2023; Eze *et al.*, 2023)^[1, 11, 15] confirm the existence of long-run relationships, emphasizing that oil production and export earnings remain key drivers of foreign investment, while institutional weaknesses and macroeconomic instability constrain inflows.

Despite these contributions, notable gaps persist. Most studies focus primarily on oil production, with limited integration of crude oil production, oil price, oil export, and exchange rate within a unified framework. Additionally, existing works often cover shorter or inconsistent periods, with insufficient attention to an extended time frame such as 1990 to 2025. Methodologically, there is a tendency to apply either cointegration techniques or volatility models in isolation, without adequately capturing both long-run dynamics and uncertainty effects. Furthermore, the role of the exchange rate as a key transmission channel remains underexplored. Therefore, this study addresses these gaps by adopting a more comprehensive approach that integrates crude oil production, oil price, oil export, and exchange rate in explaining Foreign Direct Investment in Nigeria over the period 1990 to 2025^[4], thereby offering a more holistic and policy-relevant insight.

Methodology

This paper basically relied on secondary data which were obtained from World Banks World Development Indicator (WDI), and Central Bank of Nigeria (CBN) statistical Bulletin 2025^[4] was the major source of data collection for this research paper. Crude Oil Production (COP), OIL Price (OPR), Oil Export (OEXP), were used to proxy Oil Production while Foreign Direct Investment Inflow was used as a proxy the dependent variable Foreign Direct Investment. However, Exchange Rate (EXR) serves as a control variable for the study. The Augmented Dickey Fuller (ADF) method was used in order to do the unit root test on the model that was developed. Taking into consideration the results of the ADF, the research used the Auto-regressive Distributive Lag (ARDL)

Model Specification

The analytical framework for this study is anchored on the Eclectic Paradigm Theory propounded by Dunning in 1977^[13], which emphasizes ownership, location, and internalization advantages as key determinants of foreign direct investment. Within this framework, natural resource endowment, particularly oil, constitutes a critical location-specific advantage that attracts foreign investors to resource-rich economies such as Nigeria. Drawing from the empirical model of Lawal *et al.*, the baseline model specifies foreign direct investment as a function of gross domestic product growth rate, oil price, exchange rate, and political risk index. However, in line with the objectives of this study, modifications were made to better capture the oil sector dynamics. Specifically, gross domestic product growth rate was replaced with crude oil production to directly reflect output performance in the oil sector, while political risk index was excluded due to data limitations and the study’s focus on oil-specific determinants. Additionally, oil export was introduced to capture external earnings from the oil sector.

Thus, the modified functional model is expressed as:

$$FDI = f(COP, OPR, OEXP, EXR) \quad 2$$

The mathematical model could be symbolically expressed as;

$$FDI = \beta_0 + \beta_1 COP + \beta_2 OPR + \beta_3 OEXP + \beta_4 EXR \quad 3$$

$$FDI = \beta_0 + \beta_1 COP + \beta_2 OPR + \beta_3 OEXP + \beta_4 EXR + e \quad 4$$

Where:

FDI = Foreign Direct Investment, COP = Crude oil Production, OPR = Oil Price, OEXP = Oil Export, EXR = Exchange Rate, f = functional relationship β_0 = Intercept of relationship in the model/constant β_1 - β_4 = Coefficients of each independent or explanatory variable e = Stochastic or Error term.

Description of Variables in the Model

Foreign Direct Investment (FDU): This refers to cross-border investments made by a firm or individual to acquire lasting interest and control in a business in another country. Foreign direct investment is used as the dependent variable and is measured in %.

Crude Oil Production (COP): This is the total volume of crude oil extracted and processed within a given period, usually measured in barrels per day. Higher oil production signals investment opportunities in the sector, attracting foreign investors seeking returns from oil sales and related industries. Therefore, this study presumed that crude oil production will be positively related with foreign direct investment. Crude oil production is used as a proxy for the independent variable. Hence, $\Omega_1 > 0$

Crude Oil Price (OPR): This represents the international market price per barrel of crude oil, typically in U.S. dollars. Higher oil prices increase potential returns for investors in oil exploration and export activities, making the country more appealing for foreign investment. This paper therefore expect that crude oil price will have a positive relationship between crude oil price and foreign direct investment. Crude oil price is used to proxy oil production and is measured in thousand barrels per day kb/d. thus, $\Omega_2 > 0$

