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Foreign Direct Investment and Poverty in Nigeria

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A B S T R A C T

Using yearly data series spanning 41 years, from 1981 to 2021, the research empirically evaluates the influence of FDI on poverty in Nigeria. The study's dependent variable was the poverty rate (PVT), while the independent variables were foreign direct investment (FDI) into agriculture (FDI), manufacturing (FDIM), services (FDIS), trade openness (OPN), and exchange rate (EXR). Statistical tools such as descriptive analysis, unit root testing, and ECM modelling were used to assess data that was retrieved from secondary sources. Foreign Direct Investment (FDI) in the agriculture sector decreases the poverty rate, FDIM in the manufacturing sector increases the poverty rate, FDIS in the service sector increases the poverty rate, OPN decreases the poverty rate, and EXR increases the poverty rate in Nigeria, according to the ECM. Foreign direct investment (FDI) did not alleviate poverty in Nigeria during the research period, the study found. The research concludes that foreign direct investment (FDI) may help Nigeria's economy expand and alleviate poverty if the government takes steps to attract FDI, such as lowering taxes, subsidizing infrastructure, and eliminating import duties

INTRODUCTION

Everyone feels the effects of poverty in their own unique manner; it's a worldwide problem. Having an income that is lower than a certain basic standard of living is one definition of poverty. Poverty has exploded in Nigeria, a nation with a thriving economy that is well-known throughout Africa. World Bank data from 2018 shows that 83 million people, or around 40% of the population, living below the poverty line, with an additional 25 million people, or about 25% of the population, being vulnerable. According to the World Bank, 12 million more Nigerians would fall below the global poverty line between 2019 and 2023. There are many negative consequences for individuals and the economy as a whole due to the rising poverty rate. According to the International Monetary Fund (2011), people are considered to be poor when they do not have access to basic necessities such as food, clothing, shelter, and healthcare. The poverty profile in Nigeria has been rising over the last few decades, according to Oni (2014) and Ogunniyi & Igberi (2014). For example, in 1985, 46.3% of Nigerians lived in poverty, up from 27.2% in 1980. It was 42.7% in 1992, 65.6% in 1996, and 54.4% in 2004, with a further decline. In addition, the survey reveals that out of an estimated 163 million individuals, over 121 million were reported to be living in poverty between 2004 and 2010 (National Bureau of Statistics, 2012).

Despite the government's heightened focus on poverty throughout the economy, this significant growth in poverty remains. Foreign direct investment (FDI) and other forms of foreign capital are crucial to emerging economies. As a complement, it has helped the economy expand and thrive. Regardless, technological advancements and improved management abilities often accompany it, and these two factors determine the rate of economic progress. Ogunniyi and Igberi (2014) made a valid argument when they said that FDI may help developing countries break the cycle of poverty and contribute to economic growth in other ways as well. Investments from outside, known as Foreign Direct Investment (FDI), have been a game-changer in terms of globalization and the flow of capital into developing nations in recent years. Foreign direct investment aims to boost economic development and alleviate poverty by increasing business production and facilitating the transfer of technology and technical skills. A country's economic progress is propelled in large part by foreign direct investment. Just said, FDI is one of the most important factors in a country's economic stability. For the first time since Q4 2015, when it was recorded as $123.2 million, Nigeria's FDI grew to $378.4 million in Q4 2017, according to the National Bureau of Statistics (2017). In comparison to Q3 2017 and the previous quarter, this number jumped 221.8% and 9.8%, respectively, in Q4 2017. Equity investment accounted for 99.8 percent of the rise in foreign direct investment, with a further important contribution of 0.2 percent coming from all other working capital, according to the National Bureau of Statistics (2017) report. Developing nations are able to receive cash via FDI, which helps alleviate the federal government's budget deficit. This means that developing nations will be able to improve their financial systems and gain access to international commerce via FDI. Some argue that FDI helps boost the (host) economy's overall investment by boosting savings rates at home. Kaulihowa and Adjasi (2018) are two examples of the few pieces of micro- and macro-level empirical data that support the idea of foreign direct investment (FDI) as a growth tool for economies. Therefore, this

research will analyze the ways in which foreign direct investment (FDI) has affected poverty and other variables, as well as the factors that have prevented FDI from flowing into the nation. Developing nations have benefited greatly from FDI in many ways, including increased economic activity and the creation of new jobs. Crucially, these theories remain incongruous with the Nigerian economy, which is preventing the cycle of poverty. Gaining a grasp on how FDI might worsen poverty is another valuable way to comprehend the effects on the economy. Accordingly, this study aims to provide light on how FDI affects poverty in Nigeria.

As with every emerging economy, Nigeria's is heavily dependent on FDI input. This is due to the fact that FDI can unlock a country's economy and spur a host of new activities that boost overall economic performance and have targeted impacts like increasing employment opportunities, which boost economic growth (Oyedokun and Ajose, 2018). Developing nations like Nigeria benefit greatly from FDI since it helps fund investment, improves management abilities, and transfers technology. Many studies have pointed to FDI as the key to developing nations' economic success, including Furuoka (2018), and Li and Tanna (2018). In addition, they believed that FDI is used for financial purposes, trade promotion, and strategic concerns. Nigeria has seen a rise in FDI throughout the period under review, according to the available figures. If we look at Nigeria as an example, we can see that the ratio of FDI to GDP averaged 1.58 percent from 1970 to 1979, 1.68 percent from 1980 to 1989, 4.56% from 1990 to 1999, 3.38% from 2000 to 2009, and 4.54% from 2010 to 2020 (WDI, 2021). Based on the data shown so far, it seems that FDI in Nigeria had a significant uptick throughout the time frame under consideration. Theoretically and pragmatically, these increases in FDI are anticipated to revolutionize the Nigerian economy, as shown above. An examination of the Nigerian economy, however, reveals that many of the same problems persistent underdevelopment, poverty, unemployment, rising debt load, systematic infrastructure failure, high corruption rate, etc. remain. Nigeria's economy is struggling due to factors like high inflation, a deficit or fluctuating balance of payments, low per capita income, uneven distribution of income, and long-term poverty.

The economic advancement of Nigeria has been hindered by a number of factors, including the mismanagement of the country's vast natural, human, and material resources; an unhealthy obsession with money; widespread corruption; and political banditry. There has been a lack of consensus among empirical research that have sought to define the impact of FDI on economies by using a variety of metrics. There is evidence that FDI has a good effect on the economy, while some researchers have shown a direct influence on growth, others looked at the relationship between domestic investment, FDI, and economic growth for example, Johnny et al. (2018), among others. Research on the effects of FDI and inflation on GDP growth has been conducted by Kunofiwa (2018), and Opeyemi (2020). In contrast to previous researchers, this study breaks down FDI inflow into three categories in Nigeria: agriculture, manufacturing, and services. It then empirically examines how FDI affects poverty in the country. This research is to examine the impact of FDI on poverty in Nigeria in light of the aforementioned context. This study aims to examine the effect of foreign direct investment on poverty in Nigeria from 1981 to 2021.

Specifically, the study examines the effect of FDI in the agriculture sector on poverty in Nigeria; investigate the impact of FDI in the manufacturing sector on poverty in Nigeria; and determine the effect of FDI in the service sector on poverty in Nigeria

LITERATURE REVIEW

Foreign Direct Investment

The World Bank (2022) states that FDI occurs when capital flows into a company in an economy other than the investor's in order to obtain a long-term managerial stake (10% or more of voting shares). According to the balance of payments, it is the total of equity capital, profits reinvestment, other long-term capital, and short-term capital. The International Monetary Fund (2009) and the United Nations Conference on Trade and Development (UNCTAD, 2019) both agree that a foreign direct investor must have at least 10% ownership in a business in order to be deemed an investor with a significant say in its management. A kind of international investment known as "foreign direct investment" occurs when a person or group based in one country has a long-term stake in and exerts substantial control over a business based in another one. A person or corporation from another nation makes a direct investment in a country's production or business when they purchase a company there or increase the output of an existing business there (Babasanya & Olabisi, 2018). In this research, FDI is defined as the process by which a domestic firm gains majority ownership in a foreign company. But the other country's day-to-day activities are heavily influenced by international corporations. This implies they are bringing more than just financial resources; they are also bringing expertise, experience, and new technologies.

Poverty

There is a difference between absolute and relative poverty. If a person does not have access to enough food, housing, clean water, sanitation, medical care, education, or information, they are said to be living in absolute poverty. Additionally, the availability of fundamental living requirements, in addition to financial resources, determines absolute poverty. The United Nations (2015) defines relative poverty as the bare minimum that a society accepts as a quality of life for its members.

According to Chan (2023), someone is considered poor if they do not have enough money to cover basic living expenses or buy the things they need to live a happy life. This includes individuals, families, and communities. Living in extreme poverty means scrounging for every need, including food, clothes, shelter, and healthcare. According to this view, poverty exists when people or communities do not have access to enough money or other resources to meet their most fundamental needs.

Ndhlovu (2019) argues that poverty might be attributed to a lack of resources, an innate lack of resources, or the paradoxical accumulation process in capitalist societies. Additionally, wasteful utilization of shared resources is what causes poverty. This may be the result of a lack of resources (such as money, technology, and suitable infrastructure) or bad policy.

