EFFECT OF FOREIGN DIRECT INVESTMENT ON POVERTY LEVEL IN NIGERIA: EVIDENCE FROM COINTEGRATION AND CAUSALITY ANALYSES

BINUOMOYO, Olayinka Kehinde
Department of Finance
School of Management Sciences
Babcock University, Ilishan-Remo, Ogun State, Nigeria
olayinka.binuomoyo@gmail.com

AJIKE, Emmanuel O. (Ph.D)
Department of Business Administration & Marketing
School of Management Sciences
Babcock University, Ilishan-Remo, Ogun State, Nigeria

OWUALAH, Sunday I. (Prof.)
Department of Finance
School of Management Sciences
Babcock University, Ilishan-Remo, Ogun State, Nigeria

ABSTRACT

This study examines the long-term and causal relationship between foreign direct investment (FDI) and poverty level in Nigeria, employing an annual time series data from 1990–2022, analysed using the autoregressive distributed lag (ARDL) bounds testing approach and Granger causality test. The results confirm that FDI exerts a positive short- and long-run impacts on poverty level (δ = 0.737, t = 0.288, p = 0.776) in Nigeria which is unsavoury, though these relationships are insignificant. Also, the results of Granger causality indicate that FDI and poverty level do not cause each other, which confirms no causality relationship between the two variables. Further insight shows that FDI inflation tends to push up the poverty level in Nigeria and could be responsible for the unsavoury outcome of the FDI-poverty level relationship. It is therefore recommended for the government to take decisions related to addressing the country's macroeconomic stability in order for foreign investments to have the desired impact on poverty level in the country.

Keywords: ARDL, FDI, Granger causality, Nigeria, Poverty

INTRODUCTION

Poverty is considered one of the developing and developed countries' most important indicators of economic performance and measures of development priorities. However, poverty rates have varied considerably across countries, depending on the actual success of their economic growth, which leads to sustainable development. The efforts of institutions and policy makers on sustainable development can also support the process of reducing poverty and increasing the wellbeing of the population. Given the complexity of the phenomenon and its implications, the tools to achieve these objectives are various and require long-term actions. Reducing poverty is not just linked to the economic conditions; it is an integrated process also including environmental, social, ethical, legal and other issues depending on the international sphere. For instance, the policymakers may sometimes find that there is a trade-off between environmental conditions and poverty reduction. Poverty reduction also may lead to environmental destruction higher living conditions need more resources. Because of the frequent overlapping of the abovementioned issues, the process of poverty reduction becomes a challenge in itself. Given this complexity, and the existence of different trade-offs, Mansi et al. (2020) support the idea that a country ensuring sustainable development can easily construct the right balances and get the best policy outputs regarding poverty reduction and other conditions.

The following aptly justify the imperative of FDI in an economy, that is, the level of poverty in the country places emphasis on the scepticism of the effect of FDI on economic growth in Nigeria, with the recent statistics about the level of poverty describing Nigeria with 70 million people currently living in extreme poverty (representing 33 percent of the country's population) as the poverty capital of Africa

behind India in global ranking (World Bank, 2021; Oluwole, 2022). This description is surprising because FDI inflow is expected to increase the level of economic activities and hence employment level in the country, with the ripple effect of the impact to increase the per capita income and hence reduce the level of poverty in the country. However, a great population of Nigerians still live below the poverty line suggesting a weak link between economic growth and FDI inflow into Nigeria (Onimisi, 2014). The recent chequered economic growth rates of Nigeria including the two recessions within a short span of time have been justified by the high unemployment and poverty rates witnessed over the recent years. Adigun and Oke (2021) argued that even though FDI is an engine of economic growth, it is also key in alleviating poverty but has often been directed to sectors with low impact on poverty reduction, while policies to encourage businesses and generate employment opportunities are not formulated. The authors noted that despite the various advantages attached to FDI in developing countries like Nigeria, the country is still faced with serious disrepair and underdevelopment which is characterized by widespread poverty, unemployment, and income inequality, underutilization of productive capacity and persistent balance of payments deficit with as much as 62% of the country's population in 2018 lived in extreme poverty and 70% are below the poverty line with unemployment rate at 16.5%. Madueke et al. (2022) agreed that FDI have little potential to help Nigeria reach sustainable development goal of poverty reduction, as FDI does not reduce poverty considering the interaction of trade and FDI policies, which need to be carefully examined to make FDI growth enhancing in Nigeria.

