

Foreign Direct Investment and Economic Growth in Nigeria: An Empirical Analysis



Yaqub J.O. (Ph D)^a, Adam S. L.^b and Jimoh Ayodele (Ph D)^c

^a Department of Economics, Lagos State University, Ojo, Lagos, Nigeria
jyaqub2010@yahoo.com

^b Department of Banking and Finance, Kwara State University, Malete, Ilorin, Kwara State, Nigeria
lukadam2005@yahoo.com

^c Department of Economics, University of Ilorin, Kwara State, Nigeria
dajimoh2003@yahoo.com

Abstract. The integration of Nigeria with the global economy increased since the 1990s with greater inflow of foreign direct investment (FDI). FDI is assumed to benefit a developing economy by supplementing domestic investment, generating employment and through the transfer of technology. Studies on the impact of foreign capital on the Nigerian economy, like those of other developing countries remain inconclusive. Most of these studies ignored the possibility of bi-directional causality between foreign direct investment and economic growth. This paper therefore examines the impact of FDI on economic growth in Nigeria, using Vector Auto-regression (VAR) modelling to capture the structure of inter-relationships among relevant variables. The empirical analysis shows that FDI does not granger cause economic growth. Moreover it could not be established that FDI is a statistically important determinant of real GDP in Nigeria. Growth in real GDP is mostly explained by its own shocks. The implication of this is that the policy linkage between real GDP and FDI is weak and there is need for policy to ensure provision of adequate infrastructure in order to maximise the potential benefit of FDI in Nigeria.

Keywords: Foreign Direct investment, Economic growth, Nigeria, Empirical analysis, Openness.

1 INTRODUCTION

One of the most salient features of today's globalization is the increased flow of capital across the nations. Foreign capital is considered by many countries (especially developing ones) as a major source of resources needed to attain economic growth and development. It is seen as a means of bridging the resources gap inherent in many developing nations. Foreign capital, especially foreign direct investment, is seen as an amalgamation of capital, technology, marketing and management, and thus its role in economic growth and development cannot be overemphasised.

The integration of the Nigerian economy with the global economy increased sharply in the 1990s with the changing economic policies and lowering of barriers to trade and investment. This has led to increased inflow of foreign capital in form of foreign direct investment (FDI) and others. The increased inflows of FDI are expected to result in faster economic growth through trade and investment. Over the years, the inflow of foreign capital to Nigeria has

increased tremendously. It rose from N542.3million in 1981 to N2.01 billion in 2005, with the average growth rate of FDI inflows being 10.8% between 1981 and 2006. Despite the phenomenal inflow of foreign capital to Nigeria over the years, the performance of the economy has been epileptic. The economy has remained monocultural, with oil contributing over 60% of GDP on the average since the 1990 and over 90% of the export. It therefore becomes pertinent to examine the impact of foreign direct investment on economic growth in Nigeria

Although there are plethora of studies linking foreign direct investment to economic growth, on Nigeria, with varying outcome [Oseghale and Amokhienam (1987), Oyinlola (1995) and Akinlo (2005) among others], the results from these studies are not unanimous. Some of the studies fail to capture the fact that there could be bidirectional relationship between foreign capital and economic growth. This study therefore contributes to the existing literature by examining the relationship between foreign capital as reflected by FDI, and economic growth in Nigeria using the vector autoregressive analysis (VAR) method. This method enables us to trace the transmission mechanism of FDI to economic growth. Moreover, it permits us to investigate the direction of causality between FDI and economic growth in Nigeria.

The paper consists of five sections inclusive of the introduction, which is the first section. The second section contains the literature review while the third section presents the data description, sources and methodology of analysis. In the fourth section, the estimation procedures and empirical results are discussed. The fifth section which is the last contains the policy implications and conclusion.

2 LITERATURE REVIEW

The literature is not unanimous on the contribution of foreign direct investment to economic growth. A line of thought in the literature argues that foreign direct investment promotes economic growth through productivity gains and technology transfer. Other channels identified in literature through which FDI exerts positive effect on economic growth are the introduction of new processes, managerial skills and know-how in the domestic market, employees training, international production network and access to market (Caves 1996).

