The Determinants and Impacts of Foreign Direct Investment in Nigeria

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Abstract

This paper examines the determinants and impact of FDI in Nigeria from 1970 through 2009. As a tool for economic development and means of bridging the gaps between the rich and poor nations, emerging economies grant special incentives to attract FDI, but the empirical literature is controversial about the effect of FDI on the growth and development of emerging economies. This study utilizes the Vector Error Correction Model (VECM) to examine this issue. Granger causality methodology was used to analyze and establish the nature of relationship (if any) between FDI and its determinants on one side and economic development on the other. Our empirical analysis reveals that macroeconomic variables (exchange rate, interest rate, inflation) and openness of the economy are among the major and important factors that determine the inflow of FDI into Nigeria during these periods. The GDP and government size exhibited positive but insignificant influence on FDI. The analysis revealed the presence of a long-run equilibrium relationship between FDI and GDP, but FDI does not have any significant effect on the growth as well as the development of Nigeria economy during this period. The study therefore recommends that government should ensure stable macroeconomic policies (as motivating factor for the attraction of FDI into Nigeria) and also increase its expenditure in the area of infrastructural development as ways to accelerate the growth of Nigerian economy which will reduce the excessive dependence of Nigeria on FDI.

Keywords: FDI, economic growth, VECM, granger causality, openness, Nigeria

1. Introduction

Economic growth as explained by the neoclassical growth theory emanates from increases in the quantity of factors of production as well as the efficiency in their allocation. In a simple world of two factors (i.e. labour and capital), it is known fact that developing economies (such as Nigeria) have abundant manpower but scarce capital due to shortage of domestic savings mobilization which places limitations on capital formation and economic development. Even when domestically generated capital and manpower are in abundant supply, increased production may be constrained by shortage of foreign input (machines) upon which manufacturing of goods and services in developing economies depend. This therefore makes international capital flow an important aspect of the efforts by developing countries to close their investment - savings gap.

According to Montiel and Reinhart (2002), one important component of international capital flows is the Foreign Direct Investment (FDI) which refers to movement of financial and human capital from abroad for investment in another country. This type of capital can be owned by an individual, a corporate body or a government. Basically, the common denominator of FDI is that a foreign firm or individual must have controlling equity shares of such firm. Perceived from either the meaning or rationale for FDI as seen from the foregoing, there is little or no doubt that FDI directly augment the real resources available for production in the host country. Indeed, the opinions in literature is that FDI is "a good cholesterol" necessary for closing the existing investment - savings gap in developing economies. While the presence of market failures fortifies government intervention in internalization of production, such intervention may equally be necessary to boost the economic effectiveness of FDI in most host economies. Based on this, attraction of FDI into developing economies (such as Nigeria) is usually premised on the implicit assumption that greater inflow of FDI will accelerate the level growth and development (measured by GDP) and mobilization of domestic capital as well as improvement in the balance of payments. Besides, FDI stimulates product diversification through investments into new businesses,

stimulates employment generation, increase wages and accelerate declining market sectors of the host economies (Aremu, 2003).

It is in view of the foregoing reasoning that it becomes reasonable to argue that developing countries that are desirous of achieving rapid and sustainable economic growth may find wisdom in formulating and implementing appropriate policies and programmes that tend to facilitate the enthronement of investment-friendly environments. Oaikhenan and Ughulu (2006) persuasively argued that investors generally perceived an economic environment as investment friendly when there exists tax incentives, export promotion, correct macroeconomic policies and a polity in which the safety of lives and property is reasonably guaranteed. Also see Iyoha (2001) and (2009) on this.

The efforts by several African countries to improve their business climate stems from the desire to attract FDI. In fact, one of the pillars on which the New Partnership for Africa's Development (NEPAD) was launched was to increase available capital inflow into the continent through a combination of reforms, resource mobilization and conducive environment for FDI (Funke and Nsouli, 2003). Nigeria as a country, given her vast natural resources base and large market size, qualifies to be a major recipient of FDI in Africa. However, the level of FDI attracted by Nigeria is low compared with the resource base and potential need (Asiedu, 2002, 2003). Further, the empirical linkage between FDI and economic growth in Nigeria is yet unclear despite numerous studies that have examined the influence of FDI on Nigeria's economic growth with varying outcomes (Oseghale and Amonkhienan, 1987; Odozi, 1995, Adelegan 2000; Iyoha 2001, and Akinlo, 2004). However, it is pertinent to note that the relationship between FDI and growth varies from one period to the other especially in a volatile economy such as Nigeria with high level of unstable macroeconomic variables. Given the potential importance of FDI to growth, this study investigates the economic determinants and impacts of foreign capital flows to Africa using Nigeria as case study.

