Dolado - Lütkepohl Causality Tests between Foreign Direct Investment and Economic Growth in Nigeria

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Abstract
Foreign direct investment (FDI) is often seen as an important catalyst for economic growth in the developing countries. It affects the economic growth by stimulating domestic investment, increasing human capital formation and by facilitating the technology transfer in the host countries. The main purpose of the study is to re-investigate the causation between foreign direct investment and economic growth in Nigeria for the period 1970-2010. This study made use of two different methodologies to test the Granger non-causality: the Dolado–Lu¨tkepohl test (Toda-Yamamoto causality tests.) using the VARs in levels, and the standard Granger causality test. The study found that there is a unidirectional causality between the series, running strictly from foreign direct investment to real GDP, which was corroborated at lag length of 4 when we used the standard causality test. We also found that there is a feedback effect on the economic growth arising from FDI inflows after eight years. We conclude that FDI inflows should be encouraged, as it will engender the economy to continue to witness growth in domestic product and subsequently more inflows of FDI.

1.0 INTRODUCTION

The effects of the foreign direct investment on the host economy are normally believed to be increase in the employment, productivity, export and so on. 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 consistently received FDI in the past decade. However, the level of FDI attracted by Nigeria is mediocre (Asiedu, 2003) compared with the resource base and potential need. 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; Oyinlola, 1995; Adelegan, 2000; Akinlo, 2004). Most of the previous influential studies on FDI and growth in sub-Saharan Africa are multi country studies. However, recent evidence affirms that the relationship between FDI and growth may be country and period specific. Asiedu (2003) submits that the determinants of FDI in one region may not be the same for other regions. In the same vein, the determinants of FDI in countries within a region may be different from one another, and from one period to another. (Table 1 provides a brief Framework of the related literature on Foreign Direct Investment and Economic Growth).

A brief Framework of the related literature on Foreign Direct Investment and Economic Growth in Nigeria

No	Study/Author	Period of study	Number of country	Data set	Econometrics techniques	Findings/conclusion
1	Alfaro (2003)	1980-1999	47 developing countries	Cross-section	Ordinary Least Square	FDI in the primary sector tends to have a negative effect on growth, while investment in manufacturing a positive one.
2	Lensink and Morrizzey (2001)	1990-1998	88, including 20 developing countries	Cross-section	Panel data econometric techniques	FDI has a positive effect on growth whereas volatility of FDI has a negative impact.
3	Djankou and Hoekman, (2000)	1994-1998	1 (one), Czech Republic	Time series	Ordinary Least Square	An industry wide inverse relationship was detected between the extent of foreign investment and the turnover of domestics firms.
4	Ayyagari and Kosova, (2006)	1994-2000	1(one), Czech	Time series	Ordinary Least Square	Foreign investment was found to have a positive effect on the entry rates of domestics firms at intra and inter-industry level.
5	Kumar and Pradhan (2002)	1980-1999	107, developing countries	Cross-section	Ordinary Least Square	Their results show that panel data estimations in a production function framework suggest a positive effect of FDI on growth.
6	Agosing and Mayer (2000)	1970-1996	Three developing regions (Africa), asia&latin America	Cross-section	Ordinary Least Square	They reached conclusion that, the effects of FDI on domestic investment are by no means always favourable and that simplistic policies toward FDI are unlikely to be optimal.
8	Mohey-up din (2006)	1975-2004	1(one), Pakistan	Time series	Ordinary Least Square	Shows positive impact of foreign capital inflows on the GDP growth in Pakistan.
9	De Gregorio, (1992)	1950-1985	12 latin America countries	Cross-section		His results suggest a positive and Significant impact of FDI on economic growth. In addition, the study shows

