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Foreign Direct Investment and Economic Growth in Nigeria: Evidence from Bounds testing and ARDL Models*

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Abstract

This study investigated the relationship between foreign direct investment (FDI) and economic growth in Nigeria. Bounds testing approach and Autoregressive Distributed Lags (ARDL) model were used in model estimation for the period covering 1981- 2013. Results overwhelmingly show evidence that a long run (cointegrating) relationship exists between FDI and economic growth. Our error correction model was negative and statistically significant and had an error correction of approximately %43. In the short run, FDI has a small positive but insignificant effect on growth while in the long run, it has a small negative and insignificant effect. The study also examined the effect of international trade and government's macroeconomic policies on the model and found that while economic policy had no significant effect, international trade had a strong impact on growth. Based on its findings, the study called for a review of our national policy on education to emphasize practical vocational and entrepreneurial skills in order to enhance the productivity of human resources. It also recommended that economic policy be used as a tool to diversify FDI away from the oil sector to the agricultural and manufacturing sectors where there is high potential for job creation and where growth would more easily translate to development.
Keywords: Cointegration, Economic Growth, Error Correction Model, Foreign Direct Investment.
JEL classification: E22, F21.

1. Introduction

There exists some evidence to suggest that there is a close relationship between the movement of international capital and the rate of economic growth.

The motivation for this study is based on the fact that the level of economic activity in a developing economy like Nigeria is greatly influenced by capital investment. Nigeria and other African countries have witnessed increases in foreign capital inflows but unemployment as well as growth without development seems yet untamed. This could probably be because a sizeable amount of these capital inflows come in as portfolio investment which does not necessarily create direct jobs. Additionally we suspect that the direct investment inflows are not made in sectors with the highest job-creating potential such as agriculture (Akinlo, 2004).They are mostly directed to the oil and gas sector where return on investment is higher but which requires highly advanced technical skills for which there is a deficit of local manpower (Oji-Okoro and Huang, 2012).This creates a situation where a significant proportion of manpower for the industry is sourced abroad and the chances for controlling unemployment low. Thus, Foreign Direct Investment (FDI) has not completely benefitted host economies. Also, it has been observed that the entire corporate profits made by these foreign corporations mainly from China, France, Britain, The Netherlands and The United States of America are taken out of the country because such corporations are not listed on the Nigerian Stock Exchange.

A considerable amount of research has been done about the relationship between foreign direct investment and economic growth but co-integration analysis only constitutes a small fraction of these studies. It is therefore, necessary to give further impetus to the study using co-integration analysis.

1.1 Problem

Despite the widely publicized theory linking FDI to economic growth, it is on record that FDI inflows have not really translated to growth in developing nations (Makwembere, 2014). This is surely a cause for concern for policy makers in government in developing nations where annual FDI flow has been substantial in the past decades. The much needed job creation and technology transfer have been sparsely seen in these countries and Akinlo (2004), observed that a probable reason for this could be that most of the multinational companies bringing in foreign capital tend to direct their operations to the extractive or mining sectors which are usually not the major employers of labour.

Also, the bulk of existing literature about the topic of interest relates to research done in economies where FDI is in the manufacturing sector (Akinlo,2004). It thus seems that not much has been done to investigate this topic for an oil-dependent economy like Nigeria.

It is thus necessary for policy makers to have well-tested empirical evidence on this matter as it concerns the researcher's home country of Nigeria.

1.2 Research Questions, Objectives and Hypothesis

In the course of this study we intend to find answers to the following two important questions. Is there a long-run relationship between FDI and economic growth? Does Foreign Direct Investment enhance economic growth?
We hope that our findings will throw more light into the nature of relationship between foreign direct investments and economic growth in Nigeria.
Also, the broad objective of our study is to ascertain the nature of impact that FDI exerts on economic growth in Nigeria. However, we shall specifically be investigating the long-run relationship between FDI and GDP. It is necessary for instance to know if lagged values of foreign investment affect growth positively or negatively.