2. The Review of Related Literature

An extensive body of both theoretical and empirical studies on Foreign Direct Investment (FDI) exists in the literature. Most of such studies focus mainly on why firms want to become multinationals; but, there is dearth of studies on where multinational corporations want to invest their capital. Rascuite (2006) argues that local market, political, economic, legal environment and macroeconomic variables stability are among the important factors that determine where and how most multinationals channel their investments.

FDI is an investment made to acquire a long term ownership and controlling interest (at least one-tenth of the equity) in firm operating outside the investors' own country (World Bank, 1996). Asiedu (2005), Dupasquier and Osakwe (2005), Todaro and Smith (2004) perceives FDI as involving much more than the channeling of capital or the creation of a firm in an emerging economy, it involves movement of technical know-how, culture, taste, diversity and cutting-edge business practices. Caves (1996) opines that the reasons for attracting more FDI is based on the fact that FDI impact positively on the developmental challenges of host economies. Findlay (1978) postulates that FDI increases the rate of technological development in most emerging economy through a "contagion" effect from the technology and business practices adopted by multinational corporations. As a motivating factors, host economy's governments usually provide special incentives and enabling environment to encourage multinational companies to establish firms in their countries.

Despite the rationale behind FDI, particularly those located in developing economies, some studies such as Sadik and Bolbol (2001) discovered that emerging economies should be careful of overdependence on the benefits of FDI as means of ensuring economic development. It is sometimes questioned whether FDI contributes to the broader aspects of economic growth as well as reinvestment of income in host economies. Besides, the presence of foreign firms can affect the efficiency of local industry (refer to as adverse spillover argument) (Blomstrom and Kokko, 1998). This argument tends to be more tenable when the multinational corporations are producing for the host country's market. Aitken, Harrison and Lipsey (1999) showed for example, that the entry of foreign firms disturb the existing market equilibrium in the host country, which constrained the production capacity of local industry; and further increase their cost of production. This eventually leads to net domestic productivity decline despite the technological transfer from multinational companies.

2.1 Empirical Literatures

The extant literature is dominated with several studies on the impact of FDI on emerging economies (with special focuss on Nigeria). Ezirim, Emenyeonu and Muoghalu (2006) studied the determinants of FDI in Nigeria and found that FDI relates positively with exchange rates, inflation rates, and expected rates of return on investments; contrariwise, FDI relates negatively with the rate of economic growth, interest rates, socio-political index, taxation and previous FDI. Based on these results, Ezirim *et al* (2006) conclude that FDI occur in order to

exploit the benefits associated with exchange rate depreciation, persistently rising price level and market imperfections in their quest for maximum profits in the host economies.

Ariyo (1998) observes the impact of FDI on Nigeria's economic growth and discovered that only domestic investment contributed to raising GDP growth rates during the period 1970-1995. Adelegan (2000) explored the seemingly unrelated regression model to examine the impact of FDI on economic growth in Nigeria and found 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 statistically insignificant effect on economic growth in Nigeria.

Amadi (2002) examined the impact of the macroeconomic environment on foreign direct investment in Nigeria using the ordinary least square regression technique for the period 1970-1997. While some macroeconomic variables such as GDP per capita, interest rate and exchange rate had significant and very strong influence on FDI, others variables like inflation rate, unemployment record had weak relationship with FDI. The study concluded that macroeconomic environment plays a vital role in determining the volume of FDI inflows. Using the co-integration technique, Salako and Adebusuyi (2001) examined the empirical determinants of FDI in Nigeria. Their results indicated that exchange rate, infrastructures development and credit to the domestic economy were some of the main factors that influence FDI flows to Nigeria. It was also observed that FDI was sensitive to domestic interest rate and real per capita income while there is need to maintain political stability in order to attract FDI to Nigeria.