The United Nations Development Programme (2000) and the World Bank Institute (2019) have different definitions of poverty. The former states that it is the inability to meet basic needs such as food, clothes, housing, medical care, or education. The latter states that it is the case when a person's spending

falls below a certain level. If a person's income is less than a certain threshold, they are considered to be living in poverty according to this research. Those whose intended standard of living, as determined by their employment-based income, drops below the poverty line are deemed poor under this definition.

FDI-led Growth Hypothesis

Paul Romer and Robert Lucas established the endogenous growth model or theory in 1986 and 1988, respectively, which forms the basis of the notion of FDI-led economic expansion. Economic development has been greatly influenced by foreign direct investment (FDI), according to the idea. Other important aspects are human capital, exports, technology transfer, and capital. On the other hand, the following assumptions helped to identify the endogenous growth theory: first, that a market contains several enterprises. The article went on to state that progress in knowledge and technology is a non-rival benefit. On top of that, the theory presupposed that there are external growing returns to scale, even while a firm's production function shows constant returns to scale (e.g., constant returns among all components). The hypothesis also postulated that human actions are the source of technological progress. Per the theory's last point, imperfect competition results from several people and businesses having market power and profiting from their discoveries. Foreign direct investment (FDI) has a bigger potential role in endogenous growth models. In a lasting way, FDI impacts the poverty rate via a number of different pathways. One approach to considering these impacts is to identify the specific arguments in the production function that are impacted by foreign direct investment. Many theorists have argued that foreign direct investment (FDI) may improve a country's economy via the transfer of knowledge, the creation of jobs, and the efficiency of spillovers. Although there are valid criticisms, the FDI-led growth hypothesis or theory is relevant to this study because FDI inflows can stimulate growth in host countries. This is because FDI increases capital stock, creates new job opportunities, and facilitates technology transfer.

Direct investment from foreign sources and poverty in the agricultural sector, the industrial sector, the service sector, etc. are the main categories into which the empirical research is classified.

Foreign Direct Investment into Agriculture Sector and Poverty

Foreign direct investment (FDI) in Ghana's agricultural sector and GDP growth from 1975 to 2017 were studied by Awunyo-Vitor and Sackey (2018). A variety of statistical methods, including as ECM, descriptive statistics, and the unit root test, were used to examine the data. The research assumed that trade openness, capital, and government spending were independent variables in the relationship between FDI in Ghana's agricultural sector and the independent variable. The research also found that trade volume and foreign direct investment flowing into the agriculture sector were positively and significantly correlated with economic growth. Government spending, on the other hand, has a strong negative correlation with GDP growth. With a focus on Ghana, the study adds to the growing body of literature on economic growth by filling a gap in the literature about the role of foreign direct investment (FDI) in fostering agricultural development, which in turn supports job creation and overall economic development. Therefore, the research suggests that Ghana's policymakers prioritise trade policies that are both flexible and attractive to

foreign direct investment (FDI) in order to boost agricultural output and overall economic development.

Between 1992 and 2016, Adigun and Oke (2021) looked at how FDI affected poverty reduction in Nigeria. This study's dependent variable was the poverty rate, while its independent variables were the rates of foreign direct investment, inflation, unemployment, trade openness, and exchange rate. To investigate the effect of FDI on poverty reduction, we used ordinary least squares (OLS) and analysis of residual data (ARDL) regression analysis. At the 5% level of significance, the ARDL result confirmed that foreign direct investment (FDI) has a significant negative effect on poverty reduction in the short run. The regression result showed that there is little correlation relationship between FDI and poverty reduction. The ADF result showed that the variables in the data set are stationary. Research shows that FDI, which may boost economies and help reduce poverty, is frequently going to industries that don't really help with the latter. According to the research, the government should do more to attract FDI to industries with a high potential for reducing poverty, as well as create business-friendly legislation and make it easier for companies to operate in the nation. If foreign direct investment (FDI) is serious about alleviating poverty, it should shift its focus away from the oil industry and into other sectors.

Between 1990 and 2019, Djokoto et al. (2022) looked at 51 developing nations to determine the welfare impacts of agriculture FDI. The analysis in the research was conducted using the fixed-effects estimator. Foreign direct investment in agriculture boosts emerging nations' well-being, according to the research. The expansion of commerce, population, human capital, and infrastructure all contributed to a rise in standard of living. Inflation had little effect on wellbeing, and neither did government spending. Governments in developing nations should actively seek FDI in agriculture while simultaneously working to strengthen human capital, build infrastructure, and push trade openness policies. We need to reinvest our final spending on goods and services in initiatives and projects that help all people, particularly the poor, with their health, education, and income. Foreign direct investments in agriculture, forestry, and fisheries were studied by Nyiwu and Koirala (2022) in sixteen developing nations from 2001 to 2020. Data analysis in the research was previously conducted using a system GMM-style estimate of the panel-VAR. According to the research, value-added in the agricultural, forestry, and fisheries industries are positively and negatively correlated with FDI. Foreign direct investment (FDI) and value-added in the agricultural, forestry, and fisheries sectors have a cyclical influence, as shown by these bidirectional correlations. By the end of the fifth year, our model predicts that foreign direct investment (FDI) will have had a favourable impact on agricultural, forestry, and fishery value addition. This suggests that foreign direct investment (FDI) boosts agricultural, forestry, and fishery value addition in the medium to long run. This finding suggests that by removing these barriers, agricultural conditions in nations with high foreign direct investment (FDI) transaction costs or less favourable investment climates may be improved. Foreign direct investments (FDIs) may strengthen host nations' systems in many ways, according to the research. These improvements might include technology, practical knowledge, management, and more. The research concludes that public policy may help less developed nations attract more investments by

fostering an atmosphere that is favourable to corporate treasury management, which boosts corporate efficiency and productivity.

Foreign Direct Investment into Manufacturing Sector and Poverty

From 1981 to 2015, Idoko and Taiga (2018) looked at how FDI affected production growth in Nigeria's manufacturing sector. This research looked at the relationship between manufacturing output and FDI, currency rate, inflation rate, and capacity utilization rate. The study's assumptions were tested using the Johansen Co-integration test and the Vector Auto Regression (VAR) approach. The empirical findings of the impulse response function and variance decomposition test in the VAR analysis reveal that foreign direct investment (FDI) had a small but favorable impact on the output of Nigeria's manufacturing sector. The findings of the Cointegration test indicate that foreign direct investment (FDI) and the development of manufacturing sector output in Nigeria are related over the long term. The research concludes that the government should invest in infrastructure, such as electricity supply, to increase the absorption capacity of manufacturing enterprises, thereby maximizing the benefits of foreign direct investment (FDI) in the industry. In addition, the government's policies should lay out specific targets for foreign investment, such as the manufacturing sector. The issue of corruption and the diversion of money was raised, among other things, and it was suggested that the industrial sector try to boost its productivity by enhancing its technology.

The effect of FDI on the expansion of Nigeria's manufacturing sector's production from 1970 to 2016 was studied by Eze et al. (2019). Using the manufacturing sector's growth rate as a proxy for manufacturing output growth, the study employed the OLS and Granger causality tests to analyze private sector credit, FDI, electricity generation, exchange rate, investment (represented by gross fixed capital formation), interest rate, inflation, and political stability. The manufacturing sector has not made an encouraging positive contribution due to many obstacles, one of which is a lack of capital. Consequently, it might be a good thing that money is flowing in from other countries. In order to evaluate the potential influence of foreign direct investment (FDI) on the diversification of Nigeria's economy, which has been highly reliant on the energy sector, the research calculates a logarithmic model of the relationship between FDI inflow and increase in manufacturing output in Nigeria. Despite the lack of statistical significance, this analysis does indicate a long-run link between foreign direct investment (FDI) and MSOG. The Granger causality conclusion indicates that FDI and MSOG are causally related in just one way. Government officials should prioritize the factors that demonstrate substantial linkages to MSOG, such as power generation, currency rate, private sector lending, and political stability, according to the research. This will help diversify the economy via manufacturing.

From 1981 to 2016, Afolabi et al. (2019) tracked FDI inflows and outflows in Nigeria's manufacturing sector over 36 years. While FDI, inflation, government spending, and money supply served as explanatory variables, manufacturing sector output acted as a proxy for the manufacturing sector in this research. The data was analyzed using cointegration and autoregressive distributed lag (ARDL) methods in the research. Foreign direct investment (FDI), inflation rate (INF), government spending (GOE), and money supply (MSP) are the independent variables, while the outcome demonstrates that the

dependent factors explained 97% of the fluctuations in manufacturing sector indicators (MFI). The study concluded that the manufacturing sector is crucial to Nigeria's economy and that the federal government should allocate more foreign direct investments (FDI) to it so that it can work more efficiently, particularly in terms of its percentage impact on GDP and job creation.