The aim of this study is to investigate the long-run and causal relationship between FDI and poverty level in Nigeria in order to establish the impact (and degree) of FDI on poverty level, and the causative influences of the two variables on each other. The rest of the paper goes as follows: Section 2 describes previous studies, with the methodology discussed in Section 3, empirical results are presented in Section 4, while Section 5 discussed the findings with conclusion.

LITERATURE REVIEW

This study is anchored on the theory of economic modernization which is based on the combination of the neoclassical and endogenous growth theories, harmonising the components of both theories to the benefit of modern-day economic realities. These two fundamental growth theories (endogenous and exogenous growth theories) are critical to the discussions in economic output, which may rather be called the unique Solow growth theories (or the exo-endo theories of growth) whereby the exogenous model provides a pathway to the understanding of the endogenous model in the economic growth theory (Popa, 2014). But notably beyond economic growth, these theories have significant impact on development as evident in their impact on unemployment rate and poverty reduction effect.

The endogenous growth theory explains the relationship between FDI and poverty, in that economic growth and increased productivity will reduce poverty and improve wellbeing, with FDI having two kinds of effects on poverty: horizontal (here, technological transfer from overseas enterprises to local firms has a horizontal spill-over effect) and vertical (Meyer, 2004; Farole & Winkler, 2012). An increase in national income tends to benefit the most vulnerable population (Romer, 1986; Lucas, 1988). Table 1 contains a short summary of studies on FDI-poverty nexus.

Table 1: Short summary of empirical review

S/N	Author & Year	Methodology	FINDINGS	REMARK
1.	Haruna et al. (2023)	Nigeria, 1980-2019, using the ARDL & NARDL estimators	• FDI inflows stimulate growth, create job openings, transfer of modern technology and reduce poverty • Positive and negative shocks of FDI in turn reduce poverty significantly in the long- and short-run.	• Study is limited to a single country
2.	Huynh (2021)	36 Asian countries, 2000 to 2018, uses FGLS & two-step SGMM.	• More FDI inflows increase income inequality.	• Variable gap in the use of natural resources as a variable.
3.	Anetor, Esho, & Verhoef (2020)	29 SSA countries, 1990–2017; FGLS and OLS techniques	• FDI has no impact on poverty reduction, suggesting that FDI has not been appropriately channelled into sectors that would have a positive impact on poverty reduction in SSA countries.	•Methodological gap. •Data limitation issue.
4.	Fauzel, Seetanah & Sannassee (2016)	Mauritius, 1980 to 2013, using VECM model	• FDI has a positive & significant impact on poverty reduction in both the short-run and long-run. • FDI reduces poverty through the employment channel and trade openness.	• Study is limited to Mauritius, methodological and variable gaps.

Source: Authors' compilation.

Nigerian poverty situation is aptly explained by both the endogenous and exogenous theories as the country is characterized by low per capita income, high incidence of poverty, high unemployment rate, fast-growing population relative to the economy, as well as low savings rates, with low levels of savings and investments creating savings-investment gaps that have had negative impacts on economic growth and development. The neoclassical growth model is on point on the claims that differences in countries' per capita incomes are due to differences in their capital accumulation, which are in turn due to their differing saving rates, and also due to differences in countries' saving rates (Solow 1956). FDI inflows are seen as the foreign capital content that can help fill the gap between savings and required level of investment (Ribaj & Mexhuani, 2021). A key policy implication of the EGT is that government policies can raise the growth rate of an economy where the policies are directed at enforcing more market competition and helping stimulate innovation in products and processes, while exogenous model advocates courting external factors like the FDI to augment domestic investment. FDI inflows work through foreign firms to improve skills and knowledge of employees, added with easing capital constraints, they are able to enhance output, increase productivity and of course, positively impact employment growth (Saurav et al., 2020). A review of the theory of economic modernization, which is the focus theory that underpins this study, explains that modern economic realities hinge on the combination of endogenous and exogenous growth models with effects seeping from economic growth to unemployment rate, and to standard of living (through income), which could impact the poverty level. (Chirwa & Odhiambo, 2018), explaining the process of economic development.