Anyanwu (1998) identified change in domestic investment, change in domestic output or market size, indigenization policy and change in openness of the economy as major determinants of FDI. He further noted that the 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.

There may be no gainsaying the fact that the extensive review of the literature, as demonstrated from the foregoing reveals that the studies and discussion on the determinants of FDI and its impact on economic growth will continue for a long time due to the perceived benefit of FDI on host economies. However factor determining FDI inflows as well as its impact seems to be country and period (time) specific and can have beneficial, adverse or insignificant effects depending on the existing conditions in the host economy. This study therefore aims at examining the determinants as well as the impact of FDI in Nigeria economy between 1970 and 2009.

2.2 Theoretical Framework

The neoclassical and endogenous growth models can be considered as a theoretical foundation for FDI led economic growth hypothesis of a country. The neoclassical growth theories assume that FDI can channel required funds to the productive sectors of a capital deficient economy which, in turn, would help to increase the economic growth rate by increasing the marginal productivity of capital. In other words, the neoclassical perspective is based on a basic principle in economics which suggests that economic growth requires capital investment in the form of long-term commitment (Adams, 2009). The neoclassical economists also view FDI as more reliable and less volatile sources of capital for the developing economies that can augment economic growth (Blomstorm *et al* 1994, Borenzstein *et al*, 1995, Balasubramanyam *et al* 1996, lipsey 1999, Moosa & Cardak 2006). On the other hand, the endogenous growth theories state that the long-run growth of a country is not only influenced by the volume of physical investment but also depends on the efficiency of utilizing investment. Therefore, endogenous growth model have focused on incorporating organizational, managerial, technical and human skills, innovation and technological progress, and accumulation of knowledge endogenously in the growth theories that are often brought by FDI (Romer 1986, Lucas 1988, Mankiw *et al* 1992, Pugel 2007). In the endogenous growth model, the long-run economic growth is viewed as depending on the level of technological development arising from technology transfers and knowledge spillovers (Grossman and Helpman 1991, Romer 1994, Nair Reichert and Weinhold 2001).

The argument that FDI is positively correlated with economic growth is situated in growth theory that emphasizes the role of improved technology, efficiency and productivity in promoting growth (Lim, 2001). Besides, Dunning (1994) also proposes the eclectic theory of FDI which states that firm must possess some absolute advantages over other firms in the area of the firm's core competence like technology and trademarks. These core competence are most effective when combined with local input abroad thus, providing rationales for FDI.

The dependency theory which comprises of neo-Marxist and structuralist theories, flourished between the 1960s and 1980s. It seeks to achieve more equal wealth, income and power distributions through self reliant and collective action of nations (Yakubu, 2005). The theory saw the cause of underdevelopment primarily in exploitation by the industrialized nations. Its major contribution to the FDI studies was its focus on the

consequences of FDI in developing countries and its critical analysis of western development paradigms that regards FDI as explicitly positive. Based on these theoretical postulations, this study analyzed the determinants and impacts of FDI from the investors and host countries perspectives.

3. Methodology and Empirical Design

3.1 Variables Description

Data analyzed for this study were those significant in the attraction of FDI into the host countries, as well as those relating to the measurement of the impact of FDI in the host countries over the years. The data and their relationships are defined thus:

(a) *The Real Gross Domestic Product (RGDP):* This is usually employed to denote market size, which is indicative of the level of economic activity. A large market size is suggestive of a prosperous business climate and hence serves as a factor attracting foreign investors in one hand, and a means of measuring the impact of foreign investment in the host countries on the other hand.

(b) *Foreign Direct Investment (FDI):* Capital investment (other than portfolio investment) made to acquire a long term controlling interest in a firm operating in another country other than that of investors' country.

(c) *Openness of the economy (OPN):* This is the ratio of trade (imports and exports) to GDP. This is one of the pull factors that influence FDI flows to host countries.

(d) *Government size (GSIZ):* This is measured as the ratio of government consumption to GDP. It is expected to bear a direct relationship to economic growth and FDI because a higher level of government consumption should translate into provision of social infrastructure that should encourage production, growth and FDI.