						that the productivity of FDI is higher than the productivity of domestic investment
10	Fry (1992)		16 developing countries, including Nig. and 5 pacific basin countries.	Pooled time-series cross-section data	Framework of a macro-model	FDI had a significant negative effect on domestic investment suggesting that is crowds-out domestic investment.
11	Balasubramanyam et al, (1996)	1970-1985	46 countries	Cross-section		Export – oriented strategy was found to be positive and significant but not significant and sometimes negative for the sub-set of countries pursuing inward-oriented strategy.
12	Shabir and Mahmood, (1992)	1959-1960 to 1987-1988	1(one), Pakistan	Time series		The study concluded that net foreign private investment and disbursements of grants and external loans had a positive impact on the rate of growth of real GNP.
13	Irandoust and Ericsson (2005)	1965-2000	For a panel of Africa countries including Nigeria.	Cross-section	Units root and co-integration tests.	The findings shows that foreign and domestic saving enhance economic growth for all countries in the sample.
14	Gyapong and Karikari (1999)	1960-1980	2(two) countries, Ghana & Ivory coast	Cross-section	Correlation causality stationary and co-integration tests.	Their results show that the impact higher economic performance on DFI depends crucially on the strategy of the investment.
15	Ayashagba and Abachi (2002)	1980-1997	1(one), Nigeria	Time-series		The result shows that the foreign direct investment had significant impact on economic growth in Nigeria. They therefore concluded that the presence of FDI in the LDCs particularly in Nigeria is not totally useful.

16	Akinlo (2004)	1970-2001	1(one), Nigeria	Time-series	Error correction model (ECM)	The results show that both private capital and lagged foreign capital have small and not a statistically significant effect on the economic growth.
17	Khan (2007)	1972-2005	1(one), Pakistan	Time series	Co-integration tests	The findings suggest that Pakistan will effectively transform benefits embodied in FDI inflows, if the evolution of the domestic financial sector has aimed at a certain development level.
18	Ariyo (1998)	1970-1995	1(one), Nigeria	Time-series		He found thaht only private domestic investment consistently contributed to raising GDP growth rate.
19	Oyinlola (1995)		1(one), Nigeria	Time-series	Chenergy and stout's two-gap model (1966)	He concluded thaht FDI has a negative effect on economic development in Nigeria.
20	Ekpo (1995)		1 (one), Nigeria	Time-series		That the variables used were the key factors explaining the variability of FDI into Nigeria.
21	Ayanwale (2007)	1984-2003	1(one), Nigeria	Time-series	Stationary (unit root) test, co-integration.	The result showed he concluded that FDI contributes positively to Nigeria's economic growth, and the not significant relationship of human capital to overall economic growth suggests that there is a shortage of skilled labour in the country.
22	Oke (2007)	1984-2003	1(one), Nigeria	Time-series	Ordinary Least Squares	It was found that the partial regression coefficient of all the variables does conform to a priori, expectation and fluctuated in different direction.
23	Abu and Obida (2010)	1970-2006	1(one), Nigeria	Time series	Stationary (unit root) test, co-integration	The result showed that the principal determinants of FDI are the market size of the host country, deregulation, exchange rate depreciation and political instability.

24	Uremadu (2009)	1980-2004	1(one), Nigeria	Time-series	Ordinary Least Squares	The negative effect suggests that cumulative foreign private investment (CFPI) in real terms has crowded out gross domestic savings
25	Ehimare (2011)	1980-2009	1(one), Nigeria	Time series	Ordinary Least Square	There is no empirical strong evidence to support the notion that FDI has been pivotal in economic growth in Nigeria. And though, FDI has contributed significantly to BOP through the nations' current account balance
26	Osinubi and Amaghionyeodiwe (2010)	1970-2005	1(one), Nigeria	Time series	Ordinary Least Square	FPI was non-stationary while the variables were jointly co-integrated. The variables used in this study were positively related to the GDP growth rate.
27	Falki (2009)	1980-2006	1(one), Pakistan	Time series		The results show a negative and statistically insignificant relation between the GDP and FDI inflows in Pakistan.
28	Ogun (2007)	1960-2002	1(one), Nigeria	Time-series	Equilibrium model of the export market and co-integration technique.	These findings suggest that policies causing misalignment tend to generate adverse effects on non-oil export growth.

The impact of FDI on economic growth is more contentious in empirical than theoretical studies, hence the need to examine the relationship between FDI and growth in different economic dispensations. There is the further problem of endogeneity, which has not been consciously tackled in previous studies in Nigeria.

This study contributes to the literature by re-examining the relationship between FDI inflows and Nigeria's economic growth using an up-to-date time series data (1970-2010). The study is different from previous studies in scope (number of years considered is longer) and made use two different methodologies to test the Granger non-causality: the Dolado–Lu¨tkepohl and Toda-Yamamoto causality tests, using the VARs in levels, and the standard Granger causality test.