Oil Export (OEXP): This refers to the volume or value of crude oil and petroleum products sold to foreign markets. Higher oil exports generate more revenue, improve the balance of payments, and signal a stable and profitable oil sector, which attracts foreign investors. Therefore, this paper expect that oil export will have a positive relationship with foreign direct investment. Oil export is used to measure the explanatory variable oil production and is measured in thousands of Naira annual. Consequently, $\Omega_3 > 0$

Exchange Rate (EXR): This measures the value of the domestic currency relative to foreign currencies. High volatility discourages investors thereby reducing the amount of foreign inflow. This paper hypothesized that exchange rate will be negatively related with foreign direct investment. Exchange rate is used as a control variable and was measured in US\$. Thus, $\Omega_4 < 0$

Empirical Data Analysis

Unit Root Test

A unit root test known as the Augmented Dickey Fuller (ADF) test was used in the research project to determine the order of integration of the variables that were being investigated. This was done in order to pick the proper approach and prevent false regression.

Table 1: Unit Root Test Using Augmented Dickey Fuller (ADF)

Variables	Levels		First Difference		Order of Integration	P-value
	T. Statistics	5% Critical Value	T. Statistics	5% Critical Value		
FDI	-1.796949	-2.948404	-8.321353	-2.951125	I(1)	0.0000
LCOP	-0.599907	-2.948404	-4.944960	-2.951125	I(1)	0.0003
LOPR	-1.245893	-2.948404	-5.339290	-2.951125	I(1)	0.0001
LOEXP	2.020697	-2.948404			I(1)	0.0001
EXR	3.240601	-2.954021	-5.493228	-2.954021	I(0)	0.0000

Source: Extracts from E-view 13. * Level of significance at 5%

We examined all of the research variables using Augmented Dickey Fuller (ADF) tests to see whether they were stationary or non-stationary series, following the guidelines provided by table. 2. At the initial difference I(1), the stationarity test indicated that FDI, LCOP, LOPR and LOEXP, stationary, whereas EXR is stationary at the level I(0). The variables show either mixed-order integration or stationarity of level and initial differences when we analyse their stationarity. The Autoregressive Distributive Lag (ARDL) technique was used to analyse the data. Both the first difference (I(1)) and the stationary at level I(0) may be handled by this method. The ARDL test is the most appropriate analytical technique to utilise since it looks at the relationship between the independent and dependent variables in terms of both short-term and long-term trends.

Co-integration Test

Table 2: ARDL Bound Test

Test Statistics	Value	K
F-statistics	7.347583	4
Significance	I (0)	I(1)
10%	2.75	3.99
5%	3.35	4.77
1%	4.76	6.67

Source: Authors computation 2026

From table 2 the bound test result indicates that there exist long run relationships amongst the variables as the F-statistic value of 7.347583 exceeds both the lower and upper bound critical values. Thus, we reject the null hypotheses of no long run relationship and accept its alternative. This means that there is a long-run relationship between Oil Production and Foreign Direct Investment in Nigeria.

Table 3: ARDL Long-Run Estimation Results for the Model

Variables	Coefficient	Std. error	t-Statistic	Prob-Value
LCOP	0.278039	0.107440	2.587859	0.0032
LOPR	-0.879729	0.311914	-2.820423	0.0087
LOEXP	-0.224234	0.835533	-0.268372	0.7903
EXR	0.009495	0.011305	0.839902	0.4078

Source: Authors computation 2026

The Autoregressive Distributive Lag (ARDL) Long run result in Table 3 shows that the logarithm value of crude oil production (LCOP) showed a positive (+0.278039) relationship with foreign direct investment (FDI). This implies that a unit increase in the log value of crude oil production (LCOP) will lead to about 28% increase in foreign direct investment (FDI) in Nigeria. The p-value of 0.0032 indicates that there is a statistically significant relationship between the logarithm value of crude oil production (FDI) and foreign direct investment (FDI). Previous studies by Musa and Adebayo (2025)' and Lawal et al. (2025) are in line with the findings of this study and reported that oil production had a robust positive long-run effect on Foreign Direct Investment

Furthermore, the log value of crude oil price (LOPR) showed a negative (-0.879729) relationship with foreign direct investment (FDI). This implies that a unit increase in the log value of crude oil price (LOPR) will lead to about 88% fall in foreign direct investment (FDI) in Nigeria. The p-value of 0.0087 indicates that there is a statistically

significant relationship between the logarithm value of crude oil price (LOPR) and foreign direct investment (FDI). Earlier study by Danladi and Olufemi (2025) do not agree with the findings of this study and reported in their study that global oil price increases enhanced Foreign Direct Investment