Our study intends to test the following major hypothesis.
H_0: There is no long-run relationship between FDI and economic growth in Nigeria.
In the event that our test results permit us to reject this hypothesis, it would mean that the variables are indeed cointegrated and a long-run relationship exists. Apart from this, we shall be testing other minor hypotheses relating to unit root and serial correlation.

2. Review of Related Literature

Generally, capital tends to flow into economies where profit potential on businesses and investments is high. Foreign capital investment in an economy usually takes the form of direct investment or portfolio investment.
Foreign direct investment could be viewed as investments in real assets such as lands and buildings in a foreign corporation for the purpose of making profits from business. It could also take the form of at least 10% purchase in the equity capital of a local company. FDI in Nigeria has traditionally been directed to the manufacturing and oil and gas sectors (Ademola, 2013).
According to Dutse (2008), FDI could be seen as a long-term investment by a foreign corporation representing management interest and control in a local firm which is not in the investor's country of origin. He also observed that apart from direct investment of capital to purchase voting stock, it could take the form of mergers and acquisitions or reinvestment of earnings. Foreign Direct Investments (FDI) are usually long-term investments made in the real sectors of the economy which create direct jobs and usually lead to the transfer of technology to local manpower.
Economic growth on the other hand refers to a sustained increase in the level of economic output or Gross Domestic Product (GDP) of a nation in the long-term (Okoro and Atan, 2013). GDP itself captures the total monetary value of all final goods and services produced within the geographical boundaries of a nation by all economically active individuals whether local or expatriate. It represents a good measure of market size and the level of economic activity in a country.

2.1 Global and Regional Trends in Foreign Investment

According to an OECD 2008 report, FDI has since the mid nineties been a major source of external financing for developing economies and has generally out-performed Official Development Assistance. Much of the FDI coming into Africa has historically been channeled to Nigeria for reasons not far from the nation's sheer economic size, large consumer market and her enormous oil and gas resources. In addition, there are large deposits of minerals such as aluminum, zinc, iron ore, limestone, etc and vast areas of arable land for agriculture. Resource rich developing countries in Africa have been known to be among the top FDI destinations (Ramirez, 2000).
Corporations such as Exxon Mobil, Chevron, Shell and Total are among those significantly bringing foreign capital into Nigeria. It is therefore on record that the USA, France, Netherlands and Britain are among the major countries that supply foreign capital to Nigeria and that the bulk of this capital goes into the oil sector (Oji-Okoro and Huang, 2012). Further to this, Akinlo (2004) observed also that much of the inward flowing FDI has been historically directed to the mining sectors of oil and gas.
Also, according to UNCTAD's Global Investment Trends Monitor (2014), there has been an 8% fall in global FDI flows due to uncertainties occasioned by a lull in the global economy, economic sanctions against Iran and Russia and political unrest in Africa (Libya, Nigeria and Central African Republic) and the middle east (Iraq, Syria and Yemen). The total FDI flow in 2014 was approximately U$D1.26 trillion. While FDI flows to developed economies fell by 14% last year to about U$D 511 billion, developing nations experienced a 4% growth in FDI flows, attracting a little over U$D700billion.
Developing economies currently hold a whopping 56% of global FDI flows mainly accounted for by developing Asian economies especially China which at U$D128 billion now receives the largest share of global FDI flows.
Also, UNCTAD's World Investment Report (2014) shows that Africa's FDI receipt decreased by 3% to about U$D55 billion mainly due to the political situation in Libya and the security situation in Nigeria. The report noted that FDI flows to Nigeria has fallen due to concerns about the security situation and the delay in passing the Petroleum Industry Bill (PIB). It also observed that the bulk of Nigeria's flow goes into the oil and gas sector. Despite the security concerns, table 1 below shows that Nigeria still ranks among Africa's top recipient nations.

Table 1. Ranking of inward FDI stock by host country (USD billions)

South Africa	163.5
Nigeria	111.4
Morocco	44.5
Mozambique	13.3
Zambia	12.4
Tanzania	9.2
Uganda	7.7
Ghana	7.1
Namibia	5.8
Madagascar	4.9

Source:UNCTAD World Investment Report 2014.