(e) *Return on Capital (INTR):* In this study, this connotes the interest rate paid on deposits by banks in Nigeria. FDI will get to countries that pay a higher return on capital, which is indicative of a higher level of productivity and economic growth.

(f) *Inflation Rate (INF):* This measures the rate of change of the price level and the purchasing power of the host country currency. High inflation rate have negative and significant impact on economic growth and FDI.

(g) *Exchange Rate (EXR):* This measures the price of one currency in terms of another currency. In this study, the exchange rate of Nigeria (Naira) to USA (Dollar) is adopted. A weak/depreciated exchange rate makes import expensive and export cheap, and hence may likely impact positively on FDI. All these data have been gleaned from the Central Bank of Nigeria (CBN) statistical bulletin and National Bureau of Statistics (NBS) official publications.

3.2 Models Specification

This paper seeks to trace the relationship between Foreign Direct Investment (FDI), Real Gross Domestic Product (RGDP), Government Size (GOVSIZ), Trade Openness (OPN), Exchange Rate (EXR), Inflation Rate (INF) and Interest Rate (INTR) in a bi-directional manner with emphasis on *the determinants* of FDI and *the impact* of FDI on economic growth (RGDG) in the context of Nigerian economy for the years 1970 through 2009. As part of the methodological design, the basic estimating equations in log linear form are specified as follows:

$$LNFDI \ = \ \alpha_0 + \alpha_1 LNRGDP + \alpha_2 LNGOVSIZ + \alpha_3 LNOPN + \alpha_4 LNEXR + \alpha_5 LNINF + \alpha_6 LNINTR \qquad (1)$$

where: α_0, α_1 - α_6 are parameters to be estimated

e_t is stochastic error term assumed to be independently and identically distributed

In order to execute the empirical design, the nature of the data distribution is examined using the descriptive statistics (mean, median, standard deviation, skewness and kurtosis) while the normality of the data distribution is ascertained by the Jarque Bera test. The time series property of each variable is investigated through the Augmented Dickey-Fuller (ADF) test for the unit root following Dickey and Fuller (1981). The Phillips-Perron (PP) test is also used to confirm the ADF test following Phillips and Perron (1988). The general form of ADF and PP test is estimated in the following forms.

$$ADF \ :\rightarrow \Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \sum_{t=1}^{n} \alpha Y_i + \delta_t + e_t \qquad (2)$$

$$PP :\rightarrow \Delta Y_t = \alpha_0 + \alpha_i Y_{t-1} + e_t \qquad (3)$$

Where Y is a time series, t is a linear time trend, Δ is first difference operator, α_0 is a constant, n is the optimum number of lags in the dependent variable and e_t is a random error term.

In order to solve the spurious regression problem and violation of the assumptions of the classical regression model, cointegration analysis is used to examine the longrun relationship between $LNFDI_t$, $LNRGDP_t$, $LNOPN_t$, $LNEXR_t$, $LNINF_t$, $LNINTR_t$ and $LNGOVSIZ_t$. To test for cointegration, Johansen-Juselius test (Johansen-Juselius, 1992, 1999) is used. In order to know the disequilibrium error, equation (1) is re-written as

$$e_t = LNFDI_t - \alpha_0 - \alpha_1 LNRGDP_t - \alpha_2 LNGOVSIZ_t - \alpha_3 LNOPN_t - \alpha_4 LNEXR_t - \alpha_5 LNINF_t - \alpha_6 LNINTR_t \qquad (4)$$

The order of integration of the estimated residual, e_t is tested. If there is a cointegrating regression, then the disequilibrium errors in equation (4) form a stationary time series, and have a zero mean, the e_t should be stationary, I(0) with $E(e_t) = 0$.

The longrun equilibrium may be rarely observed but there is a tendency to move towards equilibrium. Thus, Error Correction Model is used to represent the longrun (static) and short run (dynamic) relationships between FDI and other variables. Accordingly, Vector Error Correction Model (VECM) is suitable to estimate the effect of FDI on other variables especially RGDP on FDI. Thus, equation (5) represents Error Correction Model.

$$\Delta LNFDI_t = lagged\ (\Delta LNRGDP_t, \Delta LNOPN_t, \Delta LNEXR_t, \Delta LNINF_t, \Delta LNINTR_t, \Delta LNGOVSIZ_t) - \lambda e_{t-1} + \mu_t \qquad (5)$$

Where e_{t-1} represents the residual term at t-1 in long term.

