



Linkage between Foreign Direct Investment, Domestic Investment and Economic Growth: Evidence from Nigeria

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ABSTRACT

Foreign direct investment (FDI) in the words of Rutherford (1992) spurs economic growth in less developed countries; which is in alignment with the modernization theory. However, the dependency theorist contends that dependence on foreign investment is expected to affect growth and income distribution negatively. It on this premise, that this study is conducted base on this argument to empirically analyze the linkage between FDI, domestic investment (DI) and economic growth for the case of Nigeria. To this end, annual time series data for the period of 1980-2015 was employed. The study employs Johansen multivariate cointegration test and vector error correction model (VECM) as estimation techniques. The Johansen cointegration result of the study reveals that, FDI DI and economic growth have a long-run equilibrium relationship. According to the VECM result and the speed of adjustment of the variables towards their long-run equilibrium path was 52.55%. Furthermore, Granger causality test reveals a uni-directional causality running from FDI to economic growth that is, FDI is an important predictor of economic growth. This goes to validate the FDI lead growth hypothesis for Nigeria.

Keywords: Foreign Direct Investment, Domestic Investment, Economic Growth, Nigeria, Time Series, Vector Error Correction Model

JEL Classifications: C22, F3, F43

1. INTRODUCTION

Since the publication on the function of capital in sustainable development by Schumpeter (1911), the literature grew rapidly worldwide with broad empirical research mostly conducted in the less developed countries, to test the relationship between growth and capital, focusing more on foreign capital. Partially, these researches have been prompted in an effort to give an explanation for empirically the hunt amongst developing nations or growing economies in constantly bring in capital from foreign countries into their countries, this foreign capital is a major instrument and a key impetus for financial development and growth. This economic choice for foreign capital is primarily in view of the fundamental presumption that foreign capital facilitates to enhance domestic investment (DI) capital-hole, enhances productiveness and improves competition, and also managerial and technological overflows in the receiving economy or home country.

In the early 1980s the global economy has encountered towering foreign direct investment (FDI) streams. In resentment own changes and disproportional dispersion, FDI has become speedier than either world output or international trade. According to Padma and Karl (1999), amid 1980-98, worldwide FDI outpourings expanded at an average rate of around 13% annually, in comparison with normal rates of 7% for world fares of merchandise, non-factor services and that of world nominal gross domestic product (GDP). This expansion in FDI, as indicated by economic history specialists, is ascribed to basic advancement of domestic economy and financial markets, and in addition the change of demeanor by most of the countries policy makers from antagonistic vibe to FDI accommodating manners (Anyanwu et al., 2013).

In any case, in spite of the expanding stream of FDI, its dissemination has been unequal. According UNCTAD World Investment Report the industrially developed nations is taking the lion share of the global FDI while the developing nations are

getting, moderately, a little segment of aggregate FDI collectively. The uneven dispersion of FDI is more obvious and boisterous if the developing economies are decay into provincial coalitions. Africa's portion of FDI is moderately minimal, while Asia is receiving a significant share. According to UNCTAD report (2010), FDI inflows has encountered the quickest ratio of development in Asia, 20% of the continent's FDI streams goes to China, that is around 12% of the world aggregate FDI which is about 30% of FDI flowing to developing countries or developing economies.

In the case of Africa, specifically the Sub-Saharan Africa (SSA) the boom of FDI does not benefit the region. Around 1970s Africa has experienced not much increase in FDI flows (Adeolu, 2012). Nevertheless some countries in the region have a comparative advantage of large market size and presence of natural resource which encourages the flow of FDI, this makes the countries hot spot of the Africa's FDI. Considering this attestation it couples with the 2006 UNCTAD world investment report information which discovers Angola, Nigeria and South Africa as the biggest beneficiaries of FDI because of their enrichments of natural resource, about 30% of Africa's FDI goes to this three countries.

