

Measuring the Impact of Fdi on Economic Growth in Nigeria

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Abstract: This study investigates the impact of FDI on Nigeria's economic growth process. In an attempt to do this, the paper tests the validity of the modernization or depending hypothesis by employing various econometric tools such as Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests, Johansen Co-integration test, the Error Correction Mechanism (ECM) and Granger Causality test on time series data from 1970-2008. The results reveal that a long run relationship exists between the variables and a unidirectional causality from FDI to growth was also established. Thus, empirical findings support the modernization hypothesis that FDI is growth promoting in Nigeria.

Keywords: Co-integration, economic growth, error correction, FDIJEL CLASSIFICATION: F21, F30, F23, 040.

INTRODUCTION

Within policy circles, there is a widespread belief that Foreign Direct Investment (FDI) enhances the productivity of host countries and promotes economic development. This notion stems from the fact that FDI may not only provide direct capital financing, but also create positive externalities via the adoption of foreign technology and know-how (Alfaro *et al.*, 2009). However, the empirical evidence on the existence of such positive productivity externalities is sobering (Alfaro and Rodriguez-Claire, 2004).

During the past two decades, FDI has become increasingly important in the developing world, with a growing number of developing countries succeeding in attracting substantial and rising amounts of inward FDI. Economic theory has identified number of channels through which FDI flows may be beneficial to the host economy. Yet, the empirical literature has lagged behind and has had more trouble identifying these advantages in practice. Most prominently, a large number of applied papers have looked at the FDI- Growth nexus, but their results have been far from conclusive. However, with the availability of better data, the last few years have seen an especially large number of empirical papers devoted to the question (Khaliq and Noy, 2007).

Nigeria as a country, given her natural resource base and large market size, qualifies to be a major recipient of FDI in Africa and indeed is one of the top three leading African countries that constitutently received FDI in the past decade. However, the empirical linkage between FDI and economic growth in Nigeria is unclear, despite numerous studies that have examined the influence of FDI on Nigeria's economic growth with varying outcomes

(Oyinlola, 1995; Adelegan, 2000; Akinlo, 2004; Ayanwale, 2007). Close examinations of previous studies reveal that conscious effort has not been made to take care of the fact that more than 60% of the FDI inflows into Nigeria is directed towards the extractive (oil) industry.

Finally, empirical literature indicates that a country's capacity to take advantage of FDI externalities might be limited by local conditions. Further, there is increasing resistance to further liberalization within the economy. This thus limits the options available to the government to source funds for development purposes and makes the option of seeking FDI much more critical.

This study contributes to existing literature by examining the relationship between FDI inflows and Nigeria's economic growth; hence it addresses the country's specific dimension to the FDI growth debate. The main objective of this study is to examine the relationship between FDI inflows and economic growth in Nigeria by testing the validity of the two contending hypothesis (modernization and depending) hypothesis in Nigeria. While the modernization hypothesis posits that FDI could be growth promoting, the depending hypothesis opine that FDI could have deleterious long term impact on growth. The study considers more scope (between 1970 and 2008) as well as tries to ascertain the long-run sustainability of the FDI- induced growth process in the country.

REVIEW OF LITERATURE AND THEORETICAL UNDERPINNING

Until recently, empirical literatures had perceived FDI has been parasitic and retarding for the development of domestic industries for export promotion. Hence,

research interest in FDI stems from the change of perspectives among policy makers from hostility to conscious encouragement, especially among developing countries. Caves (1996) observes that the rationale for increased efforts to attract more FDI by host countries emerges from the belief that FDI are productivity gains, technology transfers, introduction of new processes, management skills, and know how in the domestic market, employee training, international production networks and access to markets.

Curiously, the empirical evidence of the benefits both at the firm level and at the national level has been ambiguous. De Gregorio (2003), while contributing to the debate on the importance of FDI, notes that FDI may allow a country to bring in technologies and knowledge that are not readily available to domestic investors, and in this way increases productivity growth throughout the economy. FDI may also bring in expertise that the country does not possess, and foreign investors may have access to global markets.