This study by Duramany-Lakkoh et al. (2021) looked at the manufacturing sector and FDI in Sierra Leone from 1970 to 2018. The research used the Vector Auto Regression (VAR) approach to evaluate the effects of foreign direct investment (FDI) on variables including manufacturing output, inflation, exchange rate movement, external debt, and exports. It begins by checking for unit root using the ADF and PP tests, which stand for Augmented Dickey-fuller and Philip Perron, respectively. Increasing FDI would lead to higher manufacturing output (MQ), according to the granger causality test, which suggests that FDI has a substantial impact on MQ. Exchange rate (ER), inflation, and MQ are all significantly related. Furthermore, when it comes to MQ, the directionality of the link between export (XPT) and external debt (DET) is irrelevant. Thus, MQ is unable to granger induce DET and XPT separately, but it is capable of granger causing both together. To determine the variables' long-term association, the research also used the Johansen cointegration technique. The empirical data showed that foreign direct investment (FDI) is positively correlated with the manufacturing sector, but negatively correlated with inflation and export. The short-run association of the variables was also tested using the error correction model (ECM). The results showed that the exchange rate and the availability of foreign direct investment (FDI) are the primary factors that determine the output of Sierra Leone's manufacturing sector. There was no short-term correlation between manufacturing sector production, foreign debt, exports, or inflation, according to the research. Based on the study's findings, the government of Sierra Leone should prioritize foreign direct investment (FDI) and work to enhance the business climate by making the country a more welcoming and secure place to invest. As a result, the government had to come up with impartial policies and foster an atmosphere conducive to business that would attract investors. This means the government has to step up its reform efforts, invest more in infrastructure, and tighten monetary policy to reduce inflation and boost the country's gross domestic product (GDP).

With panel data collected from 18 nations between 1975 and 2017, Azolibe (2021) examined the impact of FDI on the expansion of the manufacturing sector in the MENA region. The study's dependent variable was the manufacturing value added, which acted as a proxy for growth in the manufacturing sector. The independent variables included: inward and outward foreign direct investment, exchange rate, inflation rate, household consumption expenditure, financial development, and trade openness. The research used the panel unit root test (LLC). We also looked at the variables' long-term relationships using Kao's cointegration test. To estimate the short-run relationship, both the Dynamic OLS and the Fully modified OLS were used. Both the DOLS and the FMOLS studies found that foreign direct investment (FDI) from within and outside the country had a favorable effect on GDP growth in the manufacturing sector. This demonstrates that incoming and outbound FDI are major drivers of manufacturing sector development in the MENA area. In addition to the negative impact that Stevens and Lipsey (1992)

predicted, our research strongly suggests that foreign direct investment (FDI) can have a positive effect on a country's manufacturing sector if it makes good use of domestic raw materials made in the host country to make goods abroad. According to the research, MENA nations should prioritize policies that enhance the efficient use of local resources in order to attract foreign direct investment, which may stimulate development in the manufacturing sector. It is also important to support measures that will increase foreign direct investment (FDI) into the area. Foreign direct investment (FDI), both incoming and outbound, should be seriously regarded as a tool for MENA economic policymakers looking to boost the manufacturing sector.

Foreign Direct Investment into Service Sector and Poverty

Using data from 1981 to 2018, Wahab (2020) examined the impact of liberalization policies on the relationship between foreign direct investment (FDI) in Nigeria's service sector and GDP growth in two different scenarios: one with and one without a structural break. Both traditional and unit root tests with structural breaks were used to investigate time-series attributes, taking into consideration the shift dummy in the series. The series is stationary at I (1), according to their conclusions, which lead them to employ the VECM (vector error correction model). Services FDI boosts GDP when policy change is excluded, but slows growth when it is included, according to the statistical data, demonstrating the existence of a long-run link between the two. There is a negative and statistically insignificant association between growth and the estimate in the short term under the scenario with the break, while there is a strong positive relationship under the scenario without break. When government policy and action remain unchanged, the overall evaluations reveal that foreign direct investment (FDI) in services might significantly contribute to Nigeria's development. The results suggest that policymakers should encourage the growth of service-oriented businesses in order to boost the sectoral proportion of GDP. Increased plant survival often leads to societal affluence, more inclusive growth and development, and the creation of employment are all possible outcomes of such an expansion.

The impact of FDI on China's service sector was studied by Kun (2021). Following an introduction to the current state of FDI in China's service sector, this study employs monopolistic advantage, product life cycle, internalization, and the eclectic paradigm of international production theories to examine the trade effects of MNCs in the service sector. Foreign direct investment has been crucial to the fast growth of China's service economy, according to the report, and the sector housing service multinationals has been steadily diversifying.

From 1981 until 2021, this research looks at how FDI affected poverty in Nigeria. Few studies have examined the effects of foreign direct investment (FDI) on poverty in the agricultural, industrial, or service sectors. Most studies either evaluated the influence of FDI on economic growth, while others either examined the effect of FDI on agricultural or industrial sectors. Research shows that some scholars agree that FDI reduce poverty, has a positive impact on GDP, agriculture, production, and the economy (Idoko and Taiga 2018; Azolibe 2021; Adigun and Oke 2021; and Djokoto et al 2021). While others have looked at how FDI and inflation affect GDP growth (Kunofiwa, 2018; Opeyemi, 2020). The current study deviates from existing studies by analyzing the influence of foreign direct investment on poverty in Nigeria by disaggregating foreign

direct investment into agricultural, manufacturing and service, which no study recognized by this researcher has explored. Additionally, the research will cover the years 1981–2021.

METHODOLOGY

In 1986, Paul Romer and Robert Lucas put out the premise of foreign direct investment (FDI)-led economic development, which would serve as the foundation for this study's methodology. The reason for this is that FDI, along with other elements like human capital, exports, technology transfer, and capital, has a substantial effect on boosting economic development, which ultimately leads to a decrease in poverty, as stated in the theory. The theory also notes that the host country's economy might benefit from FDI inflows because of the increased capital stock, the creation of new jobs, and the facilitated transfer of knowledge. As investors establish new businesses in other nations, the thinking goes, it generates additional possibilities and more employment. As a result, residents' incomes rise and their buying power increases, which boosts the targeted economies as a whole and helps alleviate poverty.

Model Specification

This study's model definition is derived from, and modified from, the work of Adigun and Oke (2021) and Anetor et al. (2020). The following is the model put forth by Anetor et al. (2020), who investigated the effect of FDI, assistance, and trade on poverty reduction in nations in Sub-Saharan Africa:

HDI = F (FDI, FAD, TRADE, GDPPCG, GCF, POP, INF) (3.1)

Where;

Hdi = Human Development Index a Proxy for Poverty
Fdi = Foreign Direct Investment.
Fad = Foreign Aid.
Trade = Trade Openness.
Gdppcg = Per Capita Growth in GDP.
Gcf = Gross Capital Formation.
Pop = Annual Population Growth.
Inf = Inflation.

Also, Adigun and Oke (2021) examined the impact of foreign direct investment on poverty reduction in Nigeria and modelled:

PVT = f (FDI, INF, UNEMP, TRO, EXR) (3.2)

Where;

PVT = Poverty rate
FDI = Foreign direct investment
INF = Inflation rate in the country
UNEMP = Unemployment rate
TRO = trade openness
EXR = exchange rate

This study differs from others in that it uses poverty rate as its dependent variable and uses FDI into agriculture (FDIA), FDI into manufacturing (FDIM), and FDI into services (FDIS) as its main explanatory variables, with trade openness (OPN) and exchange rate (EXR) serving as its check variables.

The model's functional connection should be expressed as:

PVT = f (FDIA, FDIM, FDIS, OPN, EXR) (3.3)

The mathematical form of the model or equations (3.3) takes the form of;

$PVT_t = \beta_0 + \beta_1 FDIA_t + \beta_2 FDIM_t + \beta_3 FDIS_t + \beta_4 OPN_t + \beta_5 EXR_t$ (3.4)

The linear econometric form of the model or equations (3.4) takes the form of;

$PVT_t = \beta_0 + \beta_1 FDIA_t + \beta_2 FDIM_t + \beta_3 FDIS_t + \beta_4 OPN_t + \beta_5 EXR_t + \mu_{t1}$ (3.5)

Where;

PVT = Poverty rate

FDIA = foreign direct investment into the agriculture sector

FDIM = foreign direct investment into the manufacturing sector

FDIS = foreign direct investment into the service sector

OPN = Trade openness

EXR = Exchange rate

β_0 is the intercept

β_1 - β_5 are the coefficients of independent variables while μ_1 is the error terms.

PVT, FDIA, FDIM, FDIS, OPN and EXR are as earlier defined.

Theoretical Expectations

On a priori ground, we expected the following signs of the coefficients of the explanatory variables

$\beta_1 < 0$, $\beta_2 < 0$, $\beta_3 < 0$, $\beta_4 < 0$ and $\beta_5 < 0$.

Based on the signs of the parameter estimates, it is expected that each explanatory variable will have a negative association with the dependent variable. This is due to the fact that, all else being equal, a rise in FDI will lead to a decrease in poverty.

Dependent Variable

In this study, poverty Rate (PVT) shall be used to proxy poverty as the dependent variable in the model.

(i) Poverty Rate (PVT)

When people or a group do not have access to enough money or other resources to maintain even a basic level of life, we say that they are poor. When a person's earnings are so low that they are unable to cover their most fundamental living expenses, we say that they are poor. Housing, safe drinking water, nutritious food, and medical care may all be out of reach for low-income families and individuals. In 2015, the UN provided both an absolute and a relative definition of poverty. They looked at extreme poverty as a condition characterized by a severe lack of resources for people's health, nutrition, housing, education, employment, and information and communication. For them, the ability to access life itself is a determinant of absolute poverty, not just money. The United Nations used a person's minimum tolerable level of life as a criterion for defining relative poverty. Poverty rates may vary from country to country based on a variety of factors. Researchers in this research utilized the proportion of the population that lives on less than $1.90 per day.

