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Impact of Selected Macroeconomic Variables on Foreign Direct Investment (FDI) Inflow into the Top Five (5) Oil Producing Countries in Sub-Sahara Africa (1999-2024)

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Abstract

Amidst sustained efforts by oil-producing countries in Sub-Saharan Africa to attract foreign capital for economic diversification and development, this paper examined the impact of selected macroeconomic variables on foreign direct investment inflows into the top five oil-producing countries in Sub-Saharan Africa - Angola, Congo Brazzaville, Gabon, Ghana, and Nigeria for the period 1999 to 2024. The Feasible Generalized Least Squares (FGLS) technique was used in the analysis. The results revealed that exchange rate was the most significant determinant of foreign direct investment in the selected countries as it exhibited a strong negative relationship. Gross Domestic Product, on the other hand was not identified as a major determinant of FDI inflows into the region, showing only a weak positive association. Interest rates were statistically insignificant, while inflation displayed an unexpected but strong and highly significant positive relationship with foreign direct investment. The findings underscore the critical importance of exchange rate stabilization policies, particularly reduction in excessive currency volatility and strengthening foreign exchange rate management which will in turn improve investor confidence and attract stable FDI inflows. Based on these results, and given that exchange rate behaviour is shaped by monetary authorities whose policy actions influence currency stability, investor confidence, external competitiveness and consequently FDI inflows, this paper recommended that the monetary authorities in the countries of study particularly their Central Banks and Finance ministries should prioritize foreign exchange management, as the policy variables that could enhance the flow and sustenance of foreign direct investment into the region.

Background to the Study

Developing countries are growing economies and have a thirst for capital. Capital can come into an economy across national borders in many forms, one of which is the Foreign Direct Investment (FDI), defined as an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise or affiliate enterprise or foreign affiliates (OECD 1990; IMF 1993)). For Sub-Saharan Africa (SSA), which faces an annual infrastructure financing gap estimated by the African Development Bank (2018) at between $68 to $108 billion, attracting foreign capital in the region is a developmental imperative. Foreign Direct Investment (FDI) has increasingly become a vital source of external finance for developing economies, particularly in Sub-Sahara Africa (SSA), where domestic savings are often insufficient to meet investment needs. FDI not only provides capital inflows but also facilitates technology transfer, managerial expertise, employment generation, and integration into the global economy. In contrast to other foreign capital inflows such as portfolio investments which are considered short-term and can flow out much easily, the resilience of FDI during financial crises lead many developing countries to regard it as the private capital inflow of choice (Loungani & Razin, 2001). Over the past few decades, SSA has witnessed a growing interest from multinational enterprises (MNEs), especially in resource-rich economies, where investment is largely driven by the abundance of natural resources such as crude oil and natural gas.

Empirical data from global energy sources consistently ranks Nigeria, Angola, Gabon, Ghana and Congo Brazzaville as the largest oil producers in Sub-Saharan Africa. For instance, recent statistics show that Nigeria and Angola dominate regional output, each producing over one million barrels per day, while Congo, Gabon, and Ghana follow as the next highest producers (U.S. Energy Information Administration [EIA], 2023; OPEC, 2023). Beyond production levels, these countries possess substantial proven oil reserves and host some of the most commercially viable oil fields in Africa. Nigeria, for example, holds the largest reserves in Sub-Saharan Africa, estimated at over 30 billion barrels, largely concentrated in the Niger Delta region. Angola also has significant reserves, particularly in deepwater offshore fields, while Ghana's jubilee field has contributed to its rapid rise in oil production since 2010 (British Petroleum [BP], 2022; EIA, 2023). The core issue is the persistent failure of these resource-rich economies to attract stable FDI inflows, compared to other developing regions such as Asia and Latin America despite significant policy efforts. Ghana and Nigeria, for instance, have established sovereign wealth funds, such as the Ghana Petroleum Funds and Nigeria's Sovereign Investment Authority, following best-practice guidelines from the IMF (2014). Furthermore, widespread capital account liberalisation has been pursued across the cohort. However, as the Organisation of Economic Cooperation and Development (OECD, 2021) observed, these measures have failed to replicate the success seen in developed economies, where strong institutional frameworks have created a more predictable investment climate. The inability of these borrowed policies to secure stable FDI inflows for the region seems to

suggest a critical misalignment with the fundamental macroeconomic signals that international investors require to invest in high-risk, commodity-dependent contexts. This paradox suggests that beyond natural resources, other macroeconomic and institutional factors play a crucial role in determining FDI inflows. Hence, this paper posits that the solution lies in a clearer empirical understanding of the relationships between core domestic macroeconomic indicators and FDI behaviour in the region.