METHODOLOGY

Research Design and Methods of Data Analysis

The study examined the relationship between FDI and poverty level in Nigeria. The research is an *ex-post facto* research design as it employed a quantitative design on secondary data from 1990 to 2022. The paper adopted the autoregressive distributed lag (ARDL)-bounds testing approach and Granger causality test to both establish a long-term relationship between FDI and poverty level, and also investigate causality relationship between the two variables in Nigeria. The choice of years of coverage is also informed by the availability of data over this period.

Model Specification

The basis for understanding the FDI-poverty nexus is the neoclassical model where we introduced economic output, unemployment rate, inflation population growth and domestic investment, to analyse the impact of FDI on poverty level in Nigeria, and thus, we have:

$$\mathbf{POV} = f(\mathbf{FDI}, \mathbf{GDP}, \mathbf{UNE}, \mathbf{INF}, \mathbf{POPG}, \mathbf{GFCF}) \quad (1)$$

Where FDI is foreign direct investment, GFCF is gross fixed capital formation, UNE is unemployment rate, GDP is gross domestic product (economic output), POPG is population growth, INF is inflation rate, and POV is poverty level.

Some of the variables of the above functional equation (1) are later transformed into natural log based on the descriptive properties of the variables particularly normality test, which helped achieve two things: (i) avoidance of heteroscedasticity, and (ii) the estimated coefficients can be interpreted as elasticities since the model variables are in log-form, where *In* is natural logarithm (Kissell & Poserina, 2017).

Equation (1) above analyses the effect of FDI on poverty level (POV) in the country proxied by household consumption expenditure as follows, and presented in econometric form as follows:

$$\mathbf{POV_t} = \boldsymbol{\delta_0} + \boldsymbol{\delta_1} ln\mathbf{FDI_t} + \boldsymbol{\delta_2} ln\mathbf{GDP_t} + \boldsymbol{\delta_3}\mathbf{POPG_t} + \boldsymbol{\delta_4}\mathbf{GFCF_t} + \boldsymbol{\delta_5} ln\mathbf{UNE_t} + \boldsymbol{\delta_6} ln\mathbf{INF_t} + \boldsymbol{\varepsilon_t} \quad (2)$$

$\delta_0 - \delta_6$ are the slopes and coefficients of the respective explanatory variables, with δ_0 being the slope or intercept depicting the value of the dependent variable given that the independent variables are constant, and $\delta_1 - \delta_6$ being the coefficients or parameters of the explanatory variables to be estimated, while ε_t represents the error term, accounting for other variables that may affect the relationship but are not included in the model.

Our apriori expectations of the independent variables are as follows: $\boldsymbol{\delta_1} < 0$; $\boldsymbol{\delta_2} < 0$; $\boldsymbol{\delta_3} > < 0$; $\boldsymbol{\delta_4} < 0$; $\boldsymbol{\delta_5} > 0$; and $\boldsymbol{\delta_6} > 0$.

Measurement of Variables

The components or indicators of economic performance considered in this study include economic growth (measured by real GDP growth), unemployment rate (measured by the country's unemployment rate) and poverty level (measured by household consumption expenditure), all representing the dependent variables of our models. Economic growth is measured by real GDP growth, while domestic investment is proxied by GFCF. The full study variables in Table 2 below are operationalized with sources of data defined.