Independent Variables

Any variable that has the potential to affect the dependent variable, or response, is called an independent or explanatory variable. The primary explanatory factors in this study's model will be FDI in agricultural (FDIA), FDIM in manufacturing, and FDIS in services, with trade openness (OPN) and exchange rate (EXR) serving as tick variables.

1. **Foreign Direct Investment into Agriculture (FDIA)**

When a corporation based in one nation buys out another's agricultural industry, this is called foreign direct investment in agriculture (FDIA). Foreign direct investment (FDI) in agriculture occurs when multinational corporations

take an active role in the running of the agricultural sector in a foreign country. This implies they are contributing more than just financial resources to the agriculture industry; they are also offering expertise, experience, and new technologies. One theory proposes that FDI in agriculture (FDIA) has a negative correlation with poverty. That is, poverty levels will fall as a result of more FDI in the agricultural sector. Thus, $(\frac{\delta PVT}{\delta FDIA}) < 0$.

2. Foreign Direct Investment into Manufacturing (FDIM)

When a corporation based in one nation buys out another manufacturing company based in another country, this is called foreign direct investment in manufacturing (FDIM). When a foreign company invests in a country's manufacturing sector, it becomes an active participant in the day-to-day running of that industry. This implies that they are contributing not just financial resources to the manufacturing sector, but also expertise, experience, and new technologies. It is believed that there is a negative correlation between poverty and Foreign Direct Investment into manufacturing (FDIM). To rephrase, less poverty will result from more FDI in manufacturing. Thus, $(\frac{\delta PVT}{\delta FDIM}) < 0$.

3. Foreign Direct Investment into Service (FDIS)

A company's acquisition of a service business entity in another nation is known as foreign direct investment in services (FDIS). When a nation offers foreign direct investment (FDI) services, it means that foreign corporations are actively engaged in running the service industry there. So, they're not just bringing cash to the service industry; they're also bringing expertise, experience, and new technology. It is believed that there is a negative correlation between poverty and Foreign Direct Investment into services (FDIS). To rephrase, less poverty will result from more FDI in the service sector. Thus, $(\frac{\delta PVT}{\delta FDIS}) < 0$.

4. Trade Openness (OPN)

How open a country's economy is to trade with other economies is a measure of its trade openness. The trade openness, also known as the degree of openness, may be calculated by dividing GDP by the sum of exports and imports. Economies that are more open tend to have more market possibilities, but they may also be more competitive with companies from other countries. Thus, $(\frac{\delta PVT}{\delta OPN}) < 0$.

5. Exchange Rate (EXR)

The value of one currency relative to another is known as the exchange rate. Thus, the rate will be dictated by the supply and demand for each currency, just like any other price. Since trading partners' currencies vary, this price or rate has been determined in international commerce. The exact exchange rate between one US dollar and one Nigerian naira was taken into account for this research. Thus, $\frac{\delta PVT}{\delta EXR} < 0$.

Nature and Sources of Data

The majority of the information for this research will come from secondary sources and will be based on yearly time series that span 41 years, from 1981 to 2021. World development indicators (WDI), yearly reports and statements of accounts, and the statistical bulletin of the Central Bank of Nigeria (CBN) are among the publications that fall under this category. We will collect information on poverty (PVT), foreign direct investment (FDI) in agricultural

(FDIA), FDI in manufacturing (FDIM), FDI in services (FDIS), trade openness (OPN), and exchange rate (EXR) from 1981 to 2021 from all these sources.

Estimation Techniques

To assess the influence of the explanatory factors on the dependent variable, this research used descriptive statistics, unit root test, cointegration, and Error Correction Mechanism (ECM) modelling approaches.

Descriptive Statistics

Economists often utilize descriptive statistics to look into the cause-and-effect connection between variables. Data that has been organized, summarized, and presented in a comprehensible or accessible style is known as descriptive statistics. In order to examine the trend on some of the study's variables from 1990 to 2021, this research used a variety of statistical methods, including basic averages (i.e. mean), histogram, kurtosis, Jarque-Bera, and more.

Unit Root Test

The Augmented Dickey Fuller (ADF) test is used in the research to evaluate whether each data series is integrated and has a unit root. Modern economic research often begins with a review of the data's time series characteristics before moving on to multivariate modelling and inference. The variables may be co-integrated if we find that their integration orders are larger than or equal to one. In order to ensure that our data has stationarity at both the level and difference levels, the research uses the Augmented Dickey-Fuller test (ADF). The following is the model:

$y_t = \mu + P_{yt} - 1 + \varepsilon t$ (3.11)

Where μ and P are parameters and εt is assumed to be white noise, y is a stationary series.

If – 1<P<I. if P = I, y is a non-stationary series.

The variation of y grows continuously with time and approaches infinity if the process is initiated at some point. The series is explosive if P is bigger than one in absolute value. As a result, checking whether P is strictly smaller than one is a good way to verify the stationarity series hypothesis. The preceding description of the basic unit root test is valid because the series is an AR (I) process. There can be no white-noise disruptions if the series is connected at higher-order delays.

The null hypothesis Ho: P = I is used in the Augmented Dickey Fuller tests, which takes the unit root. Considering the lack of economic rationale for explosive series, the null hypothesis is tested against the one-sided alternative Hl: P<1. A t-statistic below the crucial value allows us to reject the one-sided alternative and the null hypothesis of a unit root.

Cointegration

In order to determine if FDI and poverty have a lasting connection, this research uses the co-integration test. We test the hypothesis that our model's variables are related over the long run. We can statistically prove the presence of a long-term link if the variables used in this study are determined to be co-integrated. Johansen (1991), Johansen and Juselius (1990), and ourselves used the maximum likelihood test approach.

$y_t = A1_{yt} - 1 + \ldots\ldots\ldots + A_{pyt} - p + \beta_{xt} + \varepsilon t$ (3.12)

Where y_t is a K-vector of non-stationary I (I) variables, $_{xt}$ is a d-vector of deterministic variables, and εt is a vector of innovations.

Error Correction Mechanism (ECM)

After Sargan employed the error correction mechanism (ECM) to fix for imbalance, Engel and Granger made it popular. If two variables Y and X are co-integrated, then the connection between them may be written as ECM, according to an important theory called the Granger representation theorem. Put simply, they are involved in a long-term relationship (Iyeli, 2010).

There must be a co-integrated vector in the system for an error correcting representation to be fit. With no co-integrating vector, the error correction model cannot be considered internally consistent. The method proposed by Johansen (1988) is used to ascertain the quantity of co-integrating equations inside the Vector Error Correction Model (VECM). A minimal error correction model may be estimated if co-integration is confirmed. First, we will estimate an overparameterized model to get rid of variables that weren't significant or had the wrong sign.

Numerous factors contribute to the ECM's prominence and popularity:

1. To start with, it's a practical model for gauging the return to equilibrium after a period of disequilibrium, and it has excellent economic implications.
2. Secondly, when there is cointegration, ECMs are defined using first differences. This method usually gets rid of trends in the variables and also fixes false regressions.
3. ECMs have a convenient way to fit into the general to specific method to econometric modelling, which involves finding the most parsimonious model that fits the provided data sets. This is an essential third benefit of ECMs.
4. he fact that the disequilibrium error term is a stationary variable (thanks to cointegration) gives rise to the fourth and most crucial property of the ECM.

This is why the ECM is significant: a cointegration of the two variables suggests an adjustment mechanism that keeps the errors in the long-run connection from becoming worse and worse (Asteriou and Hall, 2011).

Here are the terms of the models' Error Correction Mechanism (ECM):

$$\Delta PVT_t = \Phi_0 + \Phi_{1_1}\Delta FDIA_{t-} + \Phi_{1_{2t}} FDIM_t + \Phi_{1_3}\Delta FDIS_t + \Phi_{1_4}\Delta OPN_t + \Phi_{1_5}\Delta EXR_t + \Phi_4\varepsilon_{t-1} + U_{t1} \quad (3.1)$$

Where;

Φ_0 is the constant terms, PVT, FDIA, FDIM, FDIS, OPN and EXR are as earlier defined,

$\Phi_0 - \Phi_5$ are the coefficients of independent variables

$\Phi_4\varepsilon_{t-1}$ is the error terms,

Δ = first difference of the variable, U_t = white noise disturbance error term.

Post Estimation Tests:

To ensure that the estimated model is robust and unbiased, the fitness of the model was determined by checking goodness of fit statistics and conducting diagnostics tests.

Presentation of Data

Table 1 and Figures 1, 2, 3, 4, and 5 show the evolution of Nigeria's poverty rate (PVR), foreign direct investment (FDI) into agricultural (FDIA), foreign direct investment (FDIM) into manufacturing (FDIM), foreign direct

investment (FDIS) into service sector (FDIS), trade openness (OPN), and exchange rate (EXR) from 1981 to 2021.