FDI stream into Nigeria is recognizably little contrasted with most countries in Europe, America and Asia. A large portion of Nigeria's aggregate investment is constituted by FDI, with lighting up and magnificent account in the country's oil extractive, telecommunication and manufacturing sectors. According to UNCTAD (2006), Nigeria receives about 11% of aggregate FDI inflows to Africa and over 70% of West African sub-region FDI inflow. Nigeria fails to take cognizant and ponder steps that will empower FDI flows at the early post-independence period. In the late 60s and early 70s Nigeria embraced the indigenization policy and import substitution strategy which was the opposite of FDI, because of these strategies there was less foreign investment in the country and no possession of Greenfield by foreigners in the economy. Oil revenue was used to maintain these policies; there was abundance in investment in both public and private capital.

Given the monoculture nature of the economy of Nigeria which heavenly rely on oil sector, the late seventies crash in the oil market prompted to genuine in capital of investment, social investment project takes the vast majority of 3rd and 4th development plans between 1975 and 1985 relinquished. According to Anyanwu (2011), the disorder in Nigeria's economy caused by the crash of oil market impacted Nigerian policy makers to leave on a quick and broad look for substitute capital, and executed a plan of strategy that will draw the attention of foreign investor, for example, actualization of structural adjustment program by increasing the level of economy openness, changing the financial system and financial market, deserting the ISS policy and government selling some of its enterprises and capital to private individuals, adjustments of domestic material advancement and tax reduction. Likewise, new institutions were built up to manage FDI persistent streams and create enabling environment that will attract foreign investor to invest in the economy and also increase their confidence. According to Anyanwu (2011), these incorporate

the Industrial Development Coordinating Committee in the year 1988 later supplanted by the Nigerian Investment Promotion Commission in the year 1995, two policies implemented in the year 1991 which are; the Nigerian Export-Import Bank and Export Processing zones. The effect of these programs and policies all together was overpowering. There was a huge expansion of FDI inflows from 1975 to 1990 from 2.3 million naira to 10.4 million naira, from that point; FDI inflows began blooming and expanding at a humble rate. Currently Nigeria is swallowing over 15% of aggregate FDI streams into Africa, making the country to be the most beneficiary of foreign capital (UNCTAD, 2012).

However, considering the credibility of the hypothetically likely advancement radiating from FDI, global economies, specifically less developed economies or countries, have been struggling in attempting to draw in a huge percentage of world FDI streams, subsequently creating exceedingly competition in FDI market. This means for a country to benefit from FDI, measures that will attract FDI should be put in place. There is proof from collection of empirical literature that discovers FDI streams to an economy or country is affected by some key factors determining FDI streams which are needed by country to succeed in attracting FDI. There is no consensus empirically in the literature on the essential factors impacting FDI streams; majority of the factors that determine FDI inflows have been investigated empirically (Anyanwu, 2011; Padma et al., 1999; Borensztein et al., 1998; Laura, 2003; Dinda, 2009; Obida and Abu, 2010). Nevertheless the impact of DI has not been given much attention in the literature, particularly in Nigeria. De Mello (1999), discovers the degree to which FDI embellish growth relies upon the level of substitution or complementary among DI and FDI supporting this finding, Ekpo (1995) noticed that private investment is precisely impacted by public investment. In that capacity the government should create empowering domain for nonpublic investors by putting more resources in infrastructural development which will make the Nigerian economy to become attractive to foreign investors.

Considerable measures has been putting in place by Nigerian government in attempting to make an empowering, less expensive environment that advances investments hopes by infrastructural improvement, amiable market strategies, and forming of correlative investment to increase domestic resources required by local firms; however government investment only comprises some portion of aggregate investment. Majority of researches on DI as an element of FDI consider it as combined variable, aside breaking down DI to its two divisions-public and private, so knowing FDI can be impacted by public and private DI separately. Similar researches have been conducted on private DI and FDI. These researches verifiably accepted that FDI is an important determinant of domestic firms' efficiency. However, DI can also be an important determinant of foreign investor's efficiency. This research departs from prior researches evidence in Nigerian case study (Verick, 2008; Ekpo, 1995 and Anyanwu, 1998) by investigating the impact of FDI on economic growth and also separately investigating the impact of DI on economic growth.

The remaining parts of this study are the literature review, research methodology, empirical findings and conclusions.