That FDI boosts a nation's exports, improves infrastructure, stimulates employment generation and ultimately encourages GDP growth is not in dispute (Jenkins and Thomas, 2012). It is however of more importance to understand how FDI stimulates growth so that growth itself would reflect in development.

2.2 Foreign Direct Investment and Economic Growth

Economic literature is replete with research about foreign direct Investment. This is due to its undeniable advantages which include stimulating long term growth and productivity through the transfer of technology which is not available locally and also through the transfer of managerial know how and technical skills to local manpower. This is because most of the FDI come in as partnership between local firms and multinational corporations on various areas of business operations including research and development. In addition, FDI enhances the process of globalizing world economies and enhancing trade (Ramirez, 2000).

However, it has been argued that the benefits of FDI mentioned above are not all that there is to it. It seems though that FDI also comes with some demerits such as the reverse cash flow that it generates in the form of repatriation of profits and payment of dividends to parent companies and transfer pricing (Akinlo, 2004). For these reasons, it has been advocated that recipient nations should while trying to reap the benefits of FDI, keep a close watch on the activities of key firms bringing foreign capital into the economy in order to be able to determine at what point its costs outweigh its benefits. This is especially important when we factor in the concessions made by governments to attract foreign capital (Ramirez, 2000). These concessions include but not limited to assistance to acquire land at little or no cost, waiver of duty on imported capital equipment and sometimes, tax holidays. In any case, whether FDI will positively impact an economy's growth depends on the quality of the financial environment and degree of preparedness of the receiving nation (Oji-Okoro & Huang, 2012).

It is of interest to this study to analyze the debate about the nature and significance of long-run relationship which exists between FDI and economic growth. Some researchers have found empirical proof in support of a strong relationship between these variables while others' findings do not show any evidence of a significant relationship. We take a look at some of the previous research on these variables. Ramirez (2000) investigated the relationship between FDI and growth in his home state of Mexico and found a positive and significant relationship. Also, Jacques (2010) in his study of ten sub-Saharan African nations including Nigeria found a positive long-run relationship among the variables and a bi-directional causality. In addition, Ilemona (2010) conducted a similar study on the Nigerian economy and found a positive, though insignificant effect of FDI on growth. Furthermore, Osinubi *et al* (2010) not only found long-run relation between FDI and growth but also found a strong positive impact of FDI on growth. Finally, Babalola *et al* (2012) found results that are pretty much correlated with those discussed above.

However, some studies have shown a negative relationship between FDI and growth. Alfaro (2003) did a sectoral analysis of the effect of FDI on GDP in a group of countries in Africa, Asia, Europe, North and South America and found that results were inconclusive. Specifically, his results show that FDI and GDP have a negative relationship in the primary sector of the economy, a positive relationship in the Manufacturing sector of the economy and no clear-cut relationship in the service sector. This position was also supported by Akinlo (2004) whose study found a statistically insignificant relationship between FDI and growth in Nigeria. Again, Imoudu (2012) found long-run association between FDI and growth in the agric and manufacturing sectors, though, FDI did not positively impact growth in the petroleum sector. In addition, Omoke (2010) did a study and found no long-run association between growth and investments, even though, he found a bi-directional causality between them which was insignificant. Furthermore, Okoro & Atan (2013) in their study found that FDI does not enhance growth in Nigeria. They found a negative relationship which was statistically significant between FDI and growth in Nigeria.

A possible inference from these studies is that though in economic theory, it is believed that FDI positively impacts growth, empirical results show that FDI could sometimes negatively impact growth. This position is supported by the studies of Akinlo (2004), Okoro and Atan (2013), etc mentioned above and Insah (2013) who found long-run relationship but observed that lagged variables of FDI indeed hindered growth in the Ghanaian economy. We are keen on seeing whether the empirical results from this study will validate this theory or not.

3. Data and Methodology

The estimation and analysis of our models were done using secondary time series data on the variables of interest, measured on annual basis, for the period 1981 to 2013. These were obtained from the databases of the World Bank development indicators 2014.Our study also relied on Eviews version 9 as the principal software of model estimation and used a 5% level of significance for hypothesis testing.

3.1 Bounds Test

Our analysis focuses on investigating the nature of long-run relationship among the variables of interest using Bounds testing of co-integration and autoregressive distributed lag (ARDL) models.