Table 2a: Descriptors of the model variables, operational measures and data sources

Variable symbols	Operational descriptions and measures	Data sources
	Dependent Variables	
POV	Poverty here is measured in terms of household spending being the amount of final consumption expenditure made by resident households to meet their everyday needs.	WDI (World Bank)
	Independent Variables	
lnFDI	Foreign direct investment (FDI) is the inflow of foreign or country's external investment for the benefit of the host country. FDI is measured as percent of GDP.	WDI (World Bank), UNCTAD
GFCF	GFCF is gross fixed capital formation and represents the capital stock. It is measured by the real value of gross fixed capital formation in constant term.	WDI (World Bank)
POPG	POPG is the growth in the number of persons in a Nigeria, measured year-on-year in percent.	WDI (World Bank)
lnINF	Inflation rate (INF) is measured by annual growth rate of the GDP implicit deflator and shows the rate of price change in the economy as a whole. It is the consumer price index (CPI).	WDI (World Bank)
lnUNE	Unemployment rate refers to the share of the labour force that is without work but available for and seeking employment.	NBS
Variable symbols	Operational descriptions and measures	Data sources
lnGDP	Gross domestic product (GDP) is the monetary value of all finished goods and services made within a country during a specific period. GDP provides an economic snapshot of a country's economy, used to estimate the size of an economy and growth rate, and can be calculated in three ways, using expenditures, production, or incomes. It can be adjusted for inflation and population to provide deeper insights. Though it has limitations, GDP is a key tool to guide policymakers, investors, and businesses in strategic decision making. In this study, the GDP is in constant US$. Log of GDP (InGDP) proxies the size of Nigerian economy as expressing the absolute of the economy.	WDI (World Bank)

Source: Author's compilation from various sources

Model Estimation Techniques

To examine the relationships between the independent variables under study and poverty level, we undertook four steps in the estimation process. For the first step, we analysed the stationarity of the variables using the Augmented Dickey-Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root tests to investigate the order of integration of the variables under study. This test revealed the stationarity or otherwise of the series and choice of model for estimation, and this step is necessary because the autoregressive distributed lags (ARDL) bounds cointegration test requires the dependent variable to be integrated of order one and the explanatory variables to be I(0) or I(1), in which if otherwise, where any of the variables is I(2), the F-test will provide biased results (Keho, 2017). In the second step, we carried out tests of the presence of both short-run and long-run relationships among the variables using co-integration tests, that is, ARDL bounds cointegration test, depending on the results of the stationarity test, with the error correction models (ECM) specified to test the short-run relationship. For the third step, we undertook the Granger causality test to test the direction of causality (relationships) between the variables. And in the last step, we carried out to explore the structural stability and diagnostic tests for robustness check.

Hence, to check the stationarity properties of the series used for the study, the ADF and KPSS tests of unit root with intercept (constant) and trend options will be used. The unit root test will be performed to guarantee that none of the variables are integrated of order above one before applying the ARDL bounds testing approach to cointegration.

Cointegration Test and the Augmented ARDL Bounds Testing Approach

After establishing that the variables are stationary, we determined whether or not there is long-run relationship between them. Cointegration regressions measure the long-term relationship between the variables whose existence guarantees that the variables demonstrate no inherent tendency to drift apart. The study employed the ARDL bounds test of cointegration for this. The ARDL bounds test is preferable in accordance with Pesaran et al. (2001), thereby justifying the use of the ARDL (Ayessa & Hakizimana, 2021).