2. REVIEW OF RELATED LITERATURE

An FDI-related review is a standout amongst the broadest research areas in capital movement and global finance. Empirical and insightful studies have concentrated significantly on determinant of FDI-growth links. The sub sequential has been widely concentrated barely, going from broad study to nation specifics examples, i.e., absolutely following the conceivable medium via which FDI affect the home nation. Examining the literature Anyanwu (2011) noticed that there are different conclusions by experienced analysts on the relationship between economic growth and FDI; FDI is positively related to economic growth if it crowds in DI and has a negative relationship if it crowds out DI local business enterprise. Likewise, there is existence of a consistent agreement among empirical researches over the accuracy of the determinants of FDI. However the fact that regional or country minutiae impacts FDI inflows has been upheld by researchers.

2.1. Theories Linking FDI and Economic Growth

Two principle theoretical points of view have been applied to clarify the effect of FDI on home nations' economies. The theories are modernization and dependency.

According to modernization theories FDI can enhance growth in less developed countries, this means dependency theory is built on autogenously and neoclassical growth theories. The modernization point of view depends on a major assumption in economics that investment in capital is the key to economic growth.

According to the viewpoint of the modernized growth theories, the moving of technology to less developed countries via FDI is particularly critical on the grounds that most developing nations do not have the basic infrastructure particularly in liberalized markets, social and economic soundness, and literate population that are required for novelty to be growth enhancing (Sanchez-Robles and Calvo, 2002). As noted by Pradhan and Kumar (2002), aside from capital and technology, FDI generally streams as a bunch of assets, inclusive of managerial and administrative abilities, market avenue through the promoting systems of multinational enterprises and showcasing know-how. Accordingly, FDI plays a binary capacity by adding to accumulation of capital also by expanding aggregate factor output (Nath, 2005). While the dependency point of view contends that there is a negative relationship on income distribution and economic growth if an economy depends on foreign investment.

As opposed to the modernization point of view, dependency theorists contend that dependence on foreign investment is expected to affect the growth and income distribution negatively. According to Bornschier (1985) an industrial design in which a single owner overshadows all, is formed by foreign investment, prompting to what they portray as "underutilization of productive forces." The assumption which says an economy regulated by nonnatives of a country will not grow naturally, but will fairly develop in a disordered way (Amin, 1974). Africa's natural resource sector receives the lion share of FDI (Pigato, 2000) this is why the entry has significant hindrances.

A collection of empirical proofs recommends a robust positive relationship between FDI and DI. FDI and DI has a bi-directional relationship Ndikumana and Verick (2008). They additionally affirm that immense return to capital is an indication of immense private DI, while the cost of investment or business is decrease due to immense public investment which leads to the satisfactory of public infrastructure. Hence, immense DI aids in drawing the attention of foreign investors.

Cost lessening and intensifies competition theory is use to comprehend the impact of domestic on FDI. On this note, we hypothesize that DI enhance competition and lessen operation expense. Comparing two countries with different DI, it is conceivably sensible to contend firms in the country with full-fledge public services experience a reduction in operational expense in respect to the other country. These facilities in mode of social infrastructure help businesses in the creation and dispersion of goods and services. Without these production helps, firms have the contrasting option of accommodating themselves, in this way expanding the cost of business and absence of business visionary motivating forces. Foreign capital and foreign investor are less captivated, because of the less business commitment in the country's economy, vice versa. This link is firmly corresponded with public DI.

Nevertheless, the impact of private DI on FDI streams is more complicated. FDI inflows into a country can be stimulate or discouraged by private DI. It relies upon the particular relationship among foreign and private domestic firms and additionally how well-established is the domestic private sector. In a circumstance where nearly all private firms are functioning in most extreme specialized and economic effectiveness and have a great international ranking, the possibilities of market rivalry is practically depleted, foreign firms look at this area as unfruitful, in this manner pushing them away. In any case, in circumstance of less rivalry among private firms, FDI is attracted.

In an alternate focal point, a country where generous private DI was made in the downstream area will experience capital inflow from foreign investors. This is alluded to as the rearward relation impact between private DI and FDI. The source of domestic material is taking into consideration by foreign firms before establishing their factory, since their capital project is a long-term investment. Foreign investors will practically import all part needed in their production process if sufficient DI in the downstream sector has not been made in the host-country, it will be more beneficial to them if they build their production factory in their own country and export the finished goods or services to other countries. This situation nonappearance of a well-established downstream area- is FDI-discouraging.