Vector Error Correction Model (VECM) is a test for whether the long run relationship exists in equation only. Following the work of Onafowora (2003), Gomez and Alvarez-Ude (2006). The Johanson-Juselius test is used to perform hypothesis tests about the number of the longrun relationship which exists in equation. The cointegration test under the Johansen (1992, 1999) uses a vector specification error correction introducing k lags as follows:

$$\Delta Y_t = \alpha + bd_t + \pi Y_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta Y_{t-1} + e_t \qquad (6)$$

Where, Y_t is a vector of order (2x1) variables integrated of order one. The cointegration test in two stages test is based on estimating the following regression:

$$X_t = \alpha b p_t + \mu_t \qquad (7)$$

$$\Delta \mu_t = C \mu_{t-1} + \sum_{i=1}^{k} di \Delta \mu_{t-1} + \theta_t \qquad (8)$$

Where: X_t and P_t respectively denote the logarithm of FDI and other variables

K is the number of lags

U_t and θ_t are error terms

On the evidence of cointegrating relationship, a vector error correction model (VECM) is estimated to model the long run causality and short run dynamics. The purpose of VECM model is to indicate the speed of adjustment from the short run equilibrium to the long run equilibrium state. The greater the coefficient of the parameter the higher the speed of adjustment of the model from short run to long run. Considering our base equation (1), the VECM model is specified as follows:

$$\Delta LNFDI_t = \alpha_0 + \alpha_1 \sum_{t=1}^{n} \Delta LNFDI_{t-1} + \alpha_2 \sum_{t-1}^{n} \Delta LNRGDP_{t-1} + \alpha_3 \sum_{t=1}^{n} \Delta LNEXR_{t-1} + \sum_{t=1}^{n} \Delta LNINF_{t-1} +$$

$$\alpha_4 \sum_{t=1}^{n} \Delta LNINF_{t-1} + \alpha_5 \sum_{t=1}^{n} \Delta LNINTR_{t-1} + \alpha_6 \sum_{t=1}^{n} \Delta LNOPN_{t-1} + \alpha_7 \sum_{t-1}^{n} \Delta LNGOVSIZ_{t-1} + \beta_i ECM\ (-1) + \varepsilon_t \qquad (9)$$

Where ε_t is the error term, ECM(-1) is the error correction term, β_i captures the long run impact. The short run effects are captured through the individual coefficients of the differenced terms (α) while the coefficient of the ECM variable contains information about whether the past values of variables affect the current values. The size and statistical significance of the coefficient of the ECM measures the tendency of each variable to return to the equilibrium. A significant coefficient implies that past equilibrium errors play a role in determining the current outcomes.

In order to determine whether changes in one variable is a cause of changes in another, we employed the Granger (1988) causality test which is a method of investigating whether A causes B. Variable B is said to be

Granger-caused by variable A; if A helps in the prediction of B or if the coefficients on the lagged A's are statistically significant. The main idea of causality is quite simple, if A causes B, then changes in A should precede changes in B (Pindyck and Rubinfield 1998). Since the time series variables are found to be stationary, the Granger causality test is performed as follows:

$$\Delta Y_t = \alpha_1 + \beta_{11}\Delta Y_{t-1} + \beta_{12}\Delta Y_{t-2} + ... + \beta_{1n}\Delta Y_{t-n} + y_{11}F_{t-1} + y_{12}F_{t-2} + ... + y_{1n}F_{t-n} + \varepsilon_{1,t} \qquad (10)$$

$$Ft = \alpha_2 + \beta_{21}F_{t-1} + \beta_{22}F_{t-2} + ... + \beta_{2n}F_{t-n} + y_{21}\Delta Y_{t-1} + y_{22}\Delta Y_{t-2} + ... + y_{2n}\Delta Y_{t-n} + \varepsilon_{2,t} \qquad (11)$$

Where n is a suitably chosen positive integer; β_j and y_j, j = 0,1… k are parameters and α's are constant, while U_t's are disturbance terms with zero means and finite variances. (ΔY_t is the first difference at time t of the time series variables).