The vast majority of research work on the relationship between FDI and economic growth are not situated in Africa; however, there have been some studies on investment and growth in Nigeria with varying results and submissions. Odozi (1995) reports in his study on the factors affecting FDI inflow into Nigeria in both the Pre and Post- Structural Adjustment Programme (SAP) eras found that the macro policies in place before the SAP were discouraging foreign investors. This policy environment led to the proliferation and growth of parallel markets and sustained capital flight.

Ariyo (1998) studied the investment trend and its impact on Nigeria's economy growth over the years. He found that only private domestic capital consistently contributed to raising GDP growth rates during the period considered (1970-1995). Furthermore, there is no reliable evidence that all the investment variables considered in his analysis have any perceptible influence on economic growth. He therefore suggested the need for an institutional rearrangement that recognizes and protects the interest of major partners in the development of Nigerian economy.

Adelegan (2000) explored the seemingly unrelated regression model to examine the impact of FDI on economic growth in Nigeria and found out that FDI is pro-consumption and pro-import and negatively related to gross domestic investment. Akinlo (2004) found that foreign capital has a small and not statistically significant effect on economic growth in Nigeria.

Furthermore, Odozi (1995) in his examination of the nature, determinants and potentials of FDI in Nigeria noted that foreign investment in Nigeria was made up of mostly Greenfield, that is, it is mostly utilized for the establishment of new enterprises and some through the existing enterprises. Anyanwu (1998) identified changes in domestic investment, change in domestic output or market size, indigenization policy and change in openness

of the economy is the major determinants of FDI. Anyanwu further noted that abrogation of the indigenization policy in 1995 encouraged FDI inflow into Nigeria and that effort must be made to raise the nation's economic growth so as to be able to attract more FDI.

Finally, Ayanwale (2007) in his study on FDI and Nigeria economic growth assert that FDI on communication has the highest potential for contributing to growth; hence, it needs to be properly channeled into the main stream of the economy. He noted that communication FDI's potential contribution is several times more than that of oil FDI.

METHODOLOGY

This study makes use of time series data sourced from statistical Bulletin, Economic and Financial Review and Annual Reports and Statement of Accounts of the Central Bank of Nigeria (CBN) and the Federal Office of Statistics (FOS). The macroeconomic data cover Gross Domestic Product (RGDP) and Foreign Direct Investment between 1970 and 2008.

The model: The model for this study uses Granger causality test to ascertain the direction of causality between GDP and external debt in Nigeria between 1970 and 2008. Other econometric tests such as unit root test, co integration test and error correction mechanism were also performed to determine the stationarity of the data and the long run relationship between the variables. The test procedure as described by (Granger, 1969) is illustrated below:

$$RGDP_t = \sum_{j=1}^K A_j FDI_{t-i} + B_j \sum_{j=1}^K RGDP_{t-j} + U_{it} \quad (1)$$

$$FDI_t = \sum_{i=1}^K C_i FDI_{t-i} + \sum_{j=1}^K D_j RGDP_{t-j} + U_{2t} \quad (2)$$

Equation (1) postulates that current RGDP is related to past values of itself as well as that of FDI and vice-versa for Eq. (2). Unidirectional causality from FDI to RGDP is indicated if the estimated coefficient on the lagged FDI in Eq. (1) are statistically different from zero as a group (i.e. $\sum A_i \neq 0$) and the set of estimated coefficients on the lagged RGDP in Eq. (2) is not statistically different from 0 (i.e. $\sum D_j = 0$). The converse is the case for unidirectional causality from RGDP to FDI. Feedback or bilateral causality exists when the sets of FDI and RGDP coefficients are statistically different from 0 in both regressions (Gujarati, 2004).

Also, the methodology adopted in this study follows the study of Ayanwale (2007). He noted that investment in a foreign country is categorized into two; market-seeking and non-market-seeking, which are both

motivated by characteristics of the host country. The markets seeking investments aim at serving domestic markets by selling goods produced in host markets in those markets. For non market seeking, FDI aim to sell the good produced in the host economy on markets abroad. Since Nigeria is a beneficiary of both types of FDI it will likely influence the nation's economic growth. Although, the evidence for the impact of FDI on economic growth is far from conclusive, there seems to be some agreement as to the main determinants of growth. In the past, two main hypothesis on the influence of FDI on economic growth has been identified; the modernization hypothesis and the depending hypothesis (Ayanwale, 2007).

