E-ISSN: 2707-6644
P-ISSN: 2707-6636
IJCPDM 2021; 2(1): 11-21
Received: 14-11-2020
Accepted: 18-12-2021

Kabiru Saidu Musa
Department of Economics, Faculty of Social Sciences, Bauchi State University Gadau, P.M.B 065, Yuli Campus, Bauchi, Nigeria

Rabiu Maijama'a
Nigerian National Petroleum Corporation, Central Business District, Garki, Abuja, Nigeria

Muhammad Mustapha Abdullahi
Department of Economics, Faculty of Social Sciences, Bauchi State University Gadau, P.M.B 065, Yuli Campus, Bauchi, Nigeria

Corresponding Author:
Kabiru Saidu Musa
Department of Economics, Faculty of Social Sciences, Bauchi State University Gadau, P.M.B 065, Yuli Campus, Bauchi, Nigeria

An analysis of foreign direct investment and economic growth nexus: Does domestic investment matters

Kabiru Saidu Musa, Rabiu Maijama'a and Muhammad Mustapha Abdullahi

DOI: https://doi.org/10.33545/27076636.2021.v2.i1a.21

Abstract
This study investigates the impact of foreign direct investment and domestic investment on economic growth in Nigeria between 1981 and 2018. The properties of time series variables were examined through the application of Augmented Dickey-Fuller and Philip Perron techniques in testing the unit root property of the series and autoregressive distributed lag model approach applied in testing the long-and-short run relationships. The results of unit root results suggested that there is a mixture of I(0) and I(1) variables in the model. The results of ARDL modelling revealed that foreign investment has a positive impact on economic growth in the long and short run, domestic investment has a negative impact on economic growth in the long and short-run while trade openness impacted positively on economic growth. It is the recommendation of this study that, concerted efforts should be made by the government, policymakers and relevant authorities to formulate policies that aim at creating a conducive investment environment so that Nigerians and non-Nigerian investors alike will be encouraged to increase their propensity to invest in the country. Policymakers should also take a step up in ensuring foreign exchange stability and improve trade openness, in order to achieve meaningful economic growth.

Keywords: foreign investment, domestic investment, economic growth, ARDL approach

Introduction
A very popular and thought-provoking question that falls in the mind of thinkers, policymakers and researchers; that why do countries of similar financial infrastructure, geographic position, level of economic development, technical knowhow and capital accessibility develop at different paces? Financial investments in a country for up-grading production processes and technical advances have long been a self-proclaimed reality as well as to narrow the capital gap, which stimulates economic growth and development (Mahmood & Alkhateeb, 2018) [17]. Any society's progress demands significant resources to keep it running. Investment, as the most important component of an open and effective economic system, also serves as a major factor in most countries' ability to expand. Besides, foreign direct investment has been advocated for economic sustainability in developed countries, Africa, Asia, and Latin America over the years (Abdulmumini &Tukur, 2012; Iya & Aminu, 2015) [1, 14].

It has been a general perception that changes in the economic growth of host countries induced by foreign direct investment always influence the level of the host nation's domestic investment. This issue arises from the fact that foreign direct investment lowers production, wages, and worsens the balance of payments of those nations (Agosin and Mayer, 2000) [2]. This is attributed to the fact that the benefits of such foreign direct investments do not naturally flood host nations, but instead drive out domestic investment by pushing local investors out of the market. Studies such as Akanbi (2010) [3] and Iya and Aminu (2015) [14] argued that a sustained rise in domestic investment will minimize widespread poverty in the Nigerian economy because domestic investment offers more work opportunities for indigenes than foreign direct investments. The magnitude of a country's need is so high that the finances available to meet the investment push of those activities required for its development are extremely limited. While domestic investment continues to be inadequate to stimulate economic growth in Nigeria, studies have affirmed that it has a greater influence on economic growth than FDI. To narrow the gap, sources must be found from outside the country where there is a surplus to balance the country's available domestic capital, and this is where foreign direct investment comes in (Iya & Aminu, 2015) [14].

Nigerian governments have taken steps to attract foreign investment into the country since 1990 in order to complement domestic capital that would fund developmental projects. The initiatives include the abolition of anti-foreign investment legislations, the promulgation of investment laws, and numerous over-the-sea trips by various presidents to clean up their profile (Iya & Aminu, 2015) [14]. Foreign direct investment is described as an investment made to gain a long-term management interest (for example, 10% in voting stocks) and at least 10% of equity shares in a business that exists in a country other than the investors' home country. Inflows of foreign direct investment into Nigeria amounted to US$ 2.23 billion in 2003, US$ 5.3 billion in 2004, and US$ 9.92 billion in 2005 (representing a percentage increase of 9.13 per cent and 87 per cent respectively). However, in 2006, the figure dropped marginally to US$ 9.44 billion. Inflows of foreign direct investment exceeded US$ 20.99 billion in the first half of 2019 (CBN, 2020).