ARDL model and error correction specifications for equation (2) above are as follows, by which we will be able to estimate the respective long-run and short-run coefficients:

$$\Delta \mathbf{POV}_t = \boldsymbol{\lambda}_{10} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{11} \Delta \mathbf{POV}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{12} \Delta ln\mathbf{FDI}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{13} \Delta ln\mathbf{GDP}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{14} \Delta ln\mathbf{UNE}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{15} \Delta ln\mathbf{INF}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{16} \Delta ln\mathbf{POPG}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{17} \Delta \mathbf{GFCF}_{t-k} + \boldsymbol{\alpha}_{11}\mathbf{POV}_{t-1} + \boldsymbol{\alpha}_{12} ln\mathbf{FDI}_{t-1} + \boldsymbol{\alpha}_{13} ln\mathbf{GDP}_{t-1} + \boldsymbol{\alpha}_{14} ln\mathbf{UNE}_{t-1} + \boldsymbol{\alpha}_{15} ln\mathbf{INF}_{t-1} + \boldsymbol{\alpha}_{16} ln\mathbf{POP}_{t-1} + \boldsymbol{\alpha}_{17}\mathbf{GFCF}_{t-1} + \boldsymbol{\mu}_t \quad (3)$$

Where $\boldsymbol{\lambda}_{11}$ to $\boldsymbol{\lambda}_{17}$ and α_{11} to α_{17} are regression coefficients, $\boldsymbol{\lambda}_{10}$ is a constant, and μ_t is a white noise error term.

The error correction model for equation (33a) is specified below:

$$\Delta \mathbf{POV}_t = \boldsymbol{\lambda}_{10} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{11} \Delta \mathbf{POV}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{12} \Delta ln\mathbf{FDI}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{13} \Delta ln\mathbf{GDP}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{14} \Delta ln\mathbf{UNE}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{15} \Delta ln\mathbf{INF}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{16} \Delta ln\mathbf{POP}_{t-k} + \sum_{k=1}^{q} \boldsymbol{\lambda}_{17} \Delta \mathbf{GFCF}_{t-k} + \boldsymbol{w}_{21}\mathbf{ECM}_{t-1} + \boldsymbol{\mu}_t \quad (4)$$

where, in equations (3) and (4) above further defined as follows: $\boldsymbol{\lambda}_{11}$ to $\boldsymbol{\lambda}_{17}$ are vector parameters of the short-run relationship, and $\boldsymbol{\alpha}_{11}$ to $\boldsymbol{\alpha}_{17}$ (vector parameters of the long-run relationship), and $\mathbf{w}_{21}$ is a regression coefficient, $\boldsymbol{\lambda}_{10}$ is a constant, $\mathbf{ECM}_{t-k}$ is a lagged error term, and $\boldsymbol{\mu}_t$ is a white noise error term, noting that $\mathbf{w}_{21}$ here is as well an error correction (EC) parameter that measures the speed of adjustment towards the long-run equilibrium following a shock to the system. The ECM is specified to estimate the short-run adjustments to equilibrium in equation (4) above, with Δ being the operator of the first difference, q is the length of the optimal lag. For the ECM, the study will test the null hypothesis of the 'non-existence of long-run relationship' against the alternative of the 'existence of long-run relationship', that

$$\mathbf{H}_0 = \boldsymbol{\lambda}_i = \boldsymbol{\lambda}_j = \mathbf{0}$$

where **i** to **j** is the range of $\boldsymbol{\lambda}$ occurring in the models.

The decisions of the bound test are made based on the F-statistic value that helps to draw conclusions about the long-run relationship of the variables in that if F-statistic > the upper critical value bounds, the variables are co-integrated, otherwise, they are not co-integrated. But where F-statistic is between the upper critical value bounds and lower critical value bounds, the decision is inconclusive (Dey & Tareque, 2020).

Causality Test

Granger causality test is employed for the purpose of determining the direction of causality that exists among FDI, institutions and poverty, and according to Adaramola and Dada (2020), there are three

types of causal relationships: unidirectional causality (occurs when only one variable influence the other variable and when there is no causality from the other variable, meaning that only one of the variables relates), bi-directional causality (occurs when 2 variables influence one another, meaning both variables relate with each other), and zero causality (occurs when none of the variables relate with each other). Hypothetic decisions on whether to accept or reject a hypothesis are on the value of F-statistics and the probability. In order to examine the causal linkages between FDI and poverty level, the study, in line with previous studies, considered modified lag 1 specifications of the ARDL model in equation (3) which examined only the regressor, LNFDI, on the dependent variable POV. The study employed pairwise Granger causality tests and statistical significance of the short-run regressors to infer our causality.