Macroeconomic stability is widely recognised as a key determinant of foreign investment decisions. Variables such as inflation rate, exchange rate, interest rate, and GDP influence investors' perception of risk and return in host economies. For instance, high inflation and exchange rate volatility often signal economic instability and hence discourage investment, whereas stable macroeconomic conditions enhance investor confidence. Empirical studies have shown that while inflation tends to have a negative or insignificant relationship with FDI, exchange rate stability exerts a positive and significant impact on attracting foreign capital. Similarly, market size – commonly proxied by Gross Domestic Product (GDP) – is an important factor influencing FDI inflows. Larger and growing economies provide better opportunities for firms to exploit economies of scale and maximise returns on investment. As a result, countries with higher GDP levels and growth rate tends to attract more market-seeking FDI. In addition, infrastructural development, financial sector depth, and institutional quality further shape the investment climate by reducing transaction costs and enhancing ease of doing business.

Despite the importance of these macroeconomic indicators, many oil-producing countries in SSA continue to face structural challenges such as macroeconomic instability, weak institutions, and overdependence on the extractive sector. These challenges often lead to volatile FDI inflows, largely concentrated in the oil sector, with limited spillover effects to other sectors of the economy. Consequently, understanding the interaction between selected macroeconomic variables and FDI inflows becomes essential for designing policies that promote sustainable and diversified investment.

Furthermore, the period between 1999 and 2024 is particularly significant for analysis. This era captures major economic reforms, globalization trends, commodity price cycles (especially oil price shocks), and increased financial integration in SSA. It also reflects policy shifts aimed at improving macroeconomic management and attracting foreign investment across the region. By focusing on key macroeconomic indicators, the study aims to provide empirical evidence on the drivers of FDI in resource-rich economies and contribute to policy discussions on how to enhance investment inflows for sustainable economic growth and development. This paper employed a Feasible Generalised Least Squares (FGLS) regression and data from 1999 to 2024, a period encompassing multiple commodity cycles and global shocks, and aims to isolate the precise influence of these variables on FDI. The findings provide evidence-based guidance, moving beyond the generic and often ineffective policy prescription of the past to help these nations finally leverage their resource wealth into sustainable financial integration.

The following hypotheses were tested:

H_{01}: Gross Domestic Product has no significant impact on foreign direct investment inflow to the top five (5) oil producing countries in sub-Saharan Africa

H_{02}: Interest Rate has no significant impact on foreign direct investment inflow to the top five (5) oil producing countries in sub-Saharan Africa

H_{03}: Inflation Rate has no significant impact on foreign direct investment inflow to the top five (5) oil producing countries in sub-Saharan Africa

H_{04}: Exchange Rate has no significant impact on foreign direct investment inflow to the top five (5) oil producing countries in sub-Saharan Africa

Conceptual Clarification and Literature Review

Foreign Direct Investment

A key part of globalization, Foreign Direct Investment (FDI) is an investment made to acquire a lasting interest in a foreign enterprise with the purpose of having an effective voice in its management. In other words, FDI is an investment made to acquire a lasting management interest (normally 10% of voting stock) in a business enterprise operating in a country other than that of the investor (World Bank, 1966). Griffin and Pustay (2007) regard FDI as the ownership and control of 10 percent or more of an enterprise's voting securities or the equivalent interest in an unincorporated business. Farrell (2008) defines FDI as a package of capital, technology, management and entrepreneurship, which allows a firm to operate and provide goods and services in a foreign market. This definition is supported by Thirwall (1994), who conceptualized FDI as an investment by multinational companies with headquarters in developed countries. This investment involves not only a transfer of funds (including the investment of profits) but also a whole package of physical capital, techniques of production, managerial and marketing expertise, products, advertising and business practices for the maximization of global profits. Distinguished from Foreign Portfolio Investment by its more permanent and long-term nature, FDI serves as a catalyst for economic growth, especially in developing countries, because it typically involves long-term commitments such as building or setting up industries.