4. Empirical Results

4.1 Descriptive Statistics

Table 1. Descriptive statistics

	LNEXR	LNFDI	LNGOVSIZ	LNINF	LNINTR	LNOPN	LNRGDP
Mean	1.938334	9.956591	-2.753569	2.688512	2.76057	-0.73129	10.08975
Median	2.04225	9.316251	-2.61981	2.609962	2.91935	-0.75492	9.405616
Maximum	5.003141	12.95673	-1.723325	4.287716	3.58602	-0.12522	15.16089
Minimum	-0.6044	6.91095	-4.396723	1.163151	1.79176	-1.53479	5.947221
Std. Dev.	2.205446	1.995436	0.748698	0.748418	0.43587	0.3154	2.74807
Skewness	0.138542	0.108592	-0.831282	0.300241	-0.13358	-0.42818	0.359877
Kurtosis	1.393158	1.457491	2.785198	2.455117	2.02222	2.6616	1.7939
Jarque-Bera	4.431194	4.044172	4.68377	1.095793	1.71238	1.41309	3.287875
Probability	0.109088	0.132379	0.096146	0.578165	0.42478	0.49335	0.193218
Observations	40	40	40	40	40	40	40

The variables under study are found to be normally distributed as shown in Table 1. The mean to median ratio of each variable is approximately one. The standard deviation of each variable is also low (except for LNEXR), compared to the mean showing a small coefficient of variation, while the range of variation between maximum and minimum is also reasonable. The coefficient of symmetry (skewness) of each variable is equally low and mildly skewed. The coefficient of flatness (kurtosis) in each variable is below 3 which confirms near normality. The Jarque-Bera test statistics also accept the null hypothesis of normal distribution of each variable.

4.2 Stationarity Results

Table 2. Unit root test result

Augmented Dickey-Fuller Test				*Phillip-Perron Test*			
Variable	Level	1st Diff	Order	Variable	Level	1st Diff.	Order
LNEXR	0.126751	3.687033*	I(1)	LNEXR	0.02191	5.033365*	I(1)
LNFDI	0.302833	3.251872**	I(1)	LNFDI	0.4325	5.284174*	I(1)
LNGOVSIZ	0.195975	4.790207*	I(1)	LNGOVSIZ	0.05409	6.046979*	I(1)
LNINF	4.2332	7.050361*	I(1)	LNINF	3.66127	6.803735*	I(1)
LNINTR	1.514993	6.335722*	I(1)	LNINTR	1.94735	9.022194*	I(1)
LNRGDP	0.708802	6.540276*	I(1)	LNRGDP	0.51672	7.436318*	I(1)
LNOPN	1.823149	5.142475*	I(1)	LNOPN	2.59746	9.529244*	I(1)
Critical Values				Critical Values			
1%	3.6117	3.6171		1%	3.6067	3.6117	
5%	2.9399	2.9422		5%	2.9378	2.9399	
10%	2.608	2.6092		10%	2.6069	2.608	

*NB: * and ** represents significant at 1% and 5% respectively*

All the variables under ADF and PP tests (except LNINF) are found to be nonstationary in levels as shown in Table 2. As a result, all the variables have been differenced once to check their stationarity. At first differencing the calculated ADF and PP test statistics clearly reject the null hypothesis of unit root at 1% and 5% significance levels when compared with their corresponding critical values, hence the ADF and PP tests decisively confirm stationarity of each variable at first differencing, and depict the same order of integration i.e. I(1) behaviour. Thus, the Johansen-Juselius cointegration approach is applied to examine the long run relationship among variables.