Post-Estimation Diagnostic and Validity Tests

The study undertook four diagnostic tests as ways of statistically treating the data as statistical measures to assess the significance of the model under study, which include tests of serial correlation to rule out the likelihood that the error term is uncorrelated (using the Breusch-Godfrey Serial Correlation LM Test), heteroskedasticity to determine whether the error terms' finite variances are constant (from Breusch-Pagan-Godfrey Heteroskedasticity Test, which is a denial of this premise), linearity test for detecting specification errors attributable to variables used (from Ramsey RESET Test), normality test as non-significance of Jarque-Bera test which measures the series' degree of asymmetry, flatness, and peakness (Jarque-Bera Test Statistics), multicollinearity (measured by the centred VIF).

DATA ANALYSIS AND FINDINGS

This chapter presents the estimated results of the equations specified specified in chapter three. The empirical analysis is carried out using ARDL techniques, is presented and discussed herein.

Results of the Stationarity Tests

Stationarity test is carried out to examine the time series properties of the variables over the study period. Specifically, the Augmented Dickey Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests were employed to test if the series are stationary, with the t-statistics and their orders of integration results presented in Table 3 below, and both intercept only and intercept and trend models were used with the lag length being automatic and Akaike information criterion (AIC).. The mix orders of integration at I(0) and I(1) necessitated the adoption of the ARDL bounds testing approach for our analysis.

Table 3: Results of unit root test

Variables	Level		First difference		Decision
	ADF	KPSS	ADF	KPSS	
LNUNE	-1.928	0.106*	-4.433*	0.106*	I(1)
POV	-4.071*	0.071*	-6.677*	0.500	I(0)
LNFDI	-0.719	0.188	-4.329*	0.198**	I(1)
GFCF	-3.389	0.170	-4.055*	0.107*	I(1)
LNGDP	-2.389	0.129*	-4.331*	0.184**	I(1)
LNINF	-2.735	0.103*	-4.671*	0.083*	I(1)
POPG	-0.377	-4.151*	0.174*	0.146*	I(1)

Source: Author's computation (2024) using EViews 12

Note: The stationary tests are carried out at intercept and trend model. The default level of significance is 5%, with values non-stationary except where otherwise stated. *Stationary at 5% level of significance,**stationary at 1% level of significance.

ARDL Bounds Test Results

Following from Table 4, the estimated model are analysed from equation (3) as follows:

Table 4: Diagnostic tests

Bounds test	Statistic	Prob.
Bounds test	5.016	0.000
Adj. R-square	0.624	
F-statistic	52.346	0.000
Serial correlation	2.013	0.159
Heteroscedasticity	1.045	0.433
Linearity test (Ramsey RESET)	0.005	0.942
Normality	7.049	0.029
Stability test	Stable* (CUSUM)	Stable* (CUSUM SQ)

Source: Author's computation (2024) using EViews 12

Note: Coeff. represents coefficient, s.e. refers to standard error, t-stat is t-statistics while prob. is probability. *Figures are illustrated in Figure 4.3a and b.

Bounds test

In the model below (based on Table 4), the bounds test is employed to ascertain the possibility of a long-run relationship with the bounds test statistic of 5.016 being statistically significant at the 5 percent level of significance because the value is greater than the critical values of 2.63 at I(0) and 3.62 at I(1), at the 5 percent significant level, and as well as at 1, 2.5, and 10 percent levels. This implies that there is the possibility of a long-run cointegrating relationship among the variables which leads to the estimation of a long-run and short-run elasticities capturing the potential existence of a long-run relationship between FDI and poverty level.