Table 1. The Variables Used in the Study

Year	PVT (%)	FDIA (N, m)	FDIM (N, m)	FDIS (N, m)	OPN (%)	EXR (N/$)
1981	32.00	120.50	1705.70	767.20	18.17	0.62
1982	35.50	120.50	1922.50	1483.60	13.78	0.67
1983	39.00	127.80	2128.10	2274.90	10.04	0.72
1984	43.00	128.50	2109.30	2622.50	9.38	0.77
1985	46.30	126.00	2278.10	2697.90	10.39	0.89
1986	46.00	128.20	2810.20	2753.00	9.14	1.75
1987	45.40	117.30	3122.30	3396.50	19.50	4.02
1988	45.00	128.90	3637.00	3133.70	16.94	4.54
1989	44.50	134.80	5406.40	3497.20	34.18	7.36
1990	44.00	334.70	6339.00	1710.40	30.92	8.04
1991	43.50	382.80	8692.40	1452.20	37.02	9.91
1992	42.70	386.40	9746.30	1482.50	38.23	17.30
1993	49.00	1214.90	12885.10	1864.50	33.72	22.07
1994	54.70	1208.50	14059.90	2247.60	23.06	22.00
1995	60.00	1209.00	27668.80	2990.70	39.53	21.90
1996	65.60	1209.00	29814.30	3668.70	40.26	21.88
1997	65.50	1209.00	31297.20	3625.70	51.46	21.89
1998	69.50	1209.00	34503.90	10460.50	39.28	21.89
1999	72.00	1209.00	36282.10	10927.30	34.46	92.34
2000	74.00	1209.00	37333.60	11201.30	49.00	101.70
2001	83.10	1209.00	37779.60	12016.30	49.68	111.23
2002	88.00	1209.00	39953.60	12317.30	40.04	120.58
2003	84.40	1209.00	45719.40	14457.30	49.33	129.22
2004	80.81	1209.00	102995.80	20242.40	31.90	132.89
2005	77.21	1209.00	133894.50	26315.10	33.06	131.27
2006	73.62	1329.90	212729.40	41309.30	42.57	128.65
2007	70.02	314718.02	5896902.21	5162631.23	39.34	125.81
2008	66.43	51122.08	4979679.31	928433.41	40.80	118.57
2009	62.83	44716.14	4463740.86	488478.13	36.06	148.88
2010	59.23	72555.74	10698034.46	2261607.99	43.32	150.30
2011	55.64	285067.88	7239082.97	618666.15	53.28	153.86
2012	52.04	1007018.46	7206969.55	5672484.42	44.53	157.50
2013	48.45	1439754.49	5130101.62	8271564.55	31.05	157.31
2014	44.85	318177.45	12349028.62	7212157.14	30.89	158.55
2015	41.26	2100905.38	6789694.52	3212414.88	21.33	192.44
2016	37.66	813576.65	18262330.28	6314340.16	20.72	253.49
2017	37.58	4421536.04	22030007.98	28284247.40	26.35	305.79
2018	37.45	7383803.39	17117926.54	32394457.40	33.01	306.08
2019	38.76	4206305.36	19136754.93	22331014.99	34.02	306.92
2020	40.96	5337214.93	19428229.32	27669906.60	16.35	358.81
2021	41.00	5642441.23	18560970.26	27465126.33	22.58	416.21

Note: (i) PVT = Poverty Rate

(ii) FDIA = FDI into Agriculture Sector

(iii) FDIM = FDI into Manufacturing Sector

(iv) FDIS = FDI into Service Sector

(v) OPN = Openness

(vi) EXR = Exchange Rate

Sources**:** WDI (2021) and CBN Statistical Bulletin (2022)

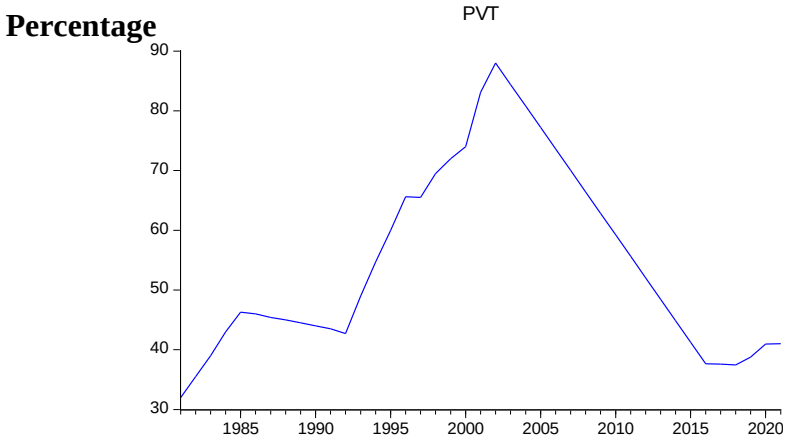

Figure 1. Time Series Plot of Nigeria's PVT (1981-2021)

The graph of Nigeria's poverty rate over time is shown in Figure 1. Figure 1 demonstrates that over the research period, the poverty rate (PVT) in Nigeria changed. For example, as shown in figure 1, it rose continuously from 1981 to 1985, then fell slowly in 1992, reached its high in 2002, and then fell steadily from 2003 to 2021.

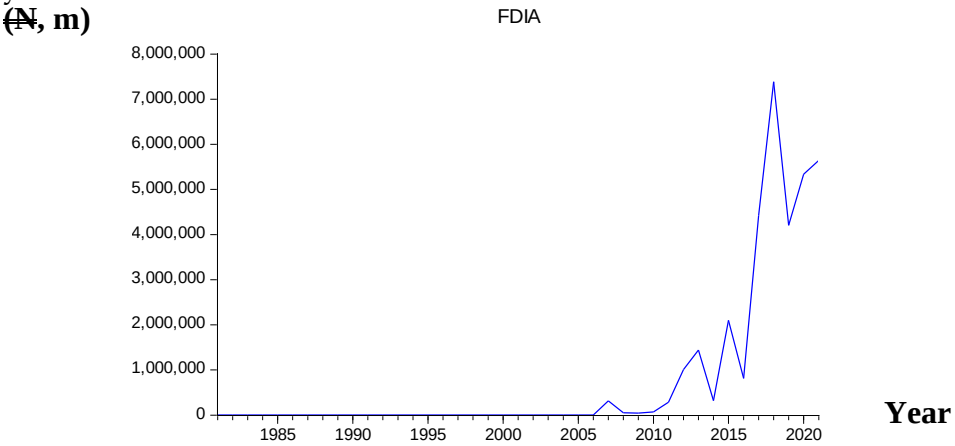

Figure 2. Time Series Plot of Nigeria's FDIA (1981-2021)

Foreign Direct Investment into Agriculture (FDIA) in Nigeria is shown in Figure 2 as a time series plot. Foreign Direct Investment (FDIA) values in Nigeria's agriculture have been on the rise during the research period, as seen in figure 2. From 1981 to 1990 and again up to the year 2000, for example, it rose at a steady rate. Once again, the graphic shows that there have been fluctuations throughout 2017, with a high in 2018 and a subsequent decline until 2021.

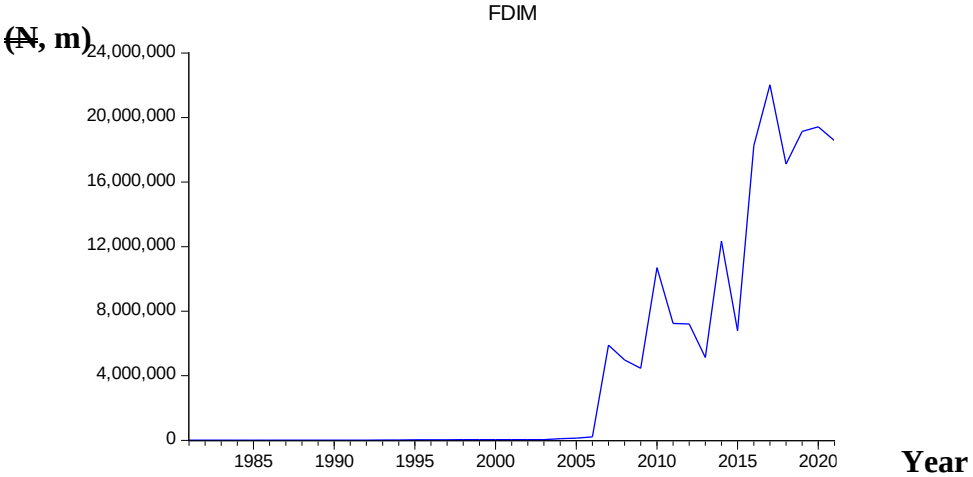

Figure 3. Time Series Plot of Nigeria's FDIM (1981-2021)

Foreign Direct Investment into Manufacturing (FDIM) in Nigeria is shown in Figure 3 as a time series plot. The upward trend in the values of Nigeria's FDIM during the time period considered in this research is seen in figure 3. For example, as seen in the picture, it rose steadily from 1981 to 1995 to 2009, then fluctuated up and down until 2016, then peaked in 2017, and then declined until 2021.