Similarly, the empirical evidence on the effect of FDI on economic growth is mixed. While some studies find positive effect of FDI on economic growth, some concludes that FDI has negative effect on economy of the host countries. Studies such as Singer (1950) and Presbisch (1968) claimed that target countries of FDI receive very few benefit, because most benefits are transferred to the multinational company's country. Those who argued that FDI has negative impact reason that although FDI raises the level of investments and perhaps the productivity of investments, as well as the consumption in host country, it lowers the rate of growth due to factor price distortions or misallocation of resources. Bos, Sanders and Secchi (1974) found the effect of FDI by US companies on the host country's growth to be negative. Their explanation was that the outflow of profit back to the US exceeded the level of new investment for each year for the period examined (1965 -1969). Saltz (1992) found similar results with respect to the third world countries. Bos et al (1974) identified another factor that caused the negative effects of the FDI on growth, which are the price distortions due to protectionism and monopolisation and finally, natural resources depletion.

Although there have been studies on the impact of FDI on economic growth in Nigeria, these studies came up with varying results and conclusions. Aluko (1960), Brown (1962) and Obinna (1983) found positive relationship between FDI and economic growth in Nigeria. However Oyinlola (1995) concluded that FDI has negative effect on economic development in Nigeria using the Chenery and Stout's two-gap model. Akinlo (2004) found that foreign capital has a small and not statistically significant effect on economic growth in Nigeria. None of these studies however, examined the possibility of having bidirectional relationship

between FDI and economic growth. Since economic performance may actually be an important factor in attracting FDI, this study therefore examined this possibility by using the vector auto regressive (VAR) methodology, which does not determine *a priori*, which variable, depends on which.

3 MATERIALS AND METHODS

3.1 Vector Autoregressive (VAR) Models¹

According to Adragi and Allender (1998), VAR models are the best methods for investigating shock transmission among variables since they provide information on impulse response. It has been shown in the literature that any linear structural model can be written as a VAR model (for example see Palm 1983). Hence a VAR model serves as a flexible approximation to the reduced form of any variety of simultaneous structural models. Considering two economic time series Y_{1t} and Y_{2t} , which represent relationship between output (Y_{1t}) and FDI (Y_{2t}), the VAR model with only one lag in each variable (assuming constants are suppressed) would be as below (according to Maddala 1988).

$$\begin{aligned} Y_{1t} &= a_{11}Y_{1,t-1} + a_{12}Y_{2,t-1} + E_{1t} \\ Y_{2t} &= a_{21}Y_{1,t-1} + a_{22}Y_{2,t-1} + E_{2t} \end{aligned} \quad (1)$$

In practice there may be more than two endogenous variables and more than one lag. Assuming the case of K endogenous variables and p lags, the VAR can be written in matrix form as equation 2 below

$$Y_t = A_1Y_{t-1} + \dots + A_pY_{t-p} + E_t \quad (2)$$

where Y_t and its lagged values and E_t are $K \times 1$ vectors and $A_1 \dots A_p$ are $K \times K$ matrices of coefficients to be estimated

Using the two-equation system (1), we can write the system in terms of lags operator (L) as

$$\begin{aligned} 1 - a_{11}L \quad - a_{12}L Y_{1t} &= E_{1t} \\ -a_{21}L \quad 1 - a_{22}L Y_{2t} &= E_{2t} \end{aligned}$$

This gives the solution

$$\begin{aligned} \begin{vmatrix} Y_{1t} \\ Y_{2t} \end{vmatrix} &= \begin{vmatrix} 1 - a_{11}L & -a_{12}L \\ -a_{21}L & 1 - a_{22}L \end{vmatrix} \begin{vmatrix} E_{1t} \\ E_{2t} \end{vmatrix} \\ &= \frac{1}{\Delta} \begin{vmatrix} 1 - a_{22}L & -a_{12}L \\ a_{21}L & 1 - a_{11}L \end{vmatrix} \begin{vmatrix} E_{1t} \\ E_{2t} \end{vmatrix} \end{aligned}$$

¹ This section is adopted from Adebisi (2009).