Also, the log value of oil export (LOEXP) showed a negative (-0.224234) relationship with foreign direct investment (FDI). This implies that a unit increase in the log value of oil export (LOEXP) will lead to about 22% fall in the value of foreign direct investment (FDI) in Nigeria. The p-value of 0.7903 indicates that there is no statistically significant relationship between the logarithm value of oil export (LOEXP) and foreign direct investment (FDI). However, earlier study by Nwosu and Okeke (2025) are not in agreement with the findings of this study and reported in there study that export volumes positively and significantly affected Foreign Direct Investment inflows

Finally, the coefficient of exchange (EXR) showed a positive (+0.009495) relationship with the foreign direct investment (FDI). This means that a unit increase in the exchange rate (EXR) will lead to about 0.001% increase in foreign direct investment (FDI) in Nigeria. The p-value of 0.4078 indicates that there is no statistically significant relationship between exchange rate (EXR) and foreign direct investment (FDI).

Table 4: ARDL Short -Run Estimation Results for the Model

Variable	Coefficient	Std. Error	t-Statistics	Prob
C	-0.225579	0.077352	-2.916266	0.0089
D(LCOP)	0.389375	0.230850	1.686703	0.1080
D(LCOP(-1))	-0.929973	0.360046	-2.582929	0.0182
D(LCOP(-2))	0.028022	2.138727	0.013102	0.9897
D(LOPR)	0.187459	0.460389	0.407177	0.6884
D(LOPR(-1))	0.654411	0.246241	2.657606	0.0036
D(LOPR(-2))	0.272733	0.502700	0.542535	0.5938
D(LOEXP)	-0.262952	0.371863	-0.707121	0.4881
D(LOEXP(-1))	-0.073961	0.352762	-0.209662	0.8362
D(LOEXP(-2))	-0.288037	0.363381	-0.792658	0.4378
D(EXR)	0.001359	0.000798	1.702296	0.1050
D(EXR(-1))	-0.002104	0.001821	-1.155191	0.2623
D(EXR(-2))	-0.008452	0.005948	-1.421083	0.1715
Ecm (-1)*	-0.437763	0.149846	-2.921420	0.0088
Adj R ² = 0.418298, F-statistics = 1.330266 (0.000291), DW = 2.480922				

Source: Authors computation 2026

The coefficient estimate for the error correction term, ECM (-1) has a negative value and is significant at the 0.05 level. It suggests that the model will reach long-run equilibrium at a rate of 0.44% every year. This means that a yearly adjustment speed of 0.44% may fix the mistake from the previous year. The independent variables (LCOP, LOPR, LOEXP, & EXR) explain 42% of the total variance in the dependent variable (FDI), according to the corrected R-Square (R²) value. As a whole, the model is noteworthy since the F-statistic is significant at the 5% level of significance. Without serial correlation, the model would not work, according to the Durbin-Watson statistics of 2.480922, which is close to 2.

Table 4 displays the model's short-run outcome. A negative log value of crude oil production (LCOP) of -0.929973 was seen in the previous year periods when the value of foreign direct investment (FDI) was used as the dependent variable. This means that the value of foreign direct investment (FDI) would decrease by approximately 0.93% for every unit

increase in the log value of crude oil production (LCOP) in Nigeria. Crude oil production and Foreign direct investment correlate statistically ($p = 0.0182$). Economic theory predict this outcome. The value of foreign direct investment is likely to rise in response to an increase in the log value of crude oil production.

Similarly, a positive value of crude oil price (LOPR) of +0.654411 was seen in the previous year periods when the value of foreign direct investment (FDI) was used as the dependent variable. This means that the log value of crude oil price (LOPR) would increase by approximately 0.65% for every unit increase in the value of foreign direct investment (FDI) in Nigeria. Crude oil price and Foreign direct investment correlate statistically ($p = 0.0036$). Economic theory predict this outcome. The value of foreign direct investment is likely to rise in response to an increase in the log value of crude oil price. Furthermore, as a stand-in for explanatory variable the log value of oil export (LOEXP) had a negative value of -0.262952, -0.073961 & -0.288037 in the current, previous and second year periods when the value of foreign direct investment (FDI) was used as the dependent variable. This means that the value of foreign direct investment (FDI) would decrease by approximately 0.26%, 0.07% and 0.29% for every unit increase in the log value of oil export (LOEXP) in Nigeria. Oil export and Foreign direct investment values do not correlate statistically ($p = 0.4881$, $p = 0.8362$ & 0.4378). Economic theory did not predict this outcome. The value of foreign direct investment is likely to decline in response to an increase in the log value of oil export.