4.3 Cointegration Results

Table 3. Johansen co-integration test

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.790751	145.2884	124.24	133.57	None **
0.5601	85.84761	94.15	103.18	At most 1
0.415538	54.64174	68.52	76.07	At most 2
0.371014	34.23335	47.21	54.46	At most 3
0.23308	16.61482	29.68	35.65	At most 4
0.139206	6.530673	15.41	20.04	At most 5
0.021721	0.834486	3.76	6.65	At most 6

*(**) denotes rejection of the hypothesis at 5%(1%) significance level

L.R. test indicates 1 cointegrating equation(s) at 5% significance level

Table 3 presents the result of Johansen co integration test. Accordingly, the Eigen value statistics and likelihood ratio detect one co integrating relationship at 5% level of significance. This test indicates the presence of a long run equilibrium relationship among variables. As a result, the vector error correction model is estimated.

4.4 Vector Error Correction Model (VECM)

The vector error correction model allows modeling adjustments that lead to a long run equilibrium relationship among the variables where a unidirectional long term causal flow runs from changes in LNFDI to other variables in Nigeria.

Table 4. Vector error correction model (VECM) results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.13049	0.116368	-1.121364	0.2798
DLNFDI(-1)	1.400969	0.461556	3.035315	0.0083
DLNFDI(-2)	0.469643	0.301639	1.556971	0.1403
DLNEXR	0.220647	0.156436	1.41046	0.1788
DLNEXR(-1)	-0.02309	0.148445	-0.155544	0.8785
DLNEXR(-2)	-0.10187	0.142588	-0.714414	0.4859
DLNINF	-0.10591	0.364965	-0.290198	0.7756
DLNINF(-1)	0.029229	0.538134	0.054316	0.9574
DLNINF(-2)	-0.23488	0.391606	-0.599777	0.5576
DLNINTR	0.135491	0.219507	0.61725	0.5463
DLNINTR(-1)	-0.02283	0.224078	-0.101888	0.9202
DLNINTR(-2)	0.044828	0.212744	0.210712	0.8359
DLNOPN	-0.32354	0.21003	-1.540425	0.1443
DLNOPN(-1)	0.158067	0.250763	0.630344	0.538
DLNOPN(-2)	-0.10129	0.202557	-0.500059	0.6243
DLNRGDP	-0.12816	0.369581	-0.34676	0.7336

DLNRGDP(-1)	0.090026	0.536762	0.167721	0.869
DLNRGDP(-2)	-0.16718	0.373066	-0.448134	0.6605
DLNGOVSIZ	-0.10874	0.26096	-0.416696	0.6828
DLNGOVSIZ(-1)	0.109806	0.325067	0.337794	0.7402
DLNGOVSIZ(-2)	-0.23423	0.255008	-0.918516	0.3729
ECM(-1)	-0.586	0.529945	-2.992753	0.0091
R-squared	0.648295	Mean dependent var		0.151276
Adjusted R-squared	0.555907	S.D. dependent var		0.218805
S.E. of regression	0.201027	Akaike info criterion		-0.08444
Sum squared resid	0.606175	Schwarz criterion		0.873405
Log likelihood	23.56211	F-statistic		11.31664
Durbin-Watson stat	2.253819	Prob(F-statistic)		0.296163

As shown in Table 4, the estimated coefficient (β_i) of the error correction term [ecm(-1)] which is negative (-0.586), as expected and statistically significant in terms of its associated t-value (-2.992753). The changes in lagged LNFDI is positively related to all other variables. While the one period lagged of all the variables considered are positively but insignificantly related to FDI, LNEXR and LNINTR is negatively related to FDI. Considering the two period lagged, all the variables (except LNINTR) are negatively related to LNFDI in different magnitude. Basically, the negative relationship between the openness (LNOPN) and LNFDI, as well as between exchange rate (LNEXR) and LNFDI is due to high level of importation (as Nigerian is import dependent economy) and depreciating values of exchange rate (local currency) in Nigeria during the period under consideration. There is mixed relationship of LNRGDP to LNFDI, while the one period lagged LNRGDP is positively related to LNFDI, the two periods lagged is negatively related. The adjusted coefficient of determination (R^2) at 0.5559 shows a moderate explanatory power of the model. The F-statistics of 11.317 suggest that good interactive feedback effect exists within the model while the Durbin Watson Stat (DW) of 2.25 indicates a good fit and an absent of autocorrelation.