Macroeconomic Variables

Macroeconomic variables are critical indicators that reflect the overall performance and stability of a nation's economy, providing a comprehensive assessment used to analyze trends, guide policy, and influence foreign capital flows. As defined by Mankiw (2021), these are broad aggregates like gross domestic product (GDP), inflation, and interest rates, which are fundamental to understanding economic health. They form the foundation for economic analysis, helping policymakers and investors gauge the economic environment and measure the impact of external shocks (Blanchard & Johnson, 2017). In globally integrated economies, variables such as exchange rates are particularly pivotal, as their fluctuations directly affect a country's competitiveness and attractiveness to foreign investors (Krugman & Obstfeld, 2020). This is especially relevant in developing contexts, where stable macroeconomic conditions are key for investment and development strategies (Todaro & Smith, 2020). Empirical research in the African context

confirms that variables like exchange rate volatility and inflation are decisive determinants of foreign investment flows, with stability encouraging inflows and unpredictability heightening risk (Adeniyi et al., 2015; Adegboye et al., 2020). Furthermore, studies by Ayenew (2022) indicate that interest rates and trade openness significantly explain variations in foreign capital across Sub-Saharan Africa, as macroeconomic stability enhances market credibility.

Gross Domestic Product

Gross Domestic Product (GDP) is a primary indicator of economic performance, representing the total monetary value of all final goods and services produced within a country's borders in a specific period (World Bank, 2024). It serves as a comprehensive barometer for the size and health of an economy, guiding policy analysis and investment decisions (Raza et al., 2015). In developing regions like Sub-Saharan Africa, GDP growth is frequently used to assess the effectiveness of foreign capital inflows, such as Foreign Portfolio Investment (FPI), and is often correlated with improvements in living standards, provided the growth is inclusive (Ibhagui, 2020). Beyond measuring output, GDP also provides a lens for evaluating institutional quality and the impact of international investment (Adegboye et al., 2020). It is a foundational variable in econometric models, used to analyse the influence of financial inflows, inflation, interest rates, and exchange rates (Ayenew, 2022). Furthermore, GDP captures the effects of internal policies and external shocks, with factors like political stability and corruption control significantly influencing its trajectory, as seen in comparative Asian studies (Abdillah et al., 2020). However, scholars like Acheampong (2019) caution that while GDP captures economic expansion, it must be evaluated alongside metrics like income distribution to determine actual welfare improvements. Ultimately, GDP remains a pivotal, though incomplete, tool for understanding economic growth, policy outcomes, and investment attractiveness.

Interest Rate

The interest rate, defined as the cost of borrowing or the return on saving, is a fundamental monetary policy instrument used by central banks to control inflation, stabilise currencies, and foster growth (World Bank, 2023). In open economies, particularly in developing nations, interest rate differentials are a critical determinant of capital mobility, influencing the direction and volume of foreign investment flows (Ehigiamusoe & Lean, 2019). It functions as the price for loanable funds, and its stability is a key signal of macroeconomic confidence and effective monetary governance, which attracts long-term foreign investors (Ibhagui, 2020). However, unstable interest rate regimes create uncertainty, deterring long-term investment by increasing risks and reducing profitability expectations (Adebayo et al., 2021). This volatility, especially when coupled with economic policy uncertainty, hampers foreign capital inflows globally (Canh et al., 2020). Technically, as a policy variable adjusted by monetary authorities, the interest rate significantly influences liquidity, domestic savings, investment patterns, and exchange rate movements (Ndubuisi, 2017). Its dual nature as both a cost for borrowers and an incentive for savers makes its management crucial for sustaining

economic growth and attracting consistent foreign capital, particularly in Sub-Saharan Africa (Mohammed, 2022).

Inflation Rate

Inflation, the persistent rise in the general price level of goods and services, erodes purchasing power and is a primary gauge of economic stability (World Bank, 2024). It acts as a macroeconomic disturbance that increases risk and uncertainty for investors, making foreign portfolio investors, in particular, highly sensitive to price instability (Ehigiamusoe & Lean, 2019). High inflation undermines real returns on investment and is negatively correlated with foreign direct investment, especially in developing countries with weak institutions (Adams & Klobodu, 2017). It is often a symptom of economic mismanagement, driven by demand-pull pressures, cost-push factors, and macroeconomic policy inconsistencies like poor fiscal discipline (Adebayo et al., 2021). By distorting price signals, inflation complicates investment planning and introduces exchange rate risk, which diminishes profit margins and deters foreign capital (Raza et al., 2015). In Sub-Saharan Africa, structural bottlenecks, supply chain inefficiencies, and imported inflation further exacerbate the problem, making economies vulnerable to price shocks (Mohammed, 2022). Ultimately, inflation is a major deterrent to foreign investment due to its distortionary effects on long-term contracts, wages, and overall investment profitability (Asamoah et al., 2016).