Finally, exchange rate was used as a control variable (EXR) had a negative value of -0.002104 and -0.008452 in the previous and second year periods when the value of foreign direct investment (FDI) was used as the dependent variable in Nigeria. This means that the value of foreign direct investment (FDI) would increase by approximately 0.002% and 0.008% for every unit increase in exchange rate (EXR) in Nigeria. Exchange Rate and Foreign direct investment

values do not correlate statistically ($p = 0.2623$), $p = 0.1715$. Economic theory predict this outcome. The value of foreign direct investment is likely to decline in response to an increase in the value of exchange rate.

Diagnostic Test

Table 5: Ramsey Reset Test, Serial Correlation LM Test and Homoscedasticity Test Results

	F-Statistic	Prob-Value
Ramsey Reset Test	0.427665	0.5237
Breusch-Godfrey Serial Correlation LM Test	2.677226	0.1062
Breusch-Pagan-Godfrey Heteroskedasticity Test	0.649353	0.8050

Source: Authors computation 2026

From Table 5, the results of the diagnostic test shows that the linearity test using Ramsey Reset test indicates that the f-statistic (0.427665) with computed p-value of 0.5237 which is greater than 5 percent (0.05) critical value, hence the study reject the null hypothesis and conclude that the model is correctly specified. The result of the Serial or Autocorrelation Test using Breusch-Godfrey Serial Correlation LM Test shows that the f-statistic is 2.677226, with a Chi-Square probability value is 0.1062. This indicates that the probability value of about 11 percent (0.1062) is greater than 5 percent (0.05) critical value; hence the study confirms no serial correlation in the model. The result of the heteroscedasticity test using Breusch-Pagan-Godfrey test shows that the f-statistic is 0.649353 with a Chi-Square probability value of 0.8050. The result suggests that there is no evidence of heteroskedasticity in the model since the probability Chi-square value is more than 5 percent ($P > 0.05$). So, residuals do have constant variance which is desirable in regression meaning that residuals are Homoscedastic.

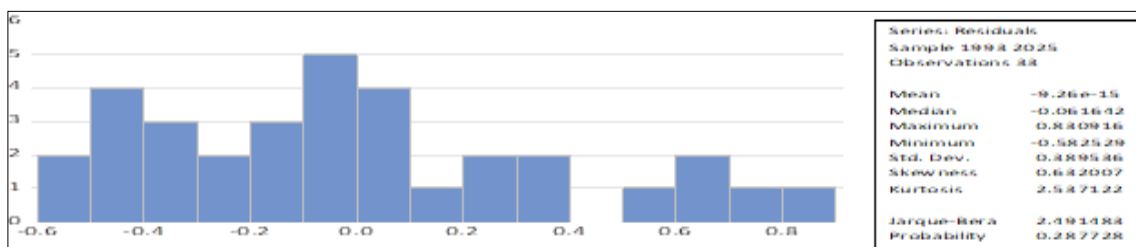


Fig 1: Normality Test

Figure 1, shows summary of the normality test with Jarque-Bera value of 2.491483 and a corresponding probability value of 0.287728 more than 0.05 level of significance, indicating that the residuals are normally distributed

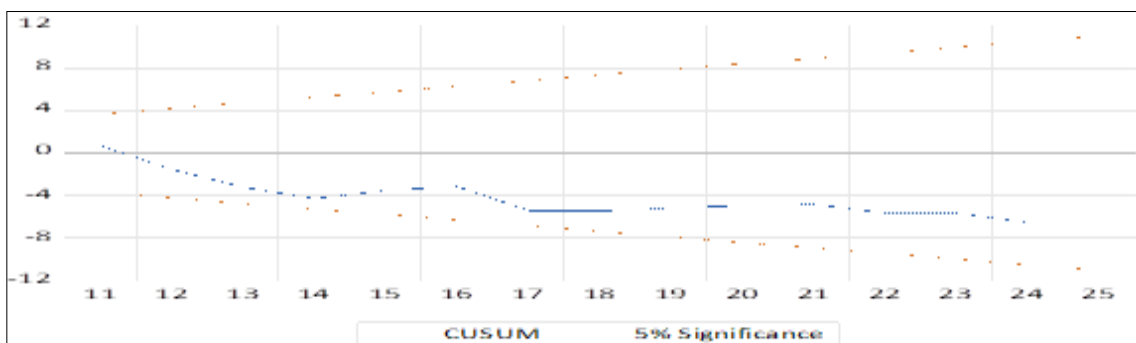


Fig 2: Stability Test

Figure 2 shows summary of the stability test, the result showed that the model is stable. This is evident to the fact that the blue line is in-between the two red (-5 & +5) or less than 0.05 level of significance.