2.2. Relationship between DI and FDI Inflows in Nigeria

Nigeria is an open economy considering the total world output Nigeria can be classified as a small economy, with a welcoming propensity and well-designed international relations. From 1986, Nigeria has turned into a friendly clime for investors from all around the world; this has been empirically verified in

many studies. As embraced before on the relationship between FDI and DI, particularly on the one way direction of DI flow, few empirical studies were done on this, however this does not imply that FDI is detached to DI; the truth is that DI impacts FDI in a range of manners. As recognized by Anyanwu (1998), with other factors included in his study, he affirmed that Nigerian DI is a significant determinant affecting FDI inflows positively, despite the fact that he was not precise on which of the component of DI has the higher edge.

2.3. Empirical Literature

The passionate move by less developed countries to pull in FDI into their economy has produced enough empirical researches to assess the motive being the reason for FDI, and investigate the assimilative limits which must be satisfied by the home country. Nevertheless, majority of the prior studies on FDI determinants have made a small or almost no consideration regarding DI. However, the few works that addressed it did it in brief or considered it as a one way flow, from FDI to DI. Moses et al. (2013) identifies that both public and private investment are negatively related to FDI inflows, so also FDI inflows is negatively related to market size and human capital, while openness to trade and natural resources are positively related to FDI. He further noted that FDI flows into Nigeria is relatively small compare to that of countries in America Europe and Asia, however FDI constitutes an important share of the country's total investment more especially in energy, manufacturing and telecommunication sectors. Alfa and Tukur (2012) used a non-probability sampling method in selection of sample size and years (1981-2010) to examine the relationship between DI and economic growth evidence from Nigeria. Their findings suggest that DI and economic growth have a long-run positive relationship, and also exports have a long-term positive relationship with economic growth in Nigeria.

De Mello et al. (1997) investigates FDI in less developed countries and growth: A selective analysis, noted that a definitive effect of FDI on GDP growth in the recipient country relies on upon the degree for effectiveness spillovers to local enterprise, by which FDI prompts to expanding returns in local production, and increments in the value-added substance of FDI-associated production. In addition, in a similar study, Adams (2009) investigated the effects of FDI and DI on economic growth in SSA from 1990 to 2003. Employing ordinary least square (OLS) and fixed effects estimation discovered that DI is decidedly and essentially corresponded with economic development, while FDI is significant and emphatically related to economic growth just in OLS estimation. He further finds that FDI has a short-run or originally negative impact on DI and in the long-run the effect turns to be a positive effect. Similarly Zhang and Markusen (1999) studied FDI and economic growth of 10 East Asian countries and finds that FDI enhance economic growth in the short-run only in Singapore and in the long-run FDI improve the economic growth of five countries namely Japan, Hong Kong, Taiwan, China and Indonesia. 11 Latin American and Asian countries where studied by Zhang et al. (2001) between 1970 and 1997 and reported that FDI will most probably advance growth in Asia countries more than in Latin America countries, he additionally discovers that FDI has a tendency to advance economic growth

when the home nation embraces liberalized trade policies, keep up macroeconomic stability and enhance education. So also, Balasubramanian and Induchoodan (1996), investigates 46 nations from the period of 1970 to 1985 noted that the FDI effects and growth improvement are more grounded in nations with immensely educated workforce and sought a strategy of export advancement instead of import replacement. Ozturk and Kalyoncu (2007) investigate empirically the impact of FDI on economic growth of Turkey and Pakistan over the period of 1975-2004. To analyze the causal relationship between FDI and economic growth, the Engle-Granger cointegration and Granger causality tests are used. It is found that these two variables are cointegrated for both countries studied. The findings suggest that it is GDP that causes FDI in the case of Pakistan, while there is strong evidence of a bi-directional causality between the two variables for Turkey.