$$\begin{aligned} \text{where } \Delta &= (1-a_{11}L)(1-a_{22}L) - (a_{12}L)(a_{21}L) \\ &= 1 - (a_{11} + a_{22})L + (a_{11}a_{22} - a_{12}a_{21})L^2 \\ &= (1 - H_1L)(1 - H_2L) \end{aligned}$$

and H_1 and H_2 are the roots of the equation,

$$H_2 - (a_{11} + a_{22})H_1 + (a_{11}a_{22} - a_{12}a_{21}) = 0$$

To have a convergent expansion for Y_{1t} and Y_{2t} in terms of E_{1t} and E_{2t} , $|H_1| < 1$ and $|H_2| < 1$. Once the condition for stability is satisfied, Y_{1t} and (Y_{2t}) can be expressed as a function of the current and lagged values of E_{1t} and E_{2t} .

To produce reliable VAR estimates, variables of the model are required to be stationary hence stationary tests were conducted on the variables of the model. In using the VAR model, the selection of lag order, p , is very essential. Several criteria similar to those used in the distributed lag models are suggested to determine the model dimension (see Judge et al. 1985). This study relies on the Akaike Information Criteria (A.I.C) to determine the optimum lag length. One important result from VAR is the error variance decomposition, which allows us to examine the economic importance of a variable over time. The economic importance of a variable in a VAR model can be measured by considering the size of the sum of the estimated coefficients by means of the forecast error variance. For example, the forecast error variance decomposition of GDP measures the response of the GDP over time in response to a shock to the variables in the model. If most of the variation in GDP can be explained by the lagged values of the GDP itself, one can conclude that lagged variables of FDI are not important in explaining variations in GDP. Besides this, the GDP equation in the VAR is useful for measuring the strength and predictability of the FDI policy linkage and changes in GDP outcomes. If there is a strong and predictable relationship between the FDI and future GDP, then it can be said that the lagged changes in the FDI are economically important and statistically significant in explaining GDP (Tutar, 2002). Four variables were employed in this study namely labour, FDI, real GDP and Openness.

3.2 Nature and Source of Data

The data used in this study are secondary and all of them were obtained from the World Development Indicators 2008 on the WDI CD ROM. FDI is taken as the net inflow of foreign direct investment to Nigeria while GDP is the real gross domestic product measured in 2000 constant price. Labour is measured as total labour force while openness is calculated as the ratio of the sum of import and export to GDP.

4 ESTIMATION PROCEDURE AND EMPIRICAL RESULTS

Unit root test was conducted on the variables to determine the level at which the data are stationary. This is followed by a co-integration test to determine the existence of long term relationship between the variables in the model. The result in each case is discussed below.

4.1 Unit Root Tests

The test for unit root was carried out using the Augmented Dickey Fuller (ADF) method. The results of the test are presented in Table 1 below.

Table 1: Unit Root Test Result

Variable	Trend,	Level	First Difference	Order of
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	Intercept, (T and I)	Critical Values	ADF statistics	Critical Statistics@ 5%)	ADF statistics	integration
OPENNESS	T and I	-3.60	-2.18	-3.60	-5.56	I(1)
LABOUR	T and I	-3.23	-3.37			I(0)
FDI	T and I	-3.60	-14.28			I(0)
GDP	T and I	-3.62	-3.01	-3.60	-5.09	I(1)

Note: Critical value for labour and Capital is at 10%, T stands for Trend and I stand for Intercept, T and I implies the variables are estimated with trend and intercept.. The variables are defined as follows: Open stands for openness, Labour stands for total labour employed

The results in Table 1 above reveal that two of the variables, namely labour employed and foreign direct investment are stationary at level; while the remaining two variables are stationary only after being differenced once.

4.2 Co-integration Test

Since the unit root test results indicated that the variables are integrated of different orders, it is therefore necessary to carry out cointegration test to confirm if there is long-run relationship among the variables in the model. The Johansen Cointegration Test method was employed and both the Trace statistics and the Eigenvalue confirmed the existence of one co-integrating equation (see Appendix). As a result of this we concluded that there is a long run relationship among the variables in the model.