The modernization hypothesis points that FDI promotes economic growth by providing external capital and through growth, it spreads the benefits throughout the economy. On the other hand, the depending thought insists that there is deleterious long term impact of FDI on growth. However, the foregoing suggests that a general empirical model of FDI on Nigeria's economic growth can be formulated. Hence, following the theoretical discussion above and Ayanwale (2007) specification, the standard long-run growth-FDI function written in logarithm form is presented as:

$$\Delta \ln \text{RGDP} = \beta_0 + \beta_1 \Delta \ln \text{FDI} + \epsilon_i \quad (3)$$

where, \ln is natural logarithm, RGDP is the real gross domestic product. A proxy for growth, FDI is the foreign direct investment, β_0 is the constant term β_1 is the slope while ϵ_i is the error term. The neoclassical aggregate production function (Ram, 1985) serves as a basis for the above postulated equation. Also, on the basis of the earlier discussion, the expected sign for the efficiency of FDI is positive according to the modernization hypothesis i.e., $\beta_1 > 0$.

RESULTS AND DISCUSSION

In modeling the Growth-FDI relationship, each of the series entering the model is estimated to determine whether it is stationary and the order of their integration. The results of the Augmented-Dickey Fuller (ADF), Dickey and Fuller (1979) and Philips-Peron (PP) unit roots tests are reported in the Table 1:

The test result in Table 1 reveals the presence of unit root in the properties of each series at their respective levels. However, after taking their first differences, the ADF test statistics reveals stationary in the series. The PP test on the other shows level stationarity in $\ln \text{RGDP}$ while $\ln \text{FDI}$ is stationary at its first difference. The level of significance for the tests is given at 1%.

Studies have shown that these tests lack power in small samples; however, other studies give more credence to the PP test because of its validity even if the disturbances are serially correlated and heterogeneous while the ADF tests require that the error term be serially uncorrelated and homogeneous. Despite the shortcomings of these tests, we cannot over-emphasize their importance for empirical modeling because they show the order of integration among variables. Given the unit-root properties of the variables, we proceeded to establish whether or not there is a long-run co-integrating relationship among the variables by using the Johansen full information maximum likelihood method (Johansen and Juselius, 1990; Johansen, 1995).

The result of the co-integration test is presented in Table 2. The result reported for the trace test and maximum eigen value statistics shows that the null hypothesis of no co-integrating relation linking $\ln \text{FDI}$ and $\ln \text{GDP}$ is rejected at the 5% level of significance. The two tests indicate one co-integrating equation between the two series.

Table 1: Unit root test result (1970-2008)

Variables	Levels		First differences		Order of integration	
	ADF	PP	ADF	PP	ADF	PP
$\ln \text{RGDP}$	-2.437421	-5.353636	-4.455327	-	I(1)	I(0)
$\ln \text{FDI}$	0.165695	0.183199	-4.598377	-8.234240	I(1)	I(1)
Critical values						
1%	-3.639407	-3.626784	-3.653730	-3.639407		
5%	-2.951125	-2.945842	-2.957110	-2.951125		
10%	-2.614300	-2.611531	-2.617434	-2.614300		

Table 2: Johansen maximum likelihood co-integration test result (1970-2008)

Panel A: Maximum eigenvalue and trace tests

Hypothesized No of CE(s)	Eigenvalue	Max-eigen statistics	5% critical value	Prob.	Trace statistics	5% critical value	Prob.
None*	0.453690	19.34617	14.26460	0.0072	19.69615	15.49471	0.0109
At most 1	0.010877	0.349977	3.841466	0.5541	0.349977	3.841466	0.5541

*: Indicates rejection of the null hypothesis at 5% significance level

Table 3: Error correction model result (1970-2008)

Variable	Coefficient	t-statistic	Probability
Constant	0.027837	3.800068	0.0010
D(GDP(-1))	0.330915	5.980689	0.0000
D(GDP(-4))	-0.122017	-2.324299	0.0302
D(FDI)	0.014628	0.781707	0.4431
D(FDI(-2))	-0.034290	-1.842107	0.0796
D(FDI(-4))	-0.042218	-2.281505	0.0331
ECT(-1)	-0.035893	-1.406184	0.1743