James (2009) investigates whether FDI and public DI crowd in or crowd out private DI in Malaysia for the time frame of 1960 to 2003, in his findings he realized that the effect of FDI on private DI can differ from one economy to another, contingent upon the type of FDI, the host country's trade strategies and qualities of the domestic firms. The result also suggests that private DI is buttressed by both public DI and FDI in the long-run. He additionally finds that the impact of FDI on private DI is more asserted than that of public investment. Ekpo (1997), investigates FDI in Nigeria. He claims that public DI directly impacts private DI, accordingly the government ought to put resources into infrastructure which prove an empowering domain for private local investors; thusly captivate FDI to Nigeria. In another research, Sumei et al. (2008) investigates China's FDI, DI and economic growth, employing vector auto-regression technique with ECM method for the period 1988-2003. The findings suggest that there is one way relationship running from FDI to DI and also one way relationship from FDI to economic growth, and a bi-directional relationship between economic growth and DI. FDI is also observed to be complementary or corresponding DI. Hence, FDI has not just aided with conquering inadequacy of capital; it has additionally invigorated economic advancement through supplementing DI in China. Using vector auto regression model David and Seo (2003) empirically test whether FDI inflow crowd out DI: Evidence from Korea, they finds that FDI has some beneficial impacts on economic growth but they are not significant. But economic growth is statistically significant and is also a strong determinant for long-run FDI flows; they further find that FDI indicates solid element endogeneity to domestic macroeconomic conditions. Acaravci and Ozturk (2012) provide a survey of the literature on FDI, export and growth, and empirically investigates the causal relationship between economic growth, export and FDI for the 10 transition European countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia) using quarterly data from 1994 to 2008. These causality results reveal that there is causal relationship between FDI, export and economic growth in four out of 10 countries considered.

Gungor and Katircioglu (2010) empirically investigates the nexus of financial development, FDI and real income growth

evidence from Turkey employing the annual data of 1960 to 2006, discovered the relationship between FDI, financial development and real income is a level relationship in long term Turkish economy, they further found that FDI, real income and financial development converge to the long term values generally at a higher levels, and finally suggested a feedback relationship between real income, FDI and financial development in Turkey. In a similar study, Omran and Bolbol (2003) investigate FDI, financial development, and economic growth: Evidence from Middle East Arab economies, they pointed out that Arab FDI will favorably affect growth if associated with financial factors at a given edge stage of growth, it likewise finds that in developing nations FDI could Granger cause financial development, and conclude that domestic financial changes ought to precede policies enhancing FDI, investment measures ought to upgrade the environment for all investors foreign and local alike, and liberal commercial approaches ought to be planned as introductory measures to attract FDI.

3. METHODOLOGY

In order to explore the dynamic nexus between FDI, DI and economic growth in Nigeria. To this end, annual data was retrieved from World Development Indicator for the period of 1980-2015. This current study, proxy economic growth as GDP, while FDI, DI and interest rate were modeled as explanatory variables. The model formulation is given below as:

$$GDP = f(FDI, DI, INT) \quad (1)$$

$$Y_t = X\beta_t + \epsilon_t \quad (2)$$

$$\ln GDP_t = \beta_0 + \beta_1 \ln FDI_t + \beta_2 \ln DI_t + \beta_3 \ln INT_t + \epsilon_t \quad (3)$$

Where our Apriori expectations $\beta_1, \beta_2, \beta_3 > 0$.

GDP = Gross domestic product,

FDI = Foreign direct investment,

DI = Domestic investment,

INT = Interest rate,

ϵ_t = Stochastic term.

4. ECONOMETRICS PROCEDURE

4.1. Unit Root Test

It is widely known that, working with time series data pose constrains of stationarity (unit root) which prompt the need for conducting both formal and informal test. The general practice is to plot the series (graphically) to have a glimpse of how the series fare (Appendix Figure 1).

Time series data are mostly not stationary, meaning that, its mean, variance and covariance are time variant (Gujarati, 2009). Econometricians are faced with non-stationary series since it prompts to spurious regression outcomes. Therefore, it is necessary to conduct stationarity test for all the variable to verify the asymptotic of the series. Stationarity test help us to know the order of integration of the series under investigation (Granger and Newbold, 1974; Nelson and Plosser, 1982). The implication

of a spurious regression is a data set with no explanatory power and policy strength. The remedy to this issue informed the widely known formal unit root tests of augmented Dickey–Fuller (ADF) by Dickey and Fuller (1981) test and Phillips–Perron (PP) test proposed by Phillips and Perron (1988) and Kwiatkowski Phillips Schmidt and Shin’s (KPSS) as a confirmatory test to affirm the outcomes the earlier test. The general form of the equation is given as:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \epsilon_t$$

Where, ϵ_t represents Gaussians white noise that is assumed to have a mean value of zero, and possible autocorrelation represents series to be regressed on the time t .