$$\mathbf{POV_t} = \mathbf{0.737}ln\mathbf{FDI_t} - \mathbf{6.939}ln\mathbf{GDP_t} - \mathbf{40.782POPG_t} - \mathbf{1.305GFCF_t} - \mathbf{0.849}ln\mathbf{UNE_t} + \mathbf{0.183}ln\mathbf{INF_t} + \mathbf{0.479}$$

t-stat:	0.288	-1.125	-1.320	-3.356	-0.305	0.070
prob.:	0.776	0.272	0.199	0.003	0.763	0.944

Adj. R-squared.: 0.638 **F-statistic.:** 28.260 **prob.:** 0.000

The long-run dynamics

The estimated long-run coefficients (or elasticities) for the ARDL model is presented in Table 5, with evidence that increased FDI results in a corresponding increase but insignificant influence on poverty level along with inflation rate that also has positive influence on poverty level, while other variables have negative relationship with poverty level though once again with only domestic investment that is significant in the relatiionship.

FDI is insignificant with 0.007 percent increase in poverty level, while a one percent increase in inflation rate resulted in an increased poverty level of 0.002 percent.

Table 5: Long-run estimates (Depedent variable: POV)

Variable	Coeff.	s.e.	t-stat	Prob.
LNFDI	0.737	2.558	0.288	0.776
LNGDP	-6.939	6.167	-1.125	0.272
POPG	-40.782	30.886	-1.320	0.199
GFCF	-1.305	0.389	-3.356	0.003
LNUNE	-0.849	2.787	-0.305	0.763
LNINF	0.183	2.600	0.070	0.944
@TREND	0.479	0.803	0.596	0.557

Source: Author's computation (2024) using EViews 12

The short-run dynamics

For the short-run scenario, as in Table 6, the coefficient of ECT(-1) of -0.839 suggests that as much as 83.9 percent of the discrepancy between the long-run and short-run is corrected within a year. The result further shows that in the short-run, only domestic investment is significant similar as in the long-run, while FDI exerts an increasing influence.

Table 6: Short-run estimates (Depedent variable: POV)

Variable	Coeff.	s.e.	t-stat	Prob.
D(LNFDI)	0.619	2.164	0.288	0.777
D(LNGDP)	-5.828	5.264	-1.107	0.279
D(POPG)	-34.252	26.115	-1.312	0.203
D(GFCF)	-1.096	0.328	-3.336	0.003
D(LNUNE)	-0.713	2.329	-0.306	0.762
D(LNINF)	0.154	2.179	0.071	0.944
C	195.614	26.859	7.283	0.000
@TREND	0.402	0.687	0.585	0.564
ECT(-1)	-0.839	0.116	-7.235	0.000

Source: Author's computation (2024) using EViews 12

A summary of the long-run and short-run results are presented in Table 7 below:

Table 7: Summary of the findings

Variables	Results
Foreign direct investment (FDI)	Positive but insignificant short- and long-run effects on poverty level.
Domestic Investment	Negative and significant long- & short-run effects on poverty level.
Gross domestic product	Negative but insignificant long- & short-run effects on poverty level.
Inflation	Positive but insignifi-cant short- & long-run effects on poverty level.
Unemployment rate	Negative but insignificant long- & short-run effects on poverty level.
Population growth	Negative but insignifi-cant long- & short-run effects on poverty level.

Source: Author's compilation (2024)

Granger causality analysis

Table 8 summarizes the causality relationships between FDI and poverty level. The results of the Granger causality are as stated as below, and showed that there is no causal relationship between FDI and poverty level. This shows confirmed that FDI is not important to addressing Nigeria's poverty level.