Bounds tests, made popular by Pesaran *et al* (1999), computes a Wald statistic in order to examine the significance of the lagged values of variables in an unrestricted error correction regression (Pesaran *et al*, 1999).

The justification for the selected method of analysis is that unlike the single equation method of Engle and Granger (1987), it allows for the testing of hypothesis about the cointegrating relationship. Secondly, unlike other methods of testing long-run relationships, the Bounds method does not place strict restrictions on the integrating order of the variables. Finally, it is a more efficient procedure for testing cointegration in the presence of small sample size.

Our Bounds testing equation is:

$$\Delta LRGDP_t = \alpha_0 + \sum_{i=1}^{P} \delta_i \Delta LRGDP_{t-i} + \sum_{i=0}^{p} \gamma_{i+1} \Delta LFDIP_{t-i} + \sum_{i=0}^{P} \tau_{i+1} \Delta LGCF_{t-i} + \sum_{i=0}^{p} \theta_{i+1} \Delta LTRADE_{t-i} + \sum_{i=0}^{p} \rho_{i+1} \Delta POPG_{t-i} + \mu_1 LRGDP_{t-1} + \mu_2 LFDIP_{t-1} + \mu_3 LGCF_{t-1} + \mu_4 LTRADE_{t-1} + \mu_5 POPG_{t-1} + \varepsilon_t \quad ---------(1)$$

where $\alpha_0$and ε_t are the intercept and random error term respectively, while Δ is the difference operator for the lagged values of the variables. The short-run relationships are measured by δ, γ,τ, θ, and ρ, while long-run relationships are measured by μs.

The following null and alternative hypotheses are used to do Bounds testing for cointegration:

H_0: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = 0$

H_1:$\mu_1 \neq 0$, $\mu_2 \neq 0$, $\mu_3 \neq 0$, $\mu_4 \neq 0$, $\mu_5 \neq 0$

The null hypothesis indicates the absence of a long-run relationship. The test computes an F-statistic in order to examine the significance of the lagged values of variables in an unrestricted error correction regression (Pesaran, Shin and Smith, 1999). It also computes two asymptotic critical values, the lower bound and the upper bound. The lower bound critical value is based on the assumption that all the causal variables are I(0) while the upper bound critical value assumes that all the regressors are I(1).The null hypothesis of no long-run relationship between the levels of the variables is rejected if the F-statistic is greater than the critical value at upper bound indicating that a long-run relationship exists. On the other hand, the null would not be rejected if the F- statistic is less than the critical value at lower bound, meaning that no long-run relationship exists. If however, this statistic falls between both bounds, the test becomes inconclusive and we will need more information about the order of integration of each of the variables before reliable inferences can be done (Pesaran, Shin and Smith, 1999).

In the second step, long-run and short-run models implied by equation 1 are expressed in equations 2 and 3, respectively:

$$LRGDP_t = \alpha_0 + \mu_1 LRGDP_{t-1} + \mu_2 LFDIP_{t-1} + \mu_3 LGCF_{t-1} + \mu_4 LTRADE_{t-1} + \mu_5 POPG_{t-1} + \varepsilon_t \quad ----------(2)$$

$$\Delta LRGDP_t = \alpha_0 + \sum_{i=1}^{P} \delta_i \Delta LRGDP_{t-i} + \sum_{i=0}^{p} \gamma_{i+1} \Delta LFDIP_{t-i} + \sum_{i=0}^{P} \tau_{i+1} \Delta LGCF_{t-i} + \sum_{i=0}^{p} \theta_{i+1} \Delta LTRADE_{t-i} + \sum_{i=0}^{p} \rho_{i+1} \Delta POPG_{t-i} + \varphi EC_{t-1} + \varepsilon_t \quad ----------(3)$$

The error correction term, EC_{t-1} captures the short-run dynamics while other parameters are as defined for equation 1.

The Bounds method cannot be applied to test long-run association if any of the variables have an order of integration greater than one. Therefore, we shall be investigating the order of integration of our variables using unit root test which is a standard test of hypothesis.