4.2. Cointegration Test

To explore for long-run equilibrium relationship, the variables under review need to be integrated of same order, for instance all variables should be 1(1). Cointegration test is necessary to measure the long-run equilibrium bond among series. Granger (1981) and Engle and Granger (1993) proposed a cointegration procedure to examine the long-run equilibrium relationship among variables. This study applies the Johansen (1988) cointegration test given below to trace for equilibrium relationship under the null hypothesis of no cointegration against the alternative of cointegration. This implies for either trace statistic or maximum Eigen if the null is rejected means the variable under review all converge together.

$$\Delta Y_t = \Gamma_1 \Delta X_{t-1} + \dots + \Gamma_{K-1} \Delta X_{t-K+1} + \Pi X_{t-K} + \mu + \epsilon_t$$

4.3. Estimation of Long-run Coefficient

Once equilibrium relationship is traced, the error correction mechanism technique is engaged. The necessity of the test is to capture for any disequilibrium in the system with the error correction term (ECT) known as the speed of adjustment, which is required to be statistically different from zero and negative to have a workable error correction mechanism.

4.4. Granger Causality

The conventional regression does not imply causation. Thus, there is need for causality test, to do this, this current study apply the Granger causality approach to test for predictability power of series as well as direction of causality. For instance, variable X is said to Granger cause Y, if variable X and its past realization are better predictor of Y rather than just X alone and its past realization.

5. EMPIRICAL FINDINGS

Summary statistics is given in Table 1 with over 30 observations. The Figure 1 shows that FDI had a higher average relative to the other series. All the series are positively skewed as well as exhibited heavy tail exception of DI.

The Pearson correlation shows the relationship among the variable under review (Table 2). The matrix reveals there exist an inverse

Figure 1: Visual view of series under investigation

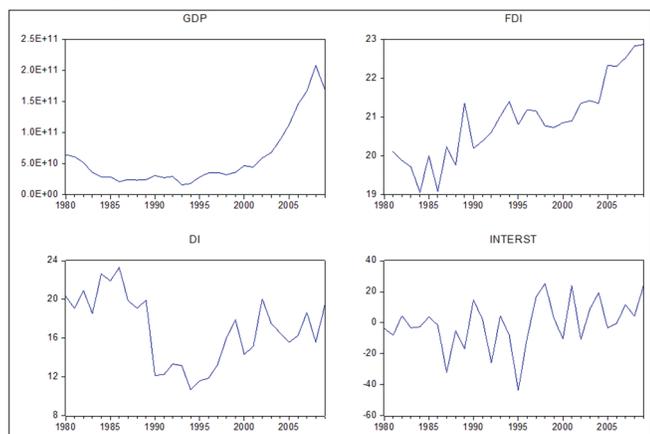


Table 1: Summary statistics

Variables	GDP	FDI	DI	INTERST
Mean	5.84E+10	20.902	16.78283	-0.559646
Median	3.55E+10	20.85441	16.553	-0.373095
Maximum	2.08E+11	22.86976	23.303	25.28227
Minimum	1.58E+10	19.05813	10.654	-43.57266
Standard deviation	5.17E+10	1.013886	3.565401	16.1378
Skewness	1.657719	0.229565	0.001131	-0.596615
Kurtosis	4.551407	2.550956	1.942509	3.477915
Jarque-Bera	16.19045	0.498366	1.35127	1.99641
P	0.000305	0.779437	0.508833	0.36854
Sum	1.69E+12	606.158	486.702	-16.22974
Sum square	7.47E+22	28.78302	355.9384	7292.004
Observations	31	31	31	31

Source: Authors compilation. GDP: Gross domestic product, FDI: Foreign direct investment, DI: Direct investment