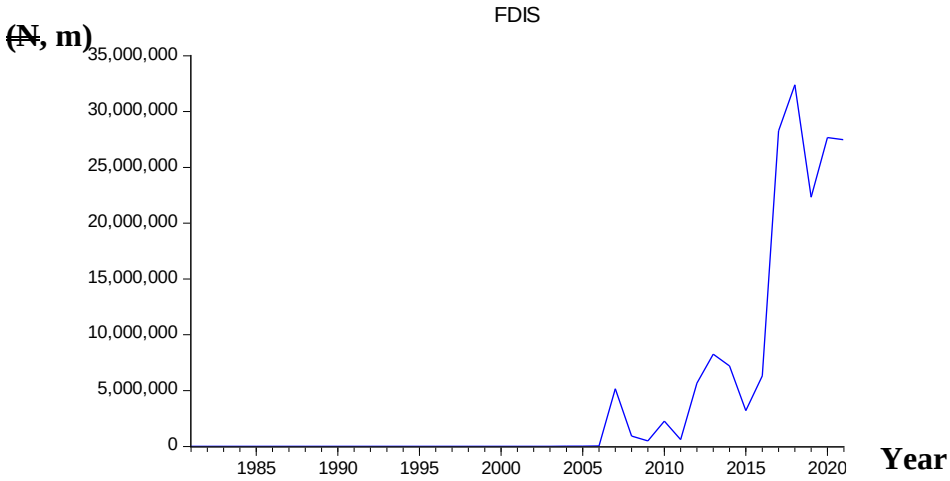

Figure 4. Time Series Plot of Nigeria's FDIS (1981-2021)

The graph of Nigeria's FDIS (Foreign Direct Investment into Services) over time is shown in Figure 4. The values of Nigeria's Foreign Direct Investment into Services (FDIS) have been trending upwards and fluctuated during the research period, as shown in figure 4. As an example, it rose slowly from 1981 to 1999, then fell and fluctuated until 2016, hit its high in 2018, and then fell again until 2021, as seen in the figure.

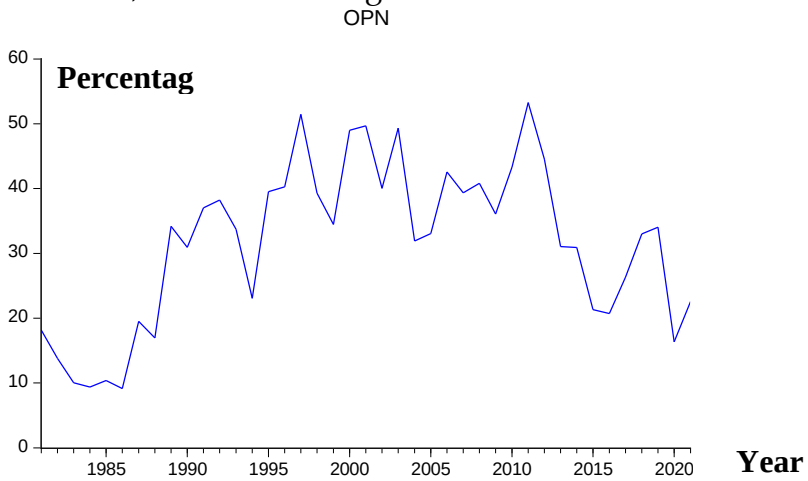

Figure 5. Time Series Plot of Nigeria's OPN (1981-2021)

The trade openness (OPN) of Nigeria is shown in Figure 5 as a time series plot. During the course of the investigation, there were noticeable fluctuations, as shown in figure 5. For example, as shown in the image, it exhibited erratic behavior between 1981 and 2010, peaked in 2011, and then exhibited more erratic behavior until 2021.

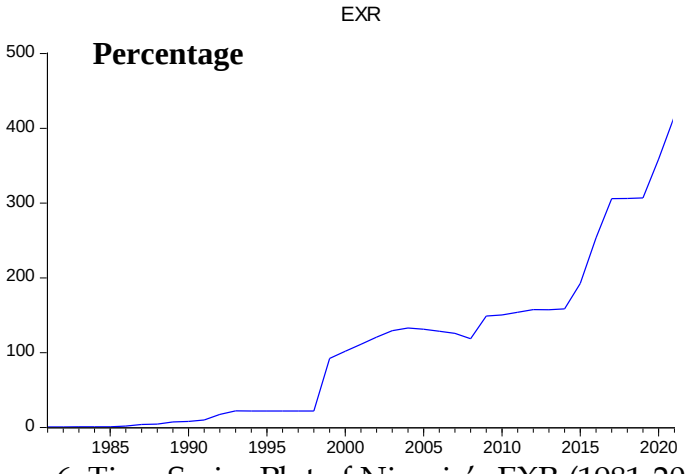

Figure 6. Time Series Plot of Nigeria's EXR (1981-2021)

The Exchange Rate (EXR) of Nigeria is shown in Figure 6 as a time series plot. Figure 6 demonstrates that the naira/USD exchange rate rose between 1981 and 1986, during the deregulation of the Nigerian financial sector under the Structural Adjustment Programme (SAP), and 2004–2005, prior to the phase of bank consolidation. As shown in the chart, the naira/dollar exchange rate fell until 2008, then rose from 2009 to 2013, and finally peaked in 2021.

Data Analysis

Four stages were involved in the data analysis. First, is the Re-instatement of Hypotheses, second, descriptive statistics and third, is the unit root test for the model.

Re-instatement of Hypotheses

H_{01}: FDI into agriculture sector cannot reduce poverty in Nigeria

H_{02}: FDI into manufacturing sector cannot reduce poverty in Nigeria

H_{03}: FDI into service sector cannot reduce poverty in Nigeria

Table 2. Descriptive Statistics

	PVT	FDIA	FDIM	FDIS	OPN	EXR
Mean	54.59756	8.899930	11.92363	11.02913	31.67488	3.597514
Median	48.45000	7.097549	10.53952	9.394019	33.72000	4.711600
Maximum	88.00000	15.81480	16.90792	17.29350	53.28000	6.031190
Minimum	32.00000	4.764735	7.441731	6.642748	9.140000	-0.478036
Std. Dev.	15.73820	3.866278	3.456407	3.695885	12.42982	2.009368
Skewness	0.574148	0.611138	0.272402	0.560692	-0.260363	-0.804266
Kurtosis	2.060978	1.811350	1.461024	1.657511	2.128428	2.382743
Jarque-Bera	3.758923	4.965865	4.553148	5.227120	1.760939	5.070986
Probability	0.152672	0.083498	0.102635	0.073273	0.414588	0.079223
Sum	2238.500	364.8971	488.8690	452.1943	1298.670	147.4981
Sum Sq. Dev.	9907.639	597.9242	477.8699	546.3826	6180.015	161.5024
Observations	41	41	41	41	41	41

Source: Author's Computation (2023)

According to Table 2 descriptive data, the poverty rate (PVT) had a mean of 54.59756 and a standard deviation of 15.73820. A long-right tail is shown by the positive skewness score of 0.574148 for the Poverty rate (PVT). However, being platykurtic, the kurtosis value of 2.060978 is less than 3. In other words, the series are less than average, indicating that the distribution is flat. Foreign direct investment (FDI) into the agricultural sector (FDIA) showed a mean of 8.899930 and a standard deviation of 3.866278. Foreign direct investment (FDI) into the agricultural sector (FDIA) has a long-right tail, according to its positive skewness value of 0.611138. Yet, it is platykurtic since the kurtosis value is less

than 3, which is 1.811350. In other words, the series are less than average, indicating that the distribution is flat.

An average of 11.92363 with a standard deviation of 3.456407 was found for foreign direct investment (FDI) into the manufacturing sector (FDIM). Foreign direct investment (FDI) into the manufacturing sector (FDIM) has a long-right skewness score of positive 0.272402. However, it is platykurtic since the kurtosis value is less than 3, which is 1.461024. In other words, the series are less than average, indicating that the distribution is flat.

A mean value of 11.02913 and a standard deviation of 3.695885 were found for foreign direct investment (FDI) into the service sector (FDIS). Foreign direct investment (FDI) into the services sector (FDIS) has a long-right tail, according to its positive skewness score of 0.560692. In contrast, it is platykurtic since the kurtosis number is smaller than 3. In other words, the series are less than average, indicating that the distribution is flat.

A mean of 31.67488 and a standard deviation of 12.42982 were found for trade openness (OPN). There is a long-left tail in trade openness (OPN) since its skewness value is negative (-0.260363). And because 2.128428 is smaller than 3, we may say that it is platykurtic. In other words, the series are less than average, indicating that the distribution is flat.

The average exchange rate (EXR) was 3.597514 with a standard deviation of 2.009368. There is a long-left tail in the exchange rate (EXR) since its skewness value is negative (-0.804266). It is platykurtic, since the kurtosis value of 2.382743 is smaller than 3. In other words, the series are less than average, indicating that the distribution is flat.

Again, the Jarque-Bera statistics of the variables are a significant finding in this table. At 5.99, Jarque-Bera is considered normal. The results demonstrate that all of the variables have normal distributions with values below 5.99, including FDIA, FDIM, FDIS, PVT, OPN, and EXR.

Since utilizing the variables at their level can provide an erroneous conclusion, it is essential to test for their stationarity and the long-run connection based on these data. The variables are made stationary by doing the unit root test. This research makes use of the ADF unit root test method.

Table 3. Unit Root Test Results

Variables	ADF at Level	ADF at 1st Difference	Status	Remarks
PVT	-1.699461	-5.571646	I(1)	Stationary
LOG(FDIA)	0.104394	-8.605073	I(1)	Stationary
LOG(FDIM)	-0.422729	-7.021882	I(1)	Stationary
LOG(FDIS)	0.396639	-6.114391	I(1)	Stationary
OPN	-2.378193	-5.404867	I(1)	Stationary
EXR	3.023856	-3.641789	I(1)	Stationary
		Critical Values		
1% level	-3.610453	-3.621023		
5% level	-2.938987	-2.943427		
10% level	-2.607932	-2.610263		

Source: Author's Computation (2023)

All of the model's variables were not stationary at level, according to the results of the unit root test in Table 3, but they were stationary at the first difference. Accordingly, the research found that the model's variables were integrated of order one, or I (1). We go ahead and do co-integration because the ADF results show that the series are of the same integration order.