Exchange Rate

The exchange rate, the price of one currency in terms of another, is a crucial link between domestic and global economies, influencing trade, investment, and macroeconomic stability (IMF, 2023). It acts as a strategic variable signalling an economy's competitiveness; misalignment can distort trade balances and capital allocation (Zhang & Ward, 2015). Regimes vary from fixed (offering predictability) to floating (determined by markets) and managed floats (a hybrid with occasional central bank intervention) (Canh et al., 2020). For emerging markets, exchange rate volatility is a significant risk, where frequent depreciation driven by inflation or political instability discourages long-term foreign investment (Ehigiamusoe & Lean, 2019). Management is critical, as an overvalued currency reduces export competitiveness and the repatriated value of foreign direct investment (FDI), while an undervalued one can spur inflation (Adeniyi et al., 2015). In import-dependent Sub-Saharan African economies, exchange rate fluctuations often have high pass-through effects to domestic prices, undermining stability (Mohammed, 2022). Therefore, a transparent and stable exchange rate policy, aligned with productivity and supported by sound macroeconomic fundamentals, is a hallmark of economies that successfully attract foreign portfolio investment (Dinga & Fonchamnyo, 2021).

Theoretical Framework

The theory underpinning this paper is the Eclectic Paradigm theory, commonly referred to as OLI Framework. Developed by British economist John H Dunning in 1977, this theory integrates elements from various theories to explain why multinational

enterprises (MNEs) engage in direct investment rather than exporting or licensing. The Eclectic Paradigm is particularly relevant in analyzing the impact of selected macroeconomic variables on FDI inflows as it provides a robust framework for understanding the multifaceted nature of FDI decisions.

Empirical Review

Asamoah *et al.* (2016) examined how institutional quality moderates the relationship between macroeconomic volatility and foreign direct investment (FDI) in 40 countries in the Sub-Saharan African region over the period from 1996 to 2011. The GARCH model was employed to model the volatility of macroeconomic uncertainty. The dynamic panel model estimation was also used to analyse the relationship between foreign direct investment and the volatility of the macroeconomic variables. The findings revealed that macroeconomic uncertainty adversely affects the flow of FDI, while institutional quality also increases the flow of FDI in the presence of other control variables. This result implies that an increase in economic uncertainty among SSA economies deters FDI attraction in the region. Consequently, Asamoah *et al.* (2016) recommends that governments of SSA countries focus on strengthening institutions, since good institutions mitigate the adverse effect that economic uncertainty exerts on FDI inflow.

Edo and Nnadozie (2023) investigated how macroeconomic performance influences divestment of foreign direct investment (FDI) in Sub-Saharan Africa within the period 1980 to 2020. The research employed the Vector Error Correction model, and the findings do not conform to the neoclassical theory that lays emphasis on investment return as a fundamental factor influencing investment. Consequently, Edo and Nnadozie recommend that macroeconomic performance and institutional quality need to be improved to ameliorate FDI divestment in Sub-Sahara Africa.

Mairafi, *et al.* (2024) investigated the impact of foreign capital inflows on economic growth in 26 Sub-Saharan African countries from 1998 to 2022. The research employed a dynamic panel econometric approach, specifically the System Generalized Method of Moments (GMM), to analyze the effects of Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), and Official Development Assistance (ODA) on real Gross Domestic Product (RGDP). The results indicated that both FDI and FPI had a statistically significant positive effect on economic growth, whereas ODA's impact, while positive, was not statistically significant. Based on these findings, the authors recommended policies to strengthen local content frameworks to maximize FDI benefits, reforms to deepen capital markets for better FPI absorption, and a critical re-evaluation of institutional frameworks governing ODA to enhance its effectiveness as a short-term economic support mechanism.

In a study which focused on the Sierra Leone economy, Faroh and Shen (2015) examined the influence of some macroeconomic variables on the flow of foreign direct investment. Using data over the period of 1985-2012, the results indicated that inflation has a weak negative relationship with FDI inflows, while interest rates exert no significant influence.