4.3 Granger Causality Test result

Granger Causality test was carried out to determine the direction of causality between the two main variables of interest namely FDI and economic growth. The result of the test is presented in Table 2 below. The result shows that FDI does not granger cause real GDP in Nigeria but rather, real GDP granger cause FDI.

Table 2: Granger Causality Test Result

Sample: 1980 2006

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
GDPREAL does not Granger Cause FDI	25	3.69804	0.04299
FDI does not Granger Cause GDPREAL		0.58293	0.56747

Based on the co-integration and Granger Causality test results presented in Table 2 and appendix 1 respectively, the model was estimated as a Vector Error Correction (VEC) Mechanism. The result of the estimated VEC model is presented in Table 3. Real Capital was dropped from the analysis because it performed badly. From the result in Table 3, the coefficient of FDI is only significant when lagged by two periods. The coefficient is however negative, which is contrary to expectation. This result suggests that FDI may not actually promote output growth in the long run in Nigeria. The coefficients of LAB (at both lags) were found not be significant even at 10% level. This implies that labour provides no information about GDP changes in Nigeria during the period under consideration. The coefficient of

OPENNESS is significant at 5% when lagged by one period implying that more openness in a previous period would promote economic growth.

Table 3: Vector Error Correction Regression Estimates

Error Correction:	D(REAL GDP)	D(FDI)	D(LAB)	D(OPEN)
CointEq1	-0.03 (-1.77)	0.24 (2.01)	-0.00 (-1.08)	0.13 (4.05)
D(GDP(-1))	0.32 (2.09)	2.19 (1.41)	-0.03 (-0.73)	0.91 (2.13)
D(GDP(-2))	-0.26 (-1.05)	0.36 (0.23)	-0.03 (-0.79)	1.51 (3.57)
D(FDI(-1))	-0.08 (-1.39)	-0.18 (-0.53)	-0.01 (-0.91)	0.36 (3.96)
D(FDI(-2))	-0.04 (-2.12)	-0.11 (-0.93)	0.00 (0.13)	0.06 (1.82)
D(LAB(-1))	-0.09 (-0.04)	2.02 (0.17)	0.08 (0.29)	-10.82 (-3.26)
D(LAB(-2))	1.19 (0.62)	13.37 (1.15)	0.14 (0.52)	-5.95 (-1.86)
D(OPENNESS(-1))	0.28 (1.80)	-0.52 (-0.56)	0.03 (1.60)	-1.36 (-5.28)
D(OPENNESS(-2))	0.14 (1.14)	0.22 (0.29)	0.04 (2.31)	-0.76 (-3.56)
C	0.01 (0.15)	-0.44 (-0.88)	0.02 (1.82)	0.43 (3.07)
Adjusted R ²	0.31	0.36	0.65	0.72
Akaike Information Criterion (AIC)	-3.43	-0.18	-7.36	-2.39

Ordering of variables: GDP, FDI, LAB AND OPENNESS

The coefficient of one period lagged GDP is significant at the 5% level. The size of the coefficient of the one period lagged value of GDP shows that highest predictive information about GDP comes from GDP itself. The result supports the existence of inertia in the output growth process in Nigeria.

To throw more light into the analysis, the study further estimated the variance decomposition of real GDP, the results of which are presented in Table 4. The table reports the variance decomposition of real GDP, FDI, Labour and Openness. At the 2-period horizon, 6% of the variance in real GDP is accounted for by FDI shocks and about 1% is due to openness while 93% of variance in real GDP is accounted for by real GDP shocks itself. This implies that in the long run, changes in real GDP are explained by innovations in its own shocks and that FDI and openness have little predictive power over changes in Nigeria.