1. Co-integration Test Result for the Model

The result of co-integration test for the Model is presented in Table 4. This will enable us determine if there exists long run equilibrium relationship among the variables in the model.

Table 4. Co-integration Test Result for Model

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.703538	128.9801	95.75366	0.0000
At most 1 *	0.691079	82.77836	69.81889	0.0033
At most 2	0.385386	38.14088	47.85613	0.2959
At most 3	0.256673	19.64398	29.79707	0.4473
At most 4	0.176219	8.372439	15.49471	0.4265
At most 5	0.026130	1.006125	3.841466	0.3158

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.703538	46.20171	40.07757	0.0091
At most 1 *	0.691079	44.63747	33.87687	0.0018
At most 2	0.385386	18.49691	27.58434	0.4543
At most 3	0.256673	11.27154	21.13162	0.6202
At most 4	0.176219	7.366314	14.26460	0.4468
At most 5	0.026130	1.006125	3.841466	0.3158

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Author's Computation (2023)

At the 5% significance level, two co-integrating equations are indicated by the trace test statistics and the max-eigen statistics, as shown in Table 4, which shows the results of the co-integration. This points to the presence of a long-term link between the model's variables. That is why the research agrees with the alternative hypothesis and disagrees with the null hypothesis, which states that the variables do not co-integrate.

2. Over-Parameterized ECM Estimation Results for the Model

The result of overparametrized ECM estimation of the Model is presented in

Table 5. Overparameterized ECM Estimation Results for Model

Dependent Variable: D(PVT)
Method: Least Squares
Sample (adjusted): 1984 2021
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.796774	0.727611	-1.095055	0.2872
D(PVT(-1))	0.812018	0.182338	4.453362	0.0003
D(PVT(-2))	0.151291	0.217780	0.694697	0.4957
DLOG(FDIA)	-2.040176	0.864640	-2.359566	0.0291
DLOG(FDIA(-1))	-0.847696	0.875180	-0.968596	0.3449
DLOG(FDIA(-2))	-0.454745	0.689904	-0.659143	0.5177
DLOG(FDIM)	0.595704	1.196244	0.497979	0.6242
DLOG(FDIM(-1))	1.960667	1.302103	1.505770	0.1486
DLOG(FDIM(-2))	0.805713	1.305622	0.617111	0.5445
DLOG(FDIS)	1.739972	0.993251	1.751794	0.0959
DLOG(FDIS(-1))	0.516790	0.968611	0.533537	0.5998
DLOG(FDIS(-2))	0.175948	0.801292	0.219581	0.8285
D(OPN)	-0.053102	0.061758	-0.859831	0.4006
D(OPN(-1))	-0.091004	0.095858	-0.949368	0.3544
D(OPN(-2))	-0.077053	0.067832	-1.135948	0.2701
D(EXR)	0.004142	0.026998	0.153433	0.8797
D(EXR(-1))	-0.013633	0.031982	-0.426277	0.6747
D(EXR(-2))	0.064996	0.030819	2.108980	0.0484
ECM(-1)	-0.270621	0.094972	-2.849478	0.0103

R-squared	0.760853	Mean dependent var	0.052632
Adjusted R-squared	0.534293	S.D. dependent var	3.605867
S.E. of regression	2.460742	Akaike info criterion	4.945656
Sum squared resid	115.0497	Schwarz criterion	5.764449
Log likelihood	-74.96746	Hannan-Quinn criter.	5.236976
F-statistic	3.358285	Durbin-Watson stat	1.930706
Prob(F-statistic)	0.005959		

Source: Author's Computation (2023)

3. Parsimonious ECM of the Model

Table 6. Parsimonious ECM Estimation Results for Model

Dependent Variable: D(PVT)
Method: Least Squares
Sample (adjusted): 1984 2021
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.468544	0.438904	-1.067534	0.2948
D(PVT(-1))	0.845441	0.108412	7.798410	0.0000
DLOG(FDIA)	-1.701324	0.657524	-2.587472	0.0152
DLOG(FDIA(-1))	-0.485827	0.478838	-1.014595	0.3190
DLOG(FDIM(-1))	1.605765	0.868746	1.848371	0.0751
DLOG(FDIS)	1.529132	0.636170	2.403655	0.0231
D(OPN)	-0.035025	0.041568	-0.842587	0.4066
D(OPN(-2))	-0.055491	0.047949	-1.157308	0.2569
D(EXR(-2))	0.048906	0.020933	2.336307	0.0269
ECM(-1)	-0.598466	0.164333	-3.641789	0.0008

R-squared	0.739827	Mean dependent var	0.052632
Adjusted R-squared	0.656200	S.D. dependent var	3.605867
S.E. of regression	2.114281	Akaike info criterion	4.556241
Sum squared resid	125.1652	Schwarz criterion	4.987185
Log likelihood	-76.56858	Hannan-Quinn criter.	4.709568
F-statistic	8.846739	Durbin-Watson stat	2.093160
Prob(F-statistic)	0.000004		

Source: Author's Computation (2023)

Table 6 parsimonious error correction procedure reveals that the model's explanatory variables accounted for 66% of the variance in Nigerian poverty (as shown by an Adjusted-R2 value of 0.656200), while the error term accounted for 34%. At the 5% level of significance, the entire regression is significant since the F-statistic of 8.846739 is higher than the essential F-statistic value of 2.64. That the model holds water and the independent variables play a key role in explaining the dependent variable is what this means. The model's variables exhibit low levels of serial autocorrelation, as shown by the Durbin Watson Statistic of 2.093160. Additionally, the ECM is properly signed and has a statistically significant value.

Additionally, as can be seen from Table 6, the short run estimate results reveal that foreign direct investment (FDI) into the agricultural sector (FDIA) has a negative correlation with poverty (-1.701324). This means that for every unit increase in FDI into the agriculture sector (FDIA), the poverty rate (PVT) in Nigeria is reduced by 1.701324 units. A priori predictions about the relationship between foreign direct investment (FDI) in agriculture and the poverty rate (PVT) are correct. There is a short-term statistically significant relationship between foreign direct investment (FDI) and the agricultural sector (FDIA) at the 5% level. Therefore, the research does not reject either the alternative or null hypothesis, which states that FDIM and poverty do not have a significant association in the short term.

A one-unit increase in foreign direct investment (FDI) into Nigeria's manufacturing sector (FDIM) raises the country's poverty rate (PVT) by 1.605765 units, according to a positive association between FDIM and poverty reduction (1.605765). Foreign direct investment (FDI) into manufacturing has a favorable influence on poverty rate (PVT), as expected beforehand. There is no statistically significant relationship between poverty and foreign direct investment (FDI) into the manufacturing sector (FDIM) at the 5% level. Therefore, the analysis accepts the null hypothesis that, at the 5% level of significance, there is no association between foreign direct investment (FDI) into the manufacturing sector and poverty.

A one-unit increase in foreign direct investment (FDI) into Nigeria's service sector (FDIS) is associated with a 1.529132-unit rise in the country's poverty rate (PVT). A priori predictions about the relationship between foreign direct investment (FDI) into the services sector and the poverty rate (PVT) are correct. At the 5% threshold of significance, foreign direct investment (FDI) into the service sector (FDIS) has a favorable effect on poverty. Consequently, the analysis does not support the alternative hypothesis that FDI into the service sector (FDIS) has no substantial association with poverty in the short term, but it does reject the null hypothesis that this is not the case.

One-unit increase in trade openness (OPN) lowers poverty in Nigeria, according to both the present and historical lag 2 of trade openness (OPN) and poverty, which are negatively correlated (-0.035025 and -0.055491, respectively). As predicted beforehand, trade openness (OPN) has a negative impact on poverty rate (PVT). At the 5% level of significance, there is no negative relationship between trade openness (OPN) and poverty rate (PVT). The research concludes that trade openness (OPN) does not significantly correlate with poverty in the near term, thereby accepting the null hypothesis.

In Nigeria, the link between exchange rate (EXR) and poverty is positive (0.048906), meaning that for every one unit rise in EXR, poverty increases by 0.048906 units. A priori predictions are correct in saying that the exchange rate (EXT) has a beneficial influence on the poverty rate (PVT). At the 5% level of significance, the positive sign of the exchange rate (EXR) on poverty is evident. Thus, the research does not reject either the alternative or null hypothesis, which states that there is a substantial link between exchange rate (EXR) and poverty in the short term.

4. Post Estimation Test for the Model

Using the Breusch-Godfrey Serial Correlation LM Test for autocorrelation, the Ramsey Reset Test for linearity, and the Breusch-Pagan-Godfrey Test for heteroscedasticity, the researcher ran a battery of diagnostic tests to establish the series' integrity.

Table 7. Ramsey Reset Test, Serial Correlation LM Test and Homoscedasticity

	F-Statistic	Prob. Value
Linearity Test (Ramsey RESET Test)	0.635871	0.4322
Breusch-Godfrey Serial Correlation LM Test	0.103337	0.9022
Breusch-Pagan-Godfrey Heteroskedasticity Test	0.363380	0.9430

Source: Author's Computation (2023)

Table 7 displays the results of the autocorrelation test that was conducted using the Breusch-Godfrey Serial Correlation LM technique. The F-statistic was 0.103337 and the Chi-Square probability value was 0.9022. With a probability value of almost 90% (0.9022) being more than 5% ($p > 0.05$), this proved that the model did not include any serial correlation.