2.0 DATA AND METHODS

This section highlights the econometric model used to study cointegration and causality between economic growth and FDI. We use Johansen (2001) cointegration approach and the Toda and Yamamoto (1995) causality testing procedure.

2.1 Data and variables

The paper uses series comprise yearly observations between 1970 and 2010, namely real gross domestic product per capita (GDPC) as a measure for economic growth and the ratio of foreign direct investment (FDI) inflows to GDP (RFDI). Data on real GDP per capita, GDP and FDI are from the CBN Statistical Bulletin, various issues.

2.2 The cointegration approach

Cointegration can be defined simply as the long-term, or equilibrium, relationship between two series. This makes cointegration an ideal analysis technique to ascertain the existence of a long-term relationship between foreign direct investment and economic growth. The cointegration method by Johansen (1991; 1995) is used in this study. The Vector Autoregression (VAR) based cointegration test methodology developed by Johansen is described as follows;

The procedure is based on a VAR of order p:

$$y_t = A_1 y_{t-1} + ... + A_p y_{t-p} + Bz_t + \varepsilon_t \quad (1)$$

where y_t is a vector of non-stationary I(1) variables (export and economic growth), z_t is a vector of deterministic variables and ε_t is a vector of innovations. The VAR may therefore be reformulated as:

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} + \Gamma_i \Delta y_{t-p} + Bz_t + \varepsilon_t \quad (2)$$

$$\text{Where } \Pi = \sum_{i=1}^{p} A_i - I \quad (3)$$

$$\text{and } \Gamma_i = \sum_{j=i+1}^{p} A_j \quad (4)$$

Estimates of Γ_i contain information on the short-run adjustments, while estimates of Π contain information on the long-run adjustments, in changes in y_t. The number of linearly dependent cointegrating vectors that exist in the system is referred to as the cointegrating rank of the system. This cointegrating rank may range from 1 to n-1 (Greene 2000:791). There are three possible cases in which $\Pi y_{t-1} \sim I(0)$ will hold. Firstly, if all the variables in y_t are I (0), this means that the coefficient matrix Π has r=n linearly independent columns and is referred to as full rank. The rank of Π could alternatively be zero: this would imply that there are no cointegrating relationships. The most common case is that the matrix Π has a reduced rank and there are $r<(n-1)$ cointegrating vectors present in β . This particular case can be represented by:

$$\Pi = \alpha\beta' \quad (5)$$

where α andβ are matrices with dimensions n x r and each column of matrix α contains coefficients that represent the speed of adjustment to disequilibrium, while matrix β contains the long-run coefficients of the cointegrating relationships.

In this case, testing for cointegration entails testing how many linearly independent columns there are in Π , effectively testing for the rank of Matrix Π (Harris, 1995:78-79). If we solve the eigenvalue specification of Johansen (1991), we obtain estimates of the eigenvalues $\lambda_1 > \ldots > \lambda_r > 0$ and the associated eigenvectors $\beta = (v_1, \ldots v_r)$. The co-integrating rank, r, can be formally tested with two statistics. The first is the maximum eigenvalue test given as:

$$\lambda\text{- max} = -T \ln (1- \lambda_{r+1}), \quad . \qquad (6)$$

Where the appropriate null is r = g cointegrating vectors against the alternative that $r \leq g+1$. The second statistic is the trace test and is computed as:

$$\lambda\text{-trace} = -T\sum_{i=r+1}^{n} \ln(1 - \lambda i), \qquad (7)$$

where the null being tested is r = g against the more general alternative $r \leq n$. The distribution of these tests is a mixture of functional of Brownian motions that are calculated via numerical simulation by Johansen and Juselius (1990) and Osterwald - Lenum (1992). Cheung and Lai (1993) use Monte Carlo methods to investigate the small sample properties of Johansen's λ-max and λ-trace statistics. In general, they find that both the λ-max and-λ trace statistics are sensitive to under parameterization of the lag length although they are not so to over parameterization.