Table 4: Variance Decomposition of Real GDP

Period	S.E.	GDP	FDI	LABOUR	OPENNESS
1	0.037575	100.0000	0.000000	0.000000	0.000000
2	0.063568	93.45103	5.619262	6.99E-05	0.929633
3	0.079627	92.57296	6.709701	0.000279	0.717059
4	0.095122	91.48761	7.836059	0.165699	0.510635
5	0.109694	88.36924	10.45310	0.602741	0.574922
6	0.122438	86.46620	12.05717	0.925201	0.551430
7	0.135200	85.57160	12.66170	1.228453	0.538246
8	0.147393	84.40628	13.49846	1.485264	0.609996
9	0.158495	83.83094	13.95992	1.597467	0.611677
10	0.169233	83.47445	14.19999	1.709310	0.616249

5 POLICY IMPLICATIONS AND CONCLUSION

5.1 Policy Implications

The results presented and discussed show that the linkage between real GDP and FDI is very weak in Nigeria especially in the long run. This may probably be due to investment reversion as a result of persistent decline in infrastructure. Another reason for the insignificant impact of FDI on economic growth in Nigeria could be due to the fact that FDI inflow is mostly in extractive industry which is subject to the vagaries of international economy.

Studies have shown that the preference of profit motive over developmental motive from the investing country may lead to massive capital flight through profit repatriation from the host country, implying that appropriate transactionary framework must be employed to retain a substantial portion of the FDI attracted in the host country. Insufficient absorptive capacity in terms of inadequate managerial skill and constricted market may also hinder the optimisation of FDI in the Nigeria.

5.2 Summary and Conclusion

This paper examined the relationship between real GDP, FDI and openness in Nigeria for the period between 1980 and 2006 using the vector error correction (VEC) estimation model. In the study unit root test were carried out and it was realised that only labour employed and FDI were found to be stationary at level while real GDP and openness were only stationary after being differenced once. Following the tests, the study estimated the vector error correction model that incorporated real GDP, FDI, labour and openness, which enabled us to trace the transmission mechanism of shocks.

It was observed that FDI, labour employed and openness innovations are not strong and statistically important determinants of real GDP performance in Nigeria, when compared with real GDP shocks themselves. In the short run, innovations in real GDP are mostly explained by their own shocks, with FDI having very little effect on real GDP. The implication of this is that the policy linkage between real GDP and FDI are weak and unpredictable, there is therefore the need to improve infrastructural facilities and put policy in place to check massive capital flight through profit repatriation from Nigeria.

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Yaqub O. Jameelah is a Senior Lecturer in the Department of Economics in Lagos State University. She received her B.Sc. and M.Sc. degrees in Economics from the University of Ilorin and University of Lagos respectively. She has her Ph.D in Economics from University of Ibadan in 2010. She has authored more than 20 journal articles. Her current research interest includes financial innovations and consumers' satisfaction as well as health economics issues. She is a member of Nigerian Economic Society and African Econometric Society.

Lukman Adam holds B.Sc. in Economics and MBA from University of Ilorin and an M.Sc. Economics from University of Lagos. Has extensive experience in financial reporting, commercial banking and strategy development for financial institutions. He taught banking and finance in University of Ilorin where he is now a PhD Research fellow. He is also a Senior Special Adviser to the Governor of Kwara state government on Small and Medium Enterprises (SME) development.

Professor Ayodele Jimoh holds a University of Ife PhD degree in Economics following from a background of a first class honours degree in Economics from Ahmadu Bello University, Zaria, Nigeria and an MSc (Hons) degree in Economics from Queens University Ontario, Canada. He has an extensive experience in banking both at commercial banking and regulatory levels. He provides academic leadership for a wide range of research students and colleagues as a former Head of Department of Economics, University of Ilorin. He is currently the Dean of the Faculty of Social Sciences in the University.

APPENDIX

Cointegration Test Results for GDP, FDI, Labour and Openness

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	Probability
None *	0.77	51.49	47.85	0.02
At most 1	0.32	15.99	29.79	0.71
At most 2	0.24	6.74	15.49	0.61
At most 3	0.01	0.16	3.84	0.69

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

Source: Eviews result from own computation

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	Probability
None *	0.77	35.50	27.58	0.00
At most 1	0.32	9.25	21.13	0.81
At most 2	0.24	6.58	14.26	0.54
At most 3	0.01	0.16	3.84	0.69

Max-eigenvalue test indicates 1 cointegrating equation(s) at the 0.05 level

Source: Eviews result from own computation