The final part of our analysis will involve doing the diagnostic test of serial correlation on the estimate's residuals using the Breusch-Godfrey test. In addition, we shall test for sensitivity of the estimates.

3.2 ARDL Model Specification

Our study will employ a modified version of the endogenous growth model of Ramirez (2000) who used an augmented Cobb-Douglas production function reproduced below.

$Y = A\, f(L,K_p,E) = AL^{\alpha}K^{\beta}E^{(1-\alpha-\beta)}$ ---------- (4)

Where Y represents real domestic output, A is the efficiency of production while L, K_P and E respectively are labour, private capital stock and the externality from the inflow of foreign capital. Also the sum of α and β is less than one.
This model takes FDI as an integral factor of production and national output. To adopt this model, our study modifies it by splitting private capital into those originating from within the economy through capital formation and those originating from foreign investors. We also use population growth rate as a proxy for the growth rate of Labour whose data are only available from 1990. In addition, we shall be controlling for the impact of macroeconomic policy and international trade. Thus our theoretical model is specified below.

$$RGDP = f(FDI, GCF, POPG, TRADE) \quad (5)$$

Where the dependent variable is real *GDP* and *GCF,LF* and *TRADE* respectively represent gross capital formation, labour force and international trade. Ramirez (2000) rightly observed that it is the stock of FDI not its flow that actually stimulates growth. This means that what goes in as a factor of our production function is the actual stock of FDI in an economy and not its flows which represent changes to stock.

4. Empirical Results

The results of unit root test are presented in Table 2 below. The tests were done using Schwarz Information Criterion.

Table 2:Unit root test

H_0: Series has a unit root

Variable	Level	First diff.	5% Crit. Value	1% Crit. Value	Int. Order
LRGDP	-1.7747	-4.8662	-3.5577	-4.2732	I(1)
LFDIP	-2.6062	-28.297	-3.5577	-4.2732	I(1)
LGCF	-2.2106	-6.0211	-3.5577	-4.2732	I(1)
LPOPG	-1.9666	-3.7218	-3.5577	-4.2732	I(1)
LTRADE	-1.9185	-7.3317	-3.5577	-4.2732	I(1)

Panel (A): Unit root test with constant and trend.

Variable	Level	First diff.	5% Crit. Value	1% Crit. Value	Int. Order
LRGDP	1.7253	-4.1733	-2.9571	-3.6537	I(1)
LFDIP	-2.8532	-9.8778	-2.9571	-3.6537	I(1)
LGCF	-2.9060	-4.8194	-2.9571	-3.6537	I(1)
LPOPG	-1.0099	-4.0571	-2.9571	-3.6537	I(1)
LTRADE	-1.9359	-7.2082	-2.9571	-3.6537	I(1)

Panel (B): unit root test with constant only.

All the series are clearly integrated of order one or I(1) when tested both with constant only and with trend and constant. Since there are no I(2) variables, we are ready for the Bounds test.

4.1 Bounds Test

In order to investigate cointegration, we shall employ the natural logarithm of our variables in
order to reduce or eliminate the effect of dominance caused by the presence of outlying observations. Taking logarithms will not negatively affect our results because a series that is cointegrated in levels will also be cointegrated in log levels (Brooks, 2008).
The table below shows the results of Bounds test.

Table 3: ARDL Bounds Test

H_0: No long-run relationships exist

Dependent Variable	F-stat	%5criticalvalues I(0)	I(1)	k
LRGDP	4.83	3.23	4.35	3

For a Wald statistic clearly greater than the upper bound critical value, we reject the null hypothesis. This suggests that a long-run cointegrating relationship exists among the variables.

4.2 ARDL Estimate and Error Correction Model

ARDLs are dynamic models which incorporate lagged values of the both the dependent and independent variables. An ARDL (2,4,3,3,4) was selected as the most efficient out of 2500 models evaluated as shown below.