Discussion of Findings

The empirical results present a compelling and insightful narrative on how key oil sector indicators and exchange rate dynamics influence the behavior of foreign direct investment in Nigeria.

The coefficient of crude oil production is positive (0.278039) and statistically significant with foreign direct investment. This implies that an increase in crude oil production leads to a corresponding rise in foreign direct investment. The result suggests that higher oil output signals resource availability and profitability, thereby attracting foreign investors, particularly in the extractive sector. Increased production enhances export capacity and foreign exchange earnings, making the economy more appealing to international investors seeking returns in resource-rich environments.

In contrast, crude oil price exhibits a negative coefficient (-0.879729) and is statistically significant with foreign direct investment. This indicates that rising oil prices adversely affect foreign direct investment. While this may appear counterintuitive for an oil-dependent economy, it likely reflects macroeconomic instability associated with oil price booms, such as inflationary pressures, exchange rate volatility, and policy uncertainty. High oil prices may also encourage rent-seeking behavior and reduce incentives for diversification, thereby discouraging foreign investors interested in broader sectors of the economy.

The coefficient of crude oil export is negative (-0.224234) but statistically insignificant ($p = 0.7903$) with foreign direct investment. This suggests that crude oil exports do not exert a meaningful influence on foreign direct investment within the study period. The insignificance may stem from the fact that Nigeria predominantly exports crude oil with limited value addition, resulting in weak spillover effects to other sectors. Consequently, export performance alone may not be sufficient to attract sustained foreign investment, particularly outside the oil sector.

Similarly, the exchange rate has a positive coefficient (0.009495) but is statistically insignificant ($p = 0.4078$) with foreign direct investment. This indicates that exchange rate movements do not significantly influence foreign direct investment in the long-run. Although a positive sign suggests that currency depreciation may improve investment attractiveness by lowering production costs for foreign investors, the lack of statistical significance implies that exchange rate instability or uncertainty may offset these potential benefits, thereby weakening its overall impact on FDI inflows.

Conclusion And Recommendation

Conclusion

This paper examined the impact of oil production on foreign direct investment in Nigeria. The empirical findings reveal that crude oil production exerts a positive and statistically significant influence on foreign direct investment inflows, indicating that Nigeria's resource endowment continues to serve as a major attraction for foreign investors, particularly within the extractive sector. However, crude oil price has a

negative and significant effect on foreign direct investment suggesting that fluctuations in global oil prices introduce macroeconomic instability that may deter foreign investors. Furthermore, the study finds that crude oil exports and exchange rate do not have a statistically significant impact on foreign direct investment. This suggests that export performance, in its current form, does not sufficiently translate into increased investor confidence, likely due to limited value addition and weak sectoral linkages. Similarly, the insignificance of exchange rate implies that currency movements alone are not a decisive factor for foreign investors, possibly due to persistent volatility and uncertainty in the foreign exchange market. Hence, it was concluded that while Nigeria's oil production capacity remains a key driver of foreign direct investment, the broader oil sector dynamics and exchange rate environment present significant challenges.

Recommendation

i. The Nigerian National Petroleum Company Limited and Ministry of Petroleum Resources should intensify efforts to boost crude oil production through sustained investment in upstream activities, deployment of modern extraction technologies, and improved security in oil-producing regions.

ii. Also, the Central Bank of Nigeria and Federal Ministry of Finance should implement robust macroeconomic stabilization policies to cushion the adverse effects of crude oil price fluctuations. This includes strengthening fiscal buffers, effective management of sovereign wealth funds, and accelerating economic diversification to reduce vulnerability to external shocks and improve investor confidence.

iii. Furthermore, the Nigerian Export Promotion Council and Ministry of Industry Trade and Investment should promote value addition within the oil sector by encouraging local refining, petrochemical development, and export diversification. Enhancing downstream activities will create stronger linkages between exports and the domestic economy, thereby making Nigeria more attractive to foreign investors.

iv. Finally, the Central Bank of Nigeria should prioritize exchange rate stability through consistent foreign exchange policies, improved market liquidity, and measures to reduce volatility in the foreign exchange market. A stable exchange rate regime will foster a predictable investment environment and support increased foreign direct investment inflows.

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