In contrast, exchange rate stability and greater trade openness strongly and significantly enhance FDI attraction. In another study, Obiamaka *et al.* (2011) and Omankhanlens (2011) examined FDI inflows into Nigeria in the period 1980-2011. The result revealed that inflation has no effect on FDI inflows. Xaypanya *et al.* (2015) studied the determinants of FDI inflows in the ASEAN (Association of Southeast Asian Nations) region using data over an eleven-year period (2000-2011) and found that while there are significantly positive effects of infrastructure facility and level of openness on FDI inflows into the ASEAN region, the inflation rate had a negative impact. Abbott *et al.* (2012) empirically examined the effect of exchange rate regimes on FDI flows on a panel of 70 developing countries for the period 1985-2004 and found that developing countries with fixed or intermediate regimes significantly outperformed those with a flexible exchange rate system in attracting FDI flows. Chong and Tan (2008) studied four Southeast Asian economies and found that there is a long-run co-movement between exchange rate and FDI. The study of Ang (2008) on the Malaysian economy supported the proposition that currency value depreciation is associated with greater FDI inflows. Wafure and Nurudeen (2010) revealed that exchange rate depreciation is one of the main determinants of FDI inflows in Nigeria. In a related study, Xing and Wan (2006) indicated that the devaluation of the yuan (renminbi) improved China's competitiveness in attracting FDI from Japan. Walsh and Yu (2010) detailed the relationship between exchange rate and FDI flows to host countries. They argued that within an imperfect capital market, weaker currency in the host country has a positive impact on the inflow of FDI in that country as assets of the host country become less expensive. On the other hand, the research of Lily *et al.* (2014) on inflows of FDI into ASEAN economies during the period 1970-2011, using ARDL approach, the result revealed that there was significant long-run cointegration between exchange rate and FDI with with a negative sign for the exchange rate coefficient, implying currency appreciation, and, moreover, the direction of causality was between the exchange rate coefficient and FDI inflows in most cases.

Chakrabarti (2001) argued that the larger the market size in host country, the greater the opportunity for FDI inflows, as a large market is required for efficient utilization of resources and exploitation of economies of scale. In independent studies, Parletun (2008) and Ang (2008) found that GDP has a significant positive impact on FDI. Jordaan (2004) mentions that FDI will move to countries with larger and expanding markets and greater purchasing power, where firms can potentially receive a higher return on their capital. Edwards (1990) and Jaspersen *et al.* (2000) used the inverse of income per capita as a proxy for the return on capital and conclude that real GDP per capita is inversely related to FDI/GDP. But Schneider and Frey (1985), Tsai (1994), and Asiedu (2002) find a positive relationship between the two variables. They argue that a higher GDP per capita implies better prospects for FDI in the host country. In a study on India, Indonesia, and Pakistan, Azam and Lukman (2010) find that market potential proxied by GDP per capita, foreign debt, domestic investment, trade liberalization, and infrastructure are the significant economic determinants of inward FDI during the period 1971-2005. A recent study by Kurecic *et al.* (2015) attempted to examine the interdependence of GDP per capita and FDI in the transitional economies of Central and Eastern Europe. In their study, which

utilized annual time series data over the years 1994-2013. The states examined were classified into three geopolitical groups, two groups of non-EU states and a third group of more recent EU states. The findings of the study revealed that FDI and GDP per capita were related based on evidence from 14 states out of 20.

Olaleye (2024) assessed the impact of foreign capital inflows, specifically Foreign Direct Investment (FDI), external debt, and Foreign Portfolio Investment (FPI), on the unemployment rate in Nigeria from 1990 to 2021. The researcher employed a quantitative econometric approach, utilizing the Autoregressive Distributed Lag (ARDL) bounds test and an Error Correction Model (ECM) to analyze both the long-run and short-run dynamics. The results revealed that FDI has a positive and significant relationship with unemployment, indicating that it was associated with higher joblessness in the Nigerian context. Based on these findings, the study recommended that government policy should be strategically directed towards attracting sustainable FDI that targets employment-generating sectors.

Pantelopoulos (2022) empirically investigated the relationship between human capital, specifically educational attainment, and the two core forms of international investment namely Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI) in OECD countries from 1960 to 2010. The analysis, which employed a series of education variables, revealed that FDI was significantly influenced by secondary and tertiary education levels, whereas FPI was affected only by tertiary education. Furthermore, schooling and completion ratios were found to have a major impact on both investment types. Based on these findings, he concluded that human capital development was a foundational determinant for attracting international investment, implicitly recommending that host country governments should prioritize investments in secondary and tertiary education to attract FDI, and specifically in tertiary education to enhance their appeal to foreign portfolio investors.

Methodology

The data employed in this paper included Foreign Direct Investment (FDI), which served as the dependent variable. The independent variables comprise of a set of selected macroeconomic variables which are Gross Domestic Product (GDP), Interest Rate (INTR), Inflation Rate (INF), and Exchange Rate (EXR). Data for these variables were obtained from World Development Indicators (WDI) database for a sample of five (5) oil-producing countries of Sub-Saharan Africa (SSA), including Angola, Congo Brazzaville, Gabon, Ghana, and Nigeria. These countries were selected based on their status as the top regional oil producers and the availability of data. The dataset was a balanced panel data spanning from 1999 to 2024.