Table 4. ARDL estimate Dependent variable: LRGDP Selected model: ARDL (2,4,3,3,4)

Variable	Coefficient	Std.Error	t-stat	P-value
LRGDP(-2)	-0.2765	0.1631	-1.6953	0.1285
FDIP(-4)	0.0294	0.0256	1.1477	0.2843
LGCF(-3)	0.4091	0.1282	3.1904	0.0128
LPOPG(-3)	-20.638	9.9584	-2.0725	0.0719
LTRADE(-4)	-0.0980	0.0870	-1.1261	0.2928

R-squared 0.9979 Adj R-squared 0.9928
F-statistic 195.495 Prob(F-stat.) 0.0000

The estimated model shows that over ninety nine percent of variations in the explained variable is accounted for by the causal variables. In addition, the model shows a strong joint significance. Result of diagnostic check for serial correlation is presented in the below.

Table 6. Diagnostic check .

Breusch-Godfrey serial correlation LM test			
F-statistic	0.6439	Prob	0.4487
Obs R-sq	2.4430	Prob Chi-sq	0.1180

Results show that the null hypothesis cannot be rejected, hence, the model is free from autocorrelation.

Our results show that FDI has a positive impact on economic growth in the short run though the effect is statistically insignificant. The results show that the error correction coefficient is -0.4301 with a p-value of 0.0313. This suggests that the error correction model is statistically significant and about %43 of errors are corrected per period. The cointegrating equation and long run coefficients are specified below

Cointeq= LRGDP – (-0.0399*LFDIP + 0.3468*LGCF + 11.9237*LPOPG + 1.1724*LTRADE +8.3042)

Table 5 Long run coefficients

Variable	Coefficient	Std. Error	t-stat	P-value
C	8.3042	2.6501	3.1335	0.0139
LFDIP	-0.0398	0.1215	-0.3279	0.7514
LGCF	0.3467	0.6068	0.5714	0.5834
LPOPG	11.9236	2.2685	5.2561	0.0008
LTRADE	1.1723	0.5289	2.2164	0.0575

In the long run, FDI has a negative and statistically insignificant impact on growth as shown in table 5 above. Specifically, a %100 change in the lagged value of LFDIP produces approximately %4 change in economic growth.

4.3 Sensitivity Analysis

Here, we attempt an analysis of how our model behaves under varying circumstances. We introduced a control variable ICPI which represents inflation in the economy to observe the effect of macroeconomic policy.

The result of this model shows that a long run cointegrating relationship exists and as before, the error correction coefficient was negative and significant. However, there was thirty percent error correction and FDI also exerted a negative impact on growth in the long run.

This shows that our model was not sensitive to macroeconomic policy or put in another way, macroeconomic policy did not significantly impact our model.

5. Conclusion

It is not encouraging to realize that FDI has an insignificant (or weak) impact on growth in Africa's largest economy especially when we consider the fact that Nigeria ranks among the top three FDI destinations in Africa.

This negative development definitely has policy implications and an understanding of the probable reasons for this ugly situation could be the basis for the formulation of strategic plans meant to turn things around. Our findings are not different from those of Ilemona (2000) and Akinlo (2004) who found a small and statistically insignificant impact of FDI on economic growth in Nigeria. What is even a bigger cause for concern is that after almost a decade since Akinlo's (2004) study, the nation is yet to feel the impact of foreign investments.

We believe that one reason for this ugly trend is that the bulk of foreign investment is in the highly lucrative oil and gas sector which unfortunately is neither a major employer of labour nor integrated into the major economy. Another reason for this is probably that the minimum level of human capital stock required to harness the benefits of foreign investment as argued by Borensztein *et al* (1997) is not available in the country.

5.1 Policy Recommendations

To stem the tide and ultimately change the status quo, we are of the view that first, the government needs to use policy incentives to encourage FDI to the nation's agricultural and manufacturing sectors which are still largely underdeveloped. This is because these two sectors to a great extent, represent the real economy where the potential for job creation is high. The importance of FDI to the development of these sectors lie in the fact that it provides not only the capital but also the technology and development of human capital required to transform them. Secondly, the government needs to review policies on education and the training of human resource. Emphasis should be placed on acquiring practical vocational and entrepreneurial skills which are not only relevant for employment and job creation but also transferable. The researcher strongly believes that if these remedial measures are well implemented, the real economy and Nigerians by implication would be better for it.

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