2.3 The causality analysis

The most common way to test the causal relationship between two variables is the Granger-Causality proposed by Granger (1969). The test involves estimating the following simple vector autoregressions (VAR):

$$X_t = \sum_{i=1}^{n} \alpha_i Y_{t-i} + \sum_{j=1}^{n} \beta_j X_{t-j} + \mu_{1t} \quad (8)$$

$$Y_t = \sum_{i=1}^{m} \lambda_i X_{t-i} + \sum_{j=1}^{m} \delta_j Y_{t-j} + \mu_{2t} \quad (9)$$

Where it is assumed that the disturbances μ_{1t} and μ_{2t} are uncorrelated. Equation (8) represents that variable X is decided by lagged variable Y and X, so does equation (9) except that its dependent variable is Y instead of X.

Granger-Causality means the lagged Y influence X significantly in equation (8) and the lagged X influence Y significantly in equation (9). In other words, researchers can jointly test if the estimated lagged coefficient $\Sigma\alpha_i$ and $\Sigma\lambda_j$ are different from zero with F-statistics. When the jointly test reject the two null hypotheses that $\Sigma\alpha_i$ and $\Sigma\lambda_j$ both are not different from zero, causal relationships between X and Y are confirmed. The Granger-Causality test is easy to carry out and be able to apply in many kinds of empirical studies. However, traditional Granger-Causality has its limitations.

First, a two-variable Granger-Causality test without considering the effect of other variables is subject to possible specification bias. As pointed out by Gujarati (1995), a causality test is sensitive to model specification and the number of lags. It would reveal different results if it was relevant and was not included in the model. Therefore, the empirical evidence of a two-variable Granger-Causality is fragile because of this problem.

Second, time series data are often non-stationary (Maddala, 2001). This situation could exemplify the problem of spurious regression. Gujarati (2006) had also said that when the variables are integrated, the F-test procedure is not valid, as the test statistics do not have a standard distribution. Although researchers can still test the significance of individual coefficients with t-statistic, one may not be able to use F-statistic to jointly test the Granger-Causality. Enders (2004) proved that in some specific cases, using F-statistic to jointly test first differential VAR is permissible, when the two-variable VAR has lagged length of two periods and only one variable is nonstationary. Other shortcomings of these tests have been discussed in Toda and Phillips (1994).

Toda and Yamamoto (1995) propose an interesting yet simple procedure requiring the estimation of an augmented VAR which guarantees the asymptotic distribution of the Wald statistic (an asymptotic χ^2-distribution), since the testing procedure is robust to the integration and cointegration properties of the process.

We use a bivariate VAR (m + d_{max}) comprised of GDP per capita (RGDP) and the ratio of foreign direct investment inflows to GDP (RFDI), following Yamada (1998), and examine the non-causality between FDI and economic growth:

$$X_t = \omega + \sum_{i=1}^{m} \theta_i X_{t-i} + \sum_{i=m+1}^{m+dmax} \theta_i X_{t-i} + + \sum_{i=1}^{m} \delta_i Y_{t-i} + \sum_{i=m+1}^{m+dmax} \delta_i Y_{t-i} + v_{1t} \quad (10)$$

$$Y_t = \psi + \sum_{i=1}^{m} \phi_i Y_{t-i} + \sum_{i=m+1}^{m+dmax} \phi_i Y_{t-i} + + \sum_{i=1}^{m} \beta_i X_{t-i} + \sum_{i=m+1}^{m+dmax} \beta_i X_{t-i} + v_{2t} \quad (11)$$

Where X=lnRGDPC and Y=lnRFDI, and ω, θ's, δ's, ψ, ϕ's and β's are parameters of the model. dmax is the maximum order of integration suspected to occur in the system; v_{1t} ~N(0, Σ_{v1}) and v_{1t} ~N(0, Σ_{v1}) are the residuals of the model and Σ_{v1} and Σ_{v2} the covariance matrices of v_{1t} and v_{2t} , respectively. The null of non-causality from FDI to growth can be expressed as H_0: $\delta_i = 0$, ∀ i=1, 2, ..., m. Let $\delta = vec(\delta_1, \delta_2, \ldots \delta_m)$ be the vector of the first m VAR coefficients.

Two steps are involved with implementing the procedure. The first step includes the determination of the lag length (m) and the second one is the selection of the maximum order of integration ($d$max) for the variables in the system. Measures such as the Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), Final Prediction Error (FPE) and Hannan-Quinn (HQ) Information Criterion can be used to determine the appropriate lag order of the VAR.