The theoretical foundation for this paper was derived from the Eclectic Paradigm theory, which was originally propounded by Dunning (1977, 1980). The theory posits that firms make FDI investments because of three aspects: Ownership advantages, Locational advantages, and Internalisation (OLI). Dunning (1993) further describes three main types

of FDI from the perspective of investing firms: market-seeking FDI, also called horizontal FDI, resource-seeking FDI, also called vertical or export-oriented FDI, and efficiency-seeking FDI.

Therefore, the functional relationship for the model can be expressed as:
$FDI = f(GDP, INTR, INF, EXR)$ (1)

Where:
FDI = Foreign Direct Investment inflow
GDP = Gross Domestic Product (Proxie for market size)
INTR = Interest Rate
INF = Inflation Rate
EXR = Exchange Rate

Following the empirical literature on FDI determinants (Alalade *et al.,* 2024; Edo & Kanwanye, 2022; Tyoga *et al.,* 2024), the functional form is transformed into an econometric model specified as follows:

$$FDI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 INTR_{it} + \beta_3 INF_{it} + \beta_4 EXR_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

A semi-log functional form was adopted to linearize the relationship between variables, improve normality of the data distribution, reduce heteroskedasticity, and allow regression coefficients to be interpreted in proportional or percentage terms, as stated below:

$$In\,(FDI)_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 INTR_{it} + \beta_3 INF_{it} + \beta_4 EXR_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

Where:
FDI_{it} represents Foreign Direct Investment inflows for country "I" in year "t".
GDP_{it} is the Gross Domestic Product of country "I" in year "t", representing market size and economic growth.
$INTR_{it}$ is the Interest Rate of country "I" in year "t", proxying for the return on financial assets.
INF_{it} is the Inflation Rate of country "I" in year "t", representing macroeconomic stability.
EXR_{it} is the Exchange Rate of country "I" in year "t", indicating currency risk.
β_0 is the constant term.
β_1- β_4 = parameters to be estimated
μ_i = country-specific effects
ε_{it} = stochastic error term

The primary estimation technique employed was the Feasible Generalized Least Squares (FGLS) technique. This method was adopted due to the violation of traditional OLS assumptions of constant variance (homoskedasticity) and correlation of error term (serial correlation), as well as the presence of cross-sectional dependence in the panel data. FGLS

is also particularly appropriate given that the time dimension (T=26) exceeds the cross-sectional dimension (N=5). Unlike OLS which assumes constant error variance, FGLS corrects for violations of classical assumptions by transforming the error term.

A Redundant Fixed Effects (RFE) test was conducted to decide whether fixed effects (FE) are necessary or whether a pooled OLS model is sufficient.

The decision rule is as follows:
If p-value < 0.05, we reject Ho that fixed effects are redundant, and accept H1 that fixed effects are not redundant. This implies the presence of significant cross-sectional heterogeneity across the selected oil-producing countries, justifying the use of the fixed effects model. Theoretically, the coefficient of GDP is expected to have a positive impact on FDI, as it signals market opportunity and higher returns. In contrast, the coefficients of INF, EXR, and INTR are expected to have negative impact, as they signify macroeconomic instability and currency depreciation risk.

The estimation was conducted using EViews 12 software. The variables used are described in Table I.

Variables Description

Table 1: Variables Description and Measurements

Variable	Acronym	Description	Measurement	Source
Foreign Direct Investment	FDI	Cross-border investments in lasting management interest	Net FDI inflows (current US$)	World Development Indicators (2024)
Gross Domestic Product	GDP	Total monetary value of all final goods and services produced	GDP (current US$)	World Development Indicators (2024)
Interest Rate	INTR	Cost of borrowing or return on saving	Real interest rate (%)	World Development Indicators (2024)
Inflation Rate	INF	Annual percentage change in consumer prices	Inflation, consumer prices (annual %)	World Development Indicators (2024)
Exchange Rate	EXR	Value of domestic currency relative to US dollar	Official exchange rate (LCU per US$, period average)	World Development Indicators (2024)

Source: Researcher's Compilation, 2025

Results and Discussion of Findings

Table 2: Redundant Fixed Effects Tests

Test	Statistic	Prob.
Cross-section F	2.891998	0.0251
Cross-section Chi-square	11.964164	0.0176

Source: Authors Computation, 2025 (Eviews-12)

Cross Sectional Dependence

In order to ensure the reliability of the panel data analysis, it was essential to test for cross-sectional dependence, as the independence of cross-sections was crucial for obtaining consistent coefficient estimates (Pesaran, 2004). This study employed the Cross-Section Dependence (CD) test, which is suitable for datasets with a smaller number of cross-sectional units (N) relative to a larger time series (T), as was the case here with N=5 and T=26. In scenarios where T > N, the Lagrange Multiplier (LM) test by Breusch and Pagan (1980) may be applied. However, when T < N, the LM test statistic lacks desirable statistical properties and tends to exhibit significant size distortions (Pesaran, 2004). The results of the cross-sectional dependence test are presented in Table 3.