R-squared: 0.776896; F-statistics: 12.18778; Adjusted R-squared: 0.713152; Probability (F-stat.): 0.000007; Akaike Info Criterion: -4.345781; Schwarz Info Crit.: -4.012730

Table 4: Granger causality test result (1970-2008)

Lags: 4		
FDI does not granger cause GDP	3.19307	0.03387
GDP does not granger cause FDI	1.65918	0.19698

Dynamic error correction specification: So far, the result of the co-integration shows that the variables in the specified model tend to move together in the long-run. The short-run deviations from this relationship could occur due to shocks to any of the variables. The short-run interaction and adjustment to long-run equilibrium between the variable is obtained through the Engle-Granger method. According to Engel and Granger (1987), if co-integration exists between non-stationary variables, then an error-correction representation of the type specified by equation below exists for these variables.

$$\Delta InRGP_t = \sum_{i=1}^{k=1} \delta_1 \Delta InRGP_{t-i} + \sum_{i=1}^{k=1} \delta_2 \Delta InFDI_{t-i} + \delta_3 ECT_{t-1} + \mu_t \tag{4}$$

ECT_{t-1} is the error correction term, which is the fitted residuals from the co-integrating equation and μ_t is a white noise error term.

The error correction term shows how the system adjusts to the long-run equilibrium implied by the co-integration equation. In choosing the optimal lag for the right-hand side variable, the general-to-specific method of eliminating insignificant lags is employed. Accordingly, we initially estimated an error correction model with four lagged differences in the explanatory variables, one constant term and one Error Correction (ECT_{t-1}) term. The dimension of the over-parameterized model was then reduced to a parsimonious ECM specification by using sequential F tests, Akaike information criterion and Schwarz information criterion to exclude the statistically insignificant lags. The result of the reduced short-run dynamic model is presented in Table 3. As expected, the Error Correction Term (ECT_{t-1}) is of the expected negative sign and highly significant. This result substantiates the finding of the co-integration test earlier reported more

importantly, the absolute value of the coefficient of the error correction term indicates that 4% of disequilibrium in growth is offset by short-run adjustment each year.

The result further shows that RGDP is influenced by its previous period values as well as current and previous values of foreign direct investment. The coefficient of determination (adjusted r-squared) used to measure the goodness-of-fit of the estimated model, indicates that the model is accurate in prediction as it shows that 71% of variation in the endogenous variables is accounted for by the included explanatory variables. The probability value of the F-statistics further revealed that there is joint significance of the explanatory at 1% level.

Causality test:

The Granger causality test as shown in Table 4 is carried out to determine causality between $InRGDP$ and $InFDI$. The test result shows that the null hypothesis that $InFDI$ does not Granger cause $InRGDP$ is rejected at 5% level of significance. While the null hypothesis that $InGDP$ does not Granger cause $InFDI$ is accepted. This implies that a unidirectional causality emanates from foreign direct investment to real GDP. This thus explains that an increase in amount of foreign capital inflow could lead to an increase in the growth of the economy.

CONCLUSION AND POLICY IMPLICATION

The objective of this study is to explore the relationship between FDI and GDP growth in Nigeria by testing the validity of modernization or depending hypothesis in the pre-policy reform (Structural Adjustment Programme) and post-policy reform era in Nigeria. The findings of the study support the modernization hypothesis and this indicates that FDI contributes positively to Nigeria's economic growth despite the structural change in the flow of FDI to the economy.

However, there is a strong need for the improvement in the nation's business environment in order to attract more foreign investors, by consciously curbing corruption through intensified and improved efforts of the two anti-graft agencies (EFCC and ICPC). Further, there is need to liberalize and improve the energy sector, such that adequate electricity is supplied to organizations at lower cost in order to reduce the cost of doing business in the country to the minimum.

Finally, there is a critical need for the integration of the nation's human resources through improved education and training to enable them contribute significantly into the growth process especially by competing with their foreign counter-parts that invest in home country. The availability of high quality personnel in the country will motivate and foster the inflow of foreign capital into the domestic economy.

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