We use the Augmented Dickey-Fuller (ADF) test for which the null hypothesis is non-stationarity as well as Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test for which the null hypothesis is stationarity to determine the maximum order of integration. We choose KPSS to have a cross-check. Many economists have argued against using the standard unit root tests and proposed using other powerful tests, such as tests that can be used to test the null of stationarity against the alternative of non-stationarity. A number of tests have been developed; the most popular one is the KPSS test developed by Kwiatkowski, Phillips, Schmidt, and Shin (1992). Kwiatkowski *et al.* (1992) argue that their test is "intended to complement unit root tests, such as the Dickey-Fuller tests. By testing both the unit root hypothesis and the stationarity hypothesis, we can distinguish between series that appear to be stationary, series that appear to have unit root, and series for which the data (or the tests) are not sufficiently informative to be sure whether they are stationary or integrated." Joint testing of both nulls can strengthen inferences made about the stationarity or non-stationarity of a time series especially when the outcomes of the two nulls corroborate each other. This joint testing has been known as *"confirmatory analysis."* For example, if the null of stationarity is accepted (rejected) and the null of non-stationarity is rejected (accepted), we have confirmation that the series is stationary (non-stationary). Conversely, we cannot have confirmation if both nulls are accepted or both are rejected.

3.0 RESULTS

Our main reason for conducing unit root tests is to determine the extra lags to be added to the vector autoregressive (VAR) model for the Toda and Yamamoto test.

Table 2: Augmented Dickey-Fuller (ADF) Unit Root Test

Variables	Constant, No Trend		Constant, with Trend		Order of Integration
	I(0)	I(1)	I(0)	I(1)	
lnRGDP	-2.329515 (-2.936942)	-5.829642* (-2.938987)	-2.066033 (-3.526609)	-6.130613* (-3.529758)	I(1)
lnRFDI	-1.285567 (-2.941145)	-12.27243* (-2.945842)	-4.873361* (-3.658446)	-	I(0)

Notes: * denotes rejection of the null hypothesis of unit root the at 5% level. Critical values at 0.05 are in parenthesis. R*GDP* and *RFDI* are GDP per capita and the ratio of FDI inflows to GDP, respectively.

Table 3: Kwiatkowski-Phillips-Schmidt-Shin (KPSS) Unit Root Test

Variables	Constant, No Trend	Order of Integration	Constant, with Trend	Order of Integration
lnRGDP	0.699131* (0.463000)	I(1)	0.183830* (0.146000)	I(1)
lnRFDI	0.739238* (0.463000)	I(1)	0.137951 (0.146000)	I(0)

Notes: * denotes rejection of the null hypothesis of stationarity the at 5% level. Critical values at 0.05 are in parenthesis.

Table 2 and 3 show that the GDP and FDI series are integrated of order one at the 5% significance level under both unit root tests, without trend. When we considered the unit root test with trend, ADF and KPSS tests reported I(1) for RGDP and I(0) for RFDI at 5% level. Hence, VAR models will add only one extra lag (i.e dmax=1) for the implementation of the causality test. Following the modelling approach described earlier, we determine the appropriate lag length and conducted the cointegration test.

Table 4: Lag Length Selection

Lag	FPE	AIC	SC	HQ
0	0.547312	5.072977	5.164586	5.103343
1	0.007905	0.834366	1.109191	0.925463
2	0.005770	0.515441	0.973484*	0.667269*
3	0.005493*	0.457014*	1.098273	0.669573
4	0.005977	0.524737	1.349213	0.798027

*indicates lag order selected by the criterion

Table 4 reports the optimal lag length of three (i.e m=3) out of a maximum of 4 lag lengths as selected by Final Prediction Error (FPE) and Akaike Information Criteria (AIC). We employed VAR Residual Serial Correlation LM Tests and inverse roots of the characteristic AR polynomial and found that the VAR is well-specified; there is no autocorrelation problem at the optimal lag, all the inverse roots of the characteristic AR polynomial must lie inside the unit circle and the modulus values are 0.98, 0.85, 076, 0.61, 0.61 and 0.21, thus VAR satisfies the stability condition.