Table 2: Pearson correlation coefficient

	GDP	FDI	DI	INTERST
GDP	1.0000			
t-statistics	-			
P value	-			
FDI	0.7823	1.0000		
t-statistics	6.5251	-		
P value	0.0000	-		
DI	0.0870	-0.3164	1.0000	
t-statistics	0.4538	-1.7331	-	
P value	0.6536	0.0945	-	
INTERST	0.3203	0.2210	0.0648	1.0000
t-statistics	1.7571	1.1776	0.3375	-
P value	0.0902	0.2492	0.7384	-

Source: Authors compilation. GDP: Gross domestic product, FDI: Foreign direct investment, DI: Direct investment

relationship between FDI and DI. That is, FDI has a crowding out effect on DI.

Table 3 reveals that all variable are not stationary at the level form, using all the three models of ADF and PP, and two models of KPSS. In all the models we fail to reject H_0 of ADF and PP, meaning all our series are non-stationary. But for the KPSS we reject the null hypothesis at 5% in both models which implies

the series has unit root (non-stationary). This is valid as KPSS hypotheses are the inverse of that of ADF and PP. The entire test results after first differencing proves that all series are stationary.

Table 4 provides evidences the existence of one cointegrating vectors, as we could reject the null hypothesis of no cointegration, which implies cointegration in the model. This means there is a long run equilibrium relationship between GDP, FDI and DI. This implies that FDI and DI will converge to the endogenous variable in the long-run. The above revelation is the precondition to run the vector error correction model (VECM) for any disequilibrium.

VECM is presented in Table 5. The ECT, which is named as the speed of adjustment of the series toward their equilibrium path is 52.55% as showed by the Table 3. The ECT is statistically significant at 1% and it is also negative, demonstrating that the short- long run dynamic equilibrium movement of the series. This implies that FDI, DI and INT will converge to their long-run equilibrium by 52.55% per annum. FDI and DI are negatively related to GDP in the short-run and in the long-run the relationship turns to be positive.

Dynamic causality test was employed with the Granger causality test, from the Table 6 the result reveals a uni-directional causality relationship running from FDI to GDP, which means FDI is an important predictor of GDP. This goes further to buttress and validates the FDI lead growth hypothesis for Nigeria.

6. CONCLUSIONS

This study aims at investigating empirically the linkage between foreign FDI, DI and economic growth for the case of Nigerian. This current study also explores inquiries if there exist a long-run link among the variables included in this research. The study uses annual time series data for a period of 1980-2015. The manuscript uses well known ADF, PP and KPSS unit root test techniques to test the stationarity of the series to ascertain the order of integration of the series under review. The result of the unit root reveals that all the variables were stationary after first differencing. Thus, implying that, all the series are integrated of order 1. According to Johansen cointegration result, this reveals, the presence of one cointegration. That is, there exist long-run equilibrium relationships between among the variables in the study. However for disequilibrium the ECT shows the adjustment speed of our series to their long-run values. Adjust speed of our variables of interest is 52.55%. From the outcomes of the error correction model, it is clear there are an initial short run relation and a significant long run relationship between economic growth, FDI and DI in Nigeria.

The revelation from the Granger causality result validates the FDI lead growth claim, that FDI is an important predictor of economic growth in Nigeria. Our finding aligns with empirical works (Moses et al., 2013; James, 2009; Zhang and Markusen, 1999). This current study extend the exiting body of knowledge by validating the FDI hypotheses, that FDI inflow into Nigeria is a key driver of economic growth and by extension better living standard. These are the core goal of macroeconomics and FDI serves as a channel for Nigeria.