Table 8: Pairwise Granger causality tests results at lag 2 for Model

Null Hypothesis (H_0)	F-stat	Prob.	Decision	Conclusion
LNFDI does not Granger cause POV	1.6150	0.2182	Fail to reject H_0	No causality between
POV does not Granger cause LNFDI	0.8909	0.4224	Fail to reject H_0	FDI and poverty level

Source: Author's computation (2024) using EViews 12

Overall tests of significance

The results of our model show a good fit being above average since it has an adjusted R-square of 63.8 percent, as the explanatory variables explain only about 64 percent of the variation in poverty level for the sample population of 33 over the years 1990 to 2022 though with the implication that as much as 36 percent of the variations in poverty level is left unaccounted for. For the test of our hypothesis, the F-statistics of 52.346 shows that the model is useful in determining the influence of FDI on poverty level in Nigeria as shown by the computed F-statistics which is greater than the tabulated joint significance F-statistics (6,27) valued at 2.46, and it is statistically significant at 5 percent level. For the individual variables, FDI's t-value of 0.288 (< critical value of 1.703, with p-value of 0.015 which also confirms non-significance) at 27 degrees of freedom.

In the overall, FDI does not also have a significant impact on poverty level though with an increasing relationship, therefore concluding in this instance that FDI has no significant impact on poverty level in Nigeria.

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Post-estimation test

In testing for serial correlation, using 'Breusch-Godfrey Serial Correlation LM Test' procedure, the p-value of 0.159 for the model is greater than significance level of 0.05, resulting in the decision to conclude that there is no serial correlation among the regressors. The heteroskedasticity test uses Breusch-Pagan-Godfrey with p-value of 0.433 greater than 0.05 with the implication that there is a strong evidence in favour of the null hypothesis (null hypothesis is homoscedasticity while the alternative is heteroskedastic with $p<0.05$ in favour of the latter), that is, the model is homoscedastic which means that the variances of the residuals are constant and follows the OLS assumption. The test of specification errors uses the Ramsey RESET test with p-value of 0.942 which is greater than the significance level of 0.05 and shows that the model is correctly specified thus there is no misspecification bias or error as the variable is in their correct functional form. The Jarque-Bera statistics value is 7.049 with p-value of 0.029 <0.05, implying that the residuals are normally distributed in first scenario. For the test of multicollinearity, the VIF is employed to each variable which has values in the range $2<VIF<10$, as none has a VIF greater than 10 indicating that there is no multicollinearity among the variables, that is, there is no strong correlation among the independent variables in our regression model.

Findings

The objective of the study was to examine the impact of FDI on poverty level in Nigeria with the findings showing that in the short- and long-run only domestic investment has significant impact on poverty level, a concern that explains the capitalist view of foreign investment as not intended to address local economic problem but to protect own economic interest. This is further implied by the fact that both inflation and unemployment rate are insignificant in the relation. The findings of Topalli et al. (2021) corroborate this research finding. Other scholars like Arogundade et al. (2022) agreed that FDI does not have direct impact on poverty, but domestic factor may indeed be significant.

CONCLUSION

While results on the effect of FDI on economic performance have been mixed, not many have examined the FDI-poverty nexus. To explore this relation, several factors were investigated in the model. It was discovered that FDI indeed, as well as inflation rate exert positive influence on poverty, while domestic investment, GDP, unemployment rate and population growth negatively affect poverty. But the fact that domestic investment is significant shows that as important as it is, there had not been adequate domestic investment by the government to influence the FDI-poverty level relation. The role of FDI has been seen as important to developing countries through human capital development and provision of employment opportunities. We are optimistic that this kind of outcome can be useful to policymakers and researchers

RECOMMENDATIONS AND LIMITATIONS

The following recommendations emanating from the empirical results of this study are suggested in line with our objectives as follows:

(i) The long-run impact of FDI on poverty level is positive, that is, FDI drives up the poverty level of the country along with the destabilizing impact of inflation in the country. Domestic investment needs to be well driven by the government being significant in the model. In the short-run, policymakers should see the need to address inflation as a transition period to make FDI to be able to reduce poverty level in the country.

(ii) It will be interesting to see further studies addressing other foreign capital flows like debt, aid, FPI and remittances, in different contexts (country-wise, panel studies, joint effects, and s on).

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