Table 5: Result of Cointegration Test

	Null Hypothesis	Test Statistics	0.05 Critical Value	Probability Value
Lags		3		
Trace Statistics	r=0	17.41918	15.49471	0.0254
	r=1	0.163538	3.841466	0.6859
Max-Eigen Statistics	r=0	17.25565	14.26460	0.0163
	r≤1	0.163538	3.841466	0.6859
Trace	No of Vectors	1		
Max-Eigen	No of Vectors	1		
[a]Denotes rejection of the null hypothesis at 0.05 level				

Table 5 provides the results from the application of Johansen cointegration test among the data set. Empirical findings show that both the maximum eigenvalue and the trace tests reject the null hypothesis of no cointegration at the 5 percent significance level according to critical value estimates. The result show a cointegration rank of one in both trace test and max-eigen value test at 5% significance level. Thus maximum order of integration ($d$max) for the variables in the system is one (dmax=1)

The results above are based on the assumptions of linear deterministic trend and lag interval in first difference of 1 to 2. Overall, the Johansen cointegration test suggests that there exists a sustainable cum long-run equilibrium relationship between economic growth proxied by real gross domestic product (RGDP) and foreign direct investment (RFDI). This suggests causality in at least one direction.

T-Y Granger Causality Test

The empirical results of Granger Causality test based on Toda and Yamamoto (1995) methodology is estimated through MWALD test and reported in Table: 6. The estimates of MWALD test shows that the test result follows the chi-square distribution with 3 degrees of freedom in accordance with the appropriate lag length along with their associated probability.

Table 6: Toda-Yamamoto Causality (modified WALD) Test Result

Null Hypothesis	Chi-sq	Prob.	Granger Causality
RGDP does not granger cause RFDI	2.63273	0.4518	Unidirectional Causality RFDI → RGDP
RFDI does not granger cause RGDP	7.33202	0.0620	

It is clear from Table 6 that there is a unidirectional causality between the series running strictly from foreign direct investment to real GDP.

Finally, we employed traditional Granger causality test to compare results of T-Y granger causality test. As presented in table 7, the result supports Toda – Yamamoto causality result of unidirectional causality only at lag length of 4. There is no evidence of causality with 3, 5,6 and 7 lags. However, the result shows a unidirectional causality that run from real GDP to foreign direct investment.

Table 7: Pair-wise Granger Causality Test

Null Hypothesis	Lag	F-Value	Prob.	Granger Causality
RGDP does not granger cause RFDI	3	0.90324	0.4524	No Causality
RFDI does not granger cause RGDP		1.22584	0.3195	
RGDP does not granger cause RFDI	4	1.15568	0.3559	Unidirectional Causality RFDI → RGDP
RFDI does not granger cause RGDP		2.44256	0.0755	
RGDP does not granger cause RFDI	5	1.01023	0.4388	No Causality
RFDI does not granger cause RGDP		0.57944	0.7153	
RGDP does not granger cause RFDI	6	1.95150	0.1375	No Causality
RFDI does not granger cause RGDP		0.87721	0.5343	
RGDP does not granger cause RFDI	7	1.44942	0.2793	No Causality
RFDI does not granger cause RGDP		1.00755	0.4752	
RGDP does not granger cause RFDI	8	5.49541	0.0184	Unidirectional Causality RGDP → RFDI
RFDI does not granger cause RGDP		0.80546	0.6190	

5. Summary and Conclusion:

This paper applies unit-root test based on ADF and KPSS and Johansen and Juselius Cointegration test and VAR based Granger Causality Test proposed by Toda-Yamamoto (1995) to investigate the causation between foreign direct investment and economic growth in Nigeria for the period 1970-2010. This study found that there is a unidirectional causality between the series running strictly from foreign direct investment to real GDP. When we used the standard causality test, the result supports Toda – Yamamoto causality result of unidirectional causality only at lag length of 4. There is no evidence of causality with 3, 5,6 and 7 lags and the result also shows a unidirectional causality that run from real GDP to foreign direct investment at lag 8. It thus follows that it will take about eight years for there to be significant feedback effect on the economic growth arising from FDI inflows.

In conclusion, the findings of this research are consistent with economic theory that foreign direct investments stimulate economic growth in less developed countries. Therefore, foreign direct investment plays a very important role in the growth of Nigeria economy. As long as its inflow is encouraged, the economy will continue to witness growth in domestic product.

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