Table 3: ADF, PP and KPSS unit root test

Statistics (level)	GDP	LG	FDI	LG	DI	LG	INT.	LG
ADF (t and i)	-1.1289	(0)	-2.0402	(1)	-1.9651	(0)	-5.1131	(0)
ADF (i)	0.7704	(0)	0.3522	(1)	-2.1501	(0)	-4.5811	(0)
ADF (n)	1.4802	(0)	1.8725	(1)	-0.4799	(0)	-4.6718	(0)
PP (t and i)	-1.1123	(2)	-4.1848	(1)	-1.8204	(2)	-5.1375	(4)
PP (t)	0.4686	(2)	-0.668148	(3)	-1.8204	(2)	-4.5844	(1)
PP (n)	1.1968	(2)	2.3787	(4)	-0.4322	(1)	-4.6744	(1)
KPSS (t and i)	0.1807**	(4)	0.2160**	(2)	-0.4322**	(4)	0.104**	(3)
KPSS (t)	0.4396**	(4)	0.6208**	(4)	0.2239**	(4)	0.408**	(1)
First difference Δ	GDP	LG	FDI	LG	DI	LG	INT.	LG
ADF (t and i)	-4.5854**	(0)	-10.83**	(0)	-4.5728**	(0)	-6.784**	(1)
ADF (i)	-1.8119**	(0)	-10.65**	(0)	-6.6478**	(0)	-6.858**	(0)
ADF (n)	-1.616***	(9)	-10.023**	(0)	-6.7833**	(0)	-6.973**	(0)
PP (t and i)	-4.7851**	(2)	-10.795**	(1)	-6.6143**	(0)	-20.95**	(6)
PP (t)	-3.2272**	(1)	-10.646**	(0)	-6.6690**	(1)	-17.97**	(5)
PP (n)	-3.1782**	(1)	-9.490**	(2)	-6.8064**	(1)	-15.15**	(5)
KPSS (t and i)	0.0806	(5)	0.3798	(4)	0.0784	(3)	0.0995	(5)
KPSS (t)	0.4560	(3)	0.4205	(4)	0.1463	(1)	0.1232	(4)

Δ represent first difference; GDP represents Nigerian gross domestic product; FDI represents foreign direct investment inflows to Nigeria; DI represents Nigerian domestic investment; INT represents interest rate, (t&i): Represents the general model with trend and intercept, (t): Represents the model with only trend, (n): Stands for the most restricted model with no trend and intercept. The numbers in parenthesis represents the lag lengths for removal of serial correlation in ADF residuals, and for PP the numbers in parenthesis represent the New-West bandwidth. *Represents 1% significant level, **represents 5% rejection of the H_0 and ***represents 10% rejection of H_0 . The unit roots test were conducted in E-VIEW 9.0. KPSS: Kwiatkowski Phillips Schmidt and Shin's, ADF: Augmented Dickey-Fuller, PP: Phillips-Perron

Table 4: Johansen multi-variate cointegration result

Hypothesized number of CE(s)	Eigen value	Trace statistic	0.05 critical value	P
$r=0$	0.782958	72.82410	63.87610	0.0073***
$r \leq 1$	0.531411	31.57717	42.91525	0.4115
$r \leq 2$	0.271421	11.11036	25.87211	0.8689
$r \leq 3$	0.090477	2.560559	12.51798	0.9241

***Signifies rejection at 1% level of significance

Table 5: ECM result $GDP=f(FDI, DI, INT)$

Variables	Coefficient	SE	t-statistics
Short run causality			
GDP	-0.284463	0.15762	-0.82907
FDI	-2.68E+10	1.1E+10	-2.39385
DI	-2.18E+09	1.5E+09	-1.47769
INT. R	-756606.9	1.6E+08	-0.00468
Long run causality			
GDP	1.000000		
FDI	-7.40E+10	1.6E+10	-5.49761
DI	-1.10E+10	2.0E+09	-5.49761
INT. R	3.57E+08	4.8E+08	0.74547

ECT is -0.5255, which is desirable and required for the system of the equation. GDP: Gross domestic product, ECT: Error correction term, FDI: Foreign direct investment, DI: Direct investment, ECM: Error correction model, SE: Standard error

Table 6: Granger causality test

Null hypothesis	Observations	F-statistic	P
FDI does not Granger cause GDP	30	3.12014	0.0319
GDP does not Granger cause FDI		0.41560	0.8320
DI does not Granger cause GDP	30	1.79956	0.1611
GDP does not Granger cause DI		0.30526	0.9037
DI does not Granger cause FDI	30	0.83147	0.5432
FDI does not Granger cause DI		0.62933	0.6796

FDI: Foreign direct investment, DI: Direct investment, GDP: Gross domestic product

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APPENDIX

Appendix Figure 1: Visual Plot of variables under consideration