4.5 Causality Test

Table 5. Pairwise granger causality tests

Null Hypothesis:	Obs	F-Statistic	Probability
LNRGDP does not Granger Cause LNEXR	38	1.53149	0.23119
LNEXR does not Granger Cause LNRGDP		3.48308**	0.04242
LNGOVSIZ does not Granger Cause LNFDI	38	2.20883	0.12581
LNFDI does not Granger Cause LNGOVSIZ		6.08856*	0.00561
LNINF does not Granger Cause LNFDI	38	0.35666	0.70267
LNFDI does not Granger Cause LNINF		1.48854	0.24046
LNINTR does not Granger Cause LNFDI	38	2.52711***	0.09524
LNFDI does not Granger Cause LNINTR		0.1924	0.8259
LNRGDP does not Granger Cause LNFDI	38	0.13255	0.87632
LNFDI does not Granger Cause LNRGDP		10.3129*	0.00033
LNOPN does not Granger Cause LNINF	38	0.18837	0.82919
LNINF does not Granger Cause LNOPN		0.23537	0.79159
LNRGDP does not Granger Cause LNINF	38	1.38654	0.26412
LNINF does not Granger Cause LNRGDP		11.2019*	0.00019
LNOPN does not Granger Cause LNINTR	38	0.12922	0.87922
LNINTR does not Granger Cause LNOPN		3.15752***	0.05562
LNRGDP does not Granger Cause LNOPN	38	1.17668	0.3209
LNOPN does not Granger Cause LNRGDP		0.28231	0.75584

*,** and *** represent 1%,5% and 10% significant level respectively

The results in table 5 shows the Pairwise Granger causality test among the variables analysed. The causality result shows that LNFDI granger cause LNGOVSIZ, which indicates that as FDI increases, government expenditure increases. LNINTR Granger cause LNFDI implies that increase in deposit interest rate in Nigeria economy leads to attraction of more foreign flow of investment. Most importantly, LNFDI also granger cause LNRGDP indicates that there is a positive and direct relationship between FDI and GDP, the more FDI we have in Nigeria, the higher the level of economic growth and development. This means that FDI has contributed significantly to the growth of Nigeria economy during the period under consideration. Also, LNINTR granger cause LNOPN, this means that increase in interest rate lead to openness of Nigeria economy to more trading relationship with the rest of the world, as foreign investors usually seeks for higher return on their investment. However, the result also indicates that exchange rate (EXR), Government size (GOVSIZ) and Inflation (INF) does not granger cause foreign direct investment (FDI) during the period under consideration.

5. Findings and Concluding Remarks

This study investigated the determinants and impacts of Foreign Direct Investment (FDI) empirically in the context of the Nigeria economy from 1970 to 2009. FDI has been identified as an important catalyst of economic development through technological transfer, cutting-edge management practices and other benefits. The VECM result indicates that FDI has contributed marginally to the economic growth of Nigeria. Though the causality test shows that FDI granger causes GDP. This finding supports the conclusions of Akinlo (2004) and Ayadi (2008) that foreign capital has a minute and statistically insignificantl effect on the growth of the Nigerian economy. The effectiveness of FDI in bringing about the desired growth may be constrained by the level of infrastructural developments and other macroeconomic variables. In terms of determinants of FDI, the lagged results of the empirical analyses indicate a mixed relationship between FDI and relevant macroeconomic variables analysed. One period lagged of trade openness, interest rates, government size and GDP exert positive influence on FDI, while there is a negative relationship between FDI and exchange rate which may be attributed to high level of currency depreciation during this period. This finding corroborates the findings of Anyanwu (1998), Salako and Adebusuyi (2001) which observed that infrastructural development, openness and domestic market size are major determinants of FDI in Nigeria. The policy implication of this finding are relatively obvious, since growth rate of the economy (GDP) serves as determinants of FDI, government should therefore increase its expenditure in the area of infrastructural development as an avenue to attract more FDI into Nigeria economy. Besides, the Nigerian government should create the necessary environment that will regulate macroeconomic policy (exchange rate inflation, interest rate, trade openness) which is highly essential for the attraction of FDI inflows into the economy. Most importantly, as an import-dependent economy, the Nigerian government should also formulate export led fiscal and monetary policies that will stabilize and balance Nigeria trade relationship with other economies of the world.

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