Table 3: Cross Sectional Dependence Tests
Breusch-Pagan LM: Use when T > N

Test	Statistic	Prob.
Breusch-Pagan LM	22.73153	0.0118
Pesaran scaled LM	2.846857	0.0044
Pesaran CD	0.186100	0.8524

Source: Authors Computation, 2025 (Eviews-12)

The model had a statistic value of 22.73153 and a p-value of 0.0118 under the Breusch-Pagan LM test, from the results of the cross-sectional dependence test. Furthermore, the Pesaran scaled LM test yielded a statistic of 2.846857 with a p-value of 0.0044. Both the Breusch-Pagan LM and Pesaran scaled LM tests were found to be statistically significant at the 5 percent level. The decision rule is that if the p-value is less than the significance level (e.g., $p<0.05$), reject the null hypothesis. This showed the presence of cross-sectional dependence in the model. Such presence may be attributed to a high degree of regional economic integration and shared exposure to global oil market shocks among the top five oil-producing nations in Sub-Saharan Africa. For instance, a simultaneous plunge in global crude oil prices would likely trigger correlated economic shocks, affecting foreign investment flows across all countries in the panel despite their individual policy differences. To address this econometric problem, this paper employed the Feasible Generalized Least Squares (FGLS) which corrects for heteroskedasticity, and serial correlation across cross-sections, thereby producing more efficient and reliable parameter estimates.

Feasible Generalized Least Squares (FGLS) Estimates

This paper estimated the relationship between Foreign Direct Investment (FDI) and selected macroeconomic variables using the Feasible Generalized Least Squares estimates. The results are presented on Table 4:

Table 4: FGLS Results (use when T > N)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.130748	0.069258	1.887835	0.0490
INTR	-0.000651	0.022729	-0.028662	0.9772
INF	0.079518	0.017921	4.437143	0.0000
EXR	-0.002132	0.001072	-1.989106	0.0490
C	2.710485	5.634957	0.481012	0.6314
R-squared	0.401156			
Adjusted R-squared	0.356242			
S.E. of regression	6.511079			
F-statistic	8.931769			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	1.242585			

Source: Authors Computation, 2025 (Eviews-12)

From Table 4, the FGLS result indicates that exchange rate, which is one of the four explanatory variables used in the investigation has a negative and statistically significant effect on FDI inflows (β=-0.0021, $p<0.05$). a 1-unit increase in exchange rate reduces FDI by approximately 0.0021 units, suggesting that currency depreciation in each of the oil-producing countries under consideration discourages foreign investors. Inflation was found to exert a positive and highly significant effect on FDI (β=0.0795, $p<0.01$), implying that rising price levels may be associated with increased investment inflows in the top five oil producing countries of sub-sahara Africa. This is counterintuitive, as the a priori expectation is that inflation should discourage FDI inflows. GDP exhibited a positive but weakly significant relationship with FDI ($p<0.10$), while interest rate was found to be statistically insignificant. The positive coefficient of the GDP and the negative coefficients of both interest rate and exchange rate aligned with economic theory and the work's a priori expectation.

The overall model is statistically significant (Prob. F = 0.0000), meaning that the explanatory variables jointly explain the variations in FDI inflows into the selected SSA countries, accounting for approximately 40% of the variations in FDI inflows. The result also revealed a relatively low R^2 of 0.4011 and an adjusted R^2 of 0.3562 which is not uncommon in FGLS studies. Consistent with econometric literature, caution is required in interpreting R^2 in FGLS models because they are used to adjust for heteroskedasticity and autocorrelation, and focus mainly on producing efficient and unbiased coefficient estimates, rather than maximizing goodness-of-fit.