Once again, the F-statistic is 0.363380 and the Chi-Square probability value is 0.9430 as a result of the heteroscedasticity test utilizing the Breusch-Pagan-Godfrey test. The findings indicate that the model does not exhibit heteroskedasticity, as the 94.5 percent Chi-square probability value (0.9430) is higher than 5% ($p > 0.05$). In regression, a constant variance in the residuals indicates that they are homoscedastic, which is a desired outcome.

DISCUSSION

Foreign Direct Investment into the Agriculture Sector (FDIA) Decreases Poverty Rate (PVT), According to the ECM Findings. This indicates that, for the time being considered, the Poverty Rate (PVT) in Nigeria is temporarily decreased for every unit increase in Foreign Direct Investment into the Agriculture Sector (FDIA). There is a statistically significant relationship between the Poverty Rate (PVT) and Foreign Direct Investment into the Agriculture Sector (FDIA) in Nigeria during the research period. Foreign Direct

Investment (FDIA) in the Agriculture Sector Lowers Poverty in Nigeria. Therefore, the research does not reject the alternative hypothesis within the study period, but it does reject the null hypothesis, which states that there is no significant link between Foreign Direct Investment into the Agriculture Sector (FDIA) and Poverty Rate (PVT) in Nigeria.

Djokoto et al. (2022) previously shown that FDIA boosts the economy and lowers poverty; our results corroborate their findings.

Foreign Direct Investment into Manufacturing Sector and Poverty Rate in Nigeria

The research shows that FDIM (Foreign Direct Investment in the Manufacturing Sector) lowers the poverty rate. As a result, throughout the time period under consideration, the Poverty Rate (PVT) in Nigeria rises for every one-unit increase in Foreign Direct Investment into the Manufacturing Sector (FDIM).

During the time frame of the research, the coefficient of FDIM in Nigeria's manufacturing sector was not statistically significant at 5% when compared to the country's poverty rate (PVT). Foreign direct investment (FDI) into Nigeria's manufacturing sector (FDIA) and the country's poverty rate (PVT) were not significantly related during the research period, so the study accepts the null hypothesis. Therefore, FDIM (Foreign Direct Investment) in Nigeria's manufacturing sector is a poverty-inducing policy.

This study's results contradict those of Afolabi et al. (2019), who discovered that FDIM reduces poverty; however, they are in line with those of other studies that have shown that FDIM promotes poverty and has a negative impact on the economy generally (Idoko and Taiga (2018), Eze et al. (2019), Duramany-Lakkoh et al., 2021).

While it would be reasonable to assume that FDIM would have a detrimental effect on poverty, this research finds the opposite to be true. One possible explanation for the beneficial impact of FDIM on poverty reduction in Nigeria is that the majority of FDI in the country goes into the oil industry, which employs a negligible percentage of the population. This suggests that FDIM in the manufacturing sector may be the driving force behind this trend. Our research shows that the communication industry has undergone a shift in foreign direct investment (FDI), but that this shift has not yet produced the desired results.

Foreign Direct Investment into Services Sector and Poverty Rate in Nigeria

A favorable relationship between the poverty rate and foreign direct investment in the service sector (FDIS) was found in the research. This indicates that, during the time frame of this assessment, the Poverty Rate (PVT) in Nigeria rises in the short term for every unit increase in Foreign Direct Investment into the Service Sector (FDIS).

Within the time frame of the analysis, there is a statistically significant correlation between the Foreign Direct Investment into the Service Sector (FDIS) and the Poverty Rate (PVT) in Nigeria at 5%. Consequently, the research DOES NOT reject the alternative hypothesis that there is a substantial association between FDIS and Nigeria's poverty rate (PVT) throughout the study period, but it DOES reject the null hypothesis that there is no relationship at all. To put it another way, FDIS (Foreign Direct Investment in the Service Sector) makes Nigerians poorer.

Research by Wahab (2020) has shown that FDI into the service sector (FDIS) helps alleviate poverty. However, our results show the opposite.
Contrary to expectations, this research finds a positive and statistically significant association between poverty and foreign direct investment (FDIS) in the service sector. Since the majority of Nigeria's foreign direct investment (FDI) goes into the oil industry, which only employs a small fraction of the population, it stands to reason that FDI into the service sector has a positive and statistically significant impact on the poverty rate (PVT). Our research shows that the beneficial effects of redirecting FDI to the communication industry have not yet materialized.

Trade Openness and Poverty Rate in Nigeria

Trade openness (OPN) hinders efforts to alleviate poverty, according to the research. The short-term impact on Nigeria's poverty rate (PVT) throughout the time period under consideration is a unit rise in Trade Openness (OPN) resulting in a lower PVT.

At the 5% level of significance, the trade openness (OPN) coefficient does not differ significantly from the poverty rate (PVT) in Nigeria during the research period. Since no statistically significant correlation was found between Nigeria's trade openness (OPN) and poverty rate (PVT) during the research period, the study concludes that the null hypothesis is correct. This indicates that OPN has little effect on poverty levels in Nigeria.

Previous research by authors such as Adigun and Oke (2021) found that Trade Openness (OPN) reduces poverty, while this study's findings contradict those of Yusuf and Emmanuel (2000), Wacziarg (2001), Paulino (2002), and Yanikkaya (2003) which found that Trade Openness (OPN) increases the poverty rate.

Although a negative correlation between trade openness (OPN) and poverty is predicted, this analysis finds no such correlation. The fact that the underlying dynamics of trade have not yet improved the living standards of Nigerians might explain why trade openness (OPN) has not reduced the poverty rate (PVT) in the country. The reason for this is the country's economic structure, namely its exports, which are heavily influenced by the oil industry, even though it only employs a small fraction of the workforce. In light of this new information, it is important to examine Nigeria's trade policies and framework to see whether they prioritize economic growth over the well-being of their people.

Exchange Rate and Poverty Rate in Nigeria

According to the research, the relationship between Exchange Rate (EXR) and Poverty Rate (PVT) is favorable. The Poverty Rate (PVT) in Nigeria is raised by one unit rise in the Exchange Rate (EXR) throughout the time period being considered.

Between the study's time frame and Nigeria's poverty rate (PVT), the exchange rate (EXR) coefficient is 5% and statistically significant. The analysis concludes that the exchange rate (EXR) and poverty rate (PVT) in Nigeria are significantly related, rejecting the null hypothesis but leaving the alternative hypothesis unrejected for the time being. So, the Exchange Rate (EXR) is a factor that makes Nigerians poorer.

This study's conclusions that the Exchange Rate (EXR) contributes to poverty are in line with those of Ozulumba (2011), Obiechina and Ukeje (2013), and Bosede (2014).

Contrary to popular belief, this research finds a positive and statistically significant correlation between Exchange Rate (EXR) and poverty. The monoculture basis of the Nigerian economy may explain the positive and considerable influence of the exchange rate (EXR) on the poverty rate (PVT). Exports would increase, leading to economic growth and poverty reduction in Nigeria, if the government kept to a consistent policy of managing the currency's value, which would prevent the Naira from being over-or under-valued. This policy would also make sure that tradable goods are competitive, that prices are relatively stable, and that there are no inconsistent fiscal policies.

RECOMMENDATION AND CONCLUSIONS

The following are recommended for government and policy makers:

1. To alleviate poverty and stimulate economic development, the Nigerian government should give tax incentives, infrastructure subsidies, import duty exemptions, and other measures to attract foreign direct investment.
2. To avoid fiscal policy inconsistencies and keep tradable products competitive, relative price stability, and an overvalued or depreciated Naira, the government should have an exchange rate management strategy that is steady. Exports will rise as a result, which is good news for Nigeria's economy.
3. The government need to push for diversification, particularly in exports from non-oil sectors. The production of the agricultural and industrial subsectors may both be enhanced to reach this goal.
4. A consistent fiscal policy, relative price stability, and a stable exchange rate management strategy are all necessary to make sure that tradable products remain competitive on the international market and that the Naira doesn't become overvalued or depreciated too much.

Using yearly time series data spanning 41 years, from 1981 to 2021, the research empirically evaluates the influence of FDI on poverty in Nigeria. Using secondary sources, descriptive statistics, unit root test, and ECM modelling techniques were employed to analyze the data, with poverty rate (PVT) serving as the dependent variable and foreign direct investment (FDI) into agriculture (FDIA), manufacturing (FDIM), service (FDIS), trade openness (OPN), and exchange rate (EXR) serving as the independent variables. Foreign Direct Investment (FDI) in the agriculture sector decreases the poverty rate, FDIM in the manufacturing sector increases the poverty rate, FDIS in the service sector increases the poverty rate, OPN decreases the poverty rate, and EXR increases the poverty rate in Nigeria, according to the ECM. Foreign direct investment (FDI) did not alleviate poverty in Nigeria during the research period, the study found.

FURTHER STUDY

FDI is one of the key indicator to liberate poverty in Nigeria as a whole. Study like this need to be review at least every 10 years' interval to know the current impact at which FDI has impacted on Nigeria economy.

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