Table 5: Post CD Test

Test	Statistic	Prob.
Breusch-Pagan LM	14.09292	0.1688
Pesaran scaled LM	0.915205	0.3601
Bias-corrected scale LM	0.815205	0.4150
Pesaran CD	0.139529	0.8890

Source: Authors Computation, 2025 (Eviews-12)

The result of the post CD test suggests that cross-sectional independence is maintained after estimation, supporting the robustness of the model

Discussion of Findings

In order to ensure the robustness of the panel data analysis, preliminary diagnostic tests were conducted. The Breusch-Pagan LM test revealed the presence of cross-sectional dependence in the model, which can be attributed to the high degree of economic integration and shared exposure to global oil market dynamics among the top five oil-producing nations in Sub-Saharan Africa. The empirical results from the Feasible Generalized Least Squares estimation revealed important insights into the determinants of Foreign Direct Investment in the selected oil-producing countries. The analysis demonstrated that Exchange rate emerged as an important and statistically significant determinant of foreign direct investment, with a negative coefficient of -0.040. This indicated that a one-unit increase in exchange rate led to a decrease in foreign direct investment inflows by approximately 0.04%. It suggested that exchange rate instability in these economies increased uncertainty on the part of the foreign direct investors. This finding is also consistent with the work of Faroh and Shen (2015). In Sub-Saharan African countries, exchange rate depreciation likely signals macroeconomic instability, discouraging foreign investors. This finding aligned with the theoretical expectations and prior studies by Adewale, *et al.* (2024) and Ojogbo & Oko-Osi (2024), who emphasized that exchange rate instability erodes investor confidence, and recommended exchange rate stabilization policies to improve investor confidence.

The coefficient of Gross Domestic Product (GDP) was found to be positive, but weakly significant. This suggests that in this paper, market size is not a dominant driver of foreign direct investment. A possible reason for this is the overdependence on the oil sector. However, the coefficient of Inflation showed a positive and highly significant relationship with FDI. This contradicts the conventional economic findings. Some studies however suggest that moderate inflation may reflect economic expansion and coincide with commodity booms and increased capital inflows. Therefore, the positive sign of inflation in this study may be capturing demand expansion or oil-driven economic activity, rather than instability. Interest rate coefficient showed a negative relationship with foreign direct investment, and was not significant ($p = 0.9772$). This suggests that interest rates may not strongly influence FDI, partly because foreign investors may rely more on external financing, with domestic credit conditions being less relevant. This

finding is reinforced by Adewale, *et* al, (2024) and Adebayo & Gambiyo (2020). In both researches on the determinants of FDI inflows into Nigeria, the coefficient of Interest rate was negative and statistically insignificant, suggesting that higher domestic interest rates did not meaningfully deter foreign investors. Theoretically, the Eclectic Paradigm (OLI) theory reveals that the insignificant effect of interest rates on FDI may be explained by the fact that Multinational Corporations (MNCs) often rely on internally generated funds, parent company financing, or external international credit markets rather than domestic borrowing within the host economy. These findings collectively showed the paramount importance of maintaining price stability through sound monetary policy as the primary mechanism for attracting foreign portfolio investment to oil-producing Sub-Saharan African economies. The results suggested further that portfolio investors prioritize macroeconomic stability over growth prospects or interest rate differentials when making investment decisions in these markets.

Conclusion and Policy Implications

This paper examined the impact of selected macroeconomic variables on Foreign Direct Investment in the top five oil-producing countries in Sub-Saharan African from 1999 to 2024. A Feasible Generalized Least Squares (FGLS) technique was used for the analysis. The empirical results revealed distinct relationships between the selected macroeconomic variables and foreign direct investment inflows. The exchange rate emerged as the most significant determinant, showing a strong negative impact on foreign direct investment. Gross domestic product also showed a negative, but weak relationship. Interest rate, however was the only insignificant variable in the analysis. In contrast, inflation rate showed a positive and statistically significant effects on the dependent variable, which is counterintuitive. Based on these specific findings, the following recommendations are proffered:

i. Given the strong negative and statistically significant relationship between exchange rate and foreign direct investment, the government should pursue and implement stringent exchange rate stabilization policies including reduced currency volatility, and strengthen foreign exchange management as this is the primary macroeconomic concern for foreign direct investors in these economies.
ii. Even though inflation was positive in this study, which is contrary to a priori expectation, policymakers should still maintain moderate and predictable inflation, while also avoiding high and volatile inflation levels. The Central banks and monetary authorities must adopt credible monetary policies to ensure price stability.
iii. Since interest rates was insignificant, the government should focus more on improving investment climate, institutional quality, regulatory environment and political stability.
iv. The positive but weak relationship between GDP and FDI suggested that economic size alone is not such a dominant determinant of foreign direct investment inflows. The government should regardless pursue sustainable economic growth, diversify the economy beyond the oil sector, and invest in critical infrastructure in order to make their economies more attractive to foreign direct investment.

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