Figure 1 shows the trend of Nigeria's foreign direct investment between 1980 and 2018. The trend exhibits a fluctuating movement at an increasing rate at the beginning of the study period up to around 2011 when it begins to decline until it reaches 2015. The trend increases from 2015 to 2016 and falls from 2016 to 2018.

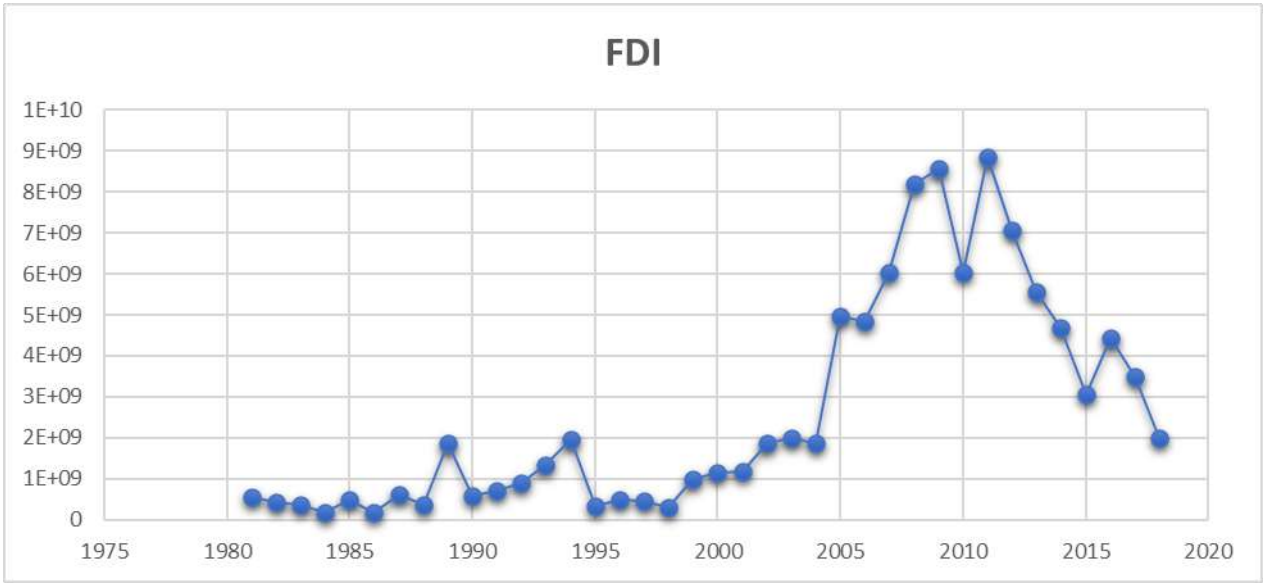

Fig 1: Trend of foreign direct investment in Nigeria from 1981 to 2018 (WDI, 2020)

On the relationship between foreign direct investments and economic growth in place of domestic investment, the majority of studies centered on either the effect of foreign direct investment on economic growth (Ayanwale, 2007; Li & Xiaming, 2004; Ekperiware, 2011) [5, 15, 11] or the impact of domestic investment on economic growth (Qin *et al*., 2006; Villa, 2008; Akanbi, 2010; Ekperiware, 2011) [28, 30, 3, 11] thus creating a gap. Therefore, the study is based on this premise, and it intends to fill a gap in the literature by looking into the impact of foreign direct investments in place of domestic investment on economic growth in Nigeria.

2.0 Literature review

Inflows of foreign direct investment have been attracted by many factors in the empirical literature. The most common and important factor is the size of an economy in terms of income. This can be estimated by either gross domestic product or income per capita. In a causality analysis, Ozturk and Huseyin (2007) [25] find a bidirectional relationship in foreign direct investment and gross domestic product relationship for the economy of Turkey. In another study, the relationship between gross domestic product and foreign direct investment, Miankhel *et al*. (2009) [22] found a positive influence of the latter on the former in Pakistan. This has proved that foreign direct investment enters into the economies with consistent growth of income and income of all countries were not necessarily strong enough to accommodate the demand for foreign investments. But in the case of Pakistan's economy, foreign direct investment only granger caused gross domestic product. Furthermore, Mahmood and Chaudhary (2009) established that there is a positive relationship between foreign direct investment inflows and economic growth of Pakistan.

Chakraborty and Basu (2002) [8] find a flow of relationship from gross domestic product to foreign investments in India using causality analysis. The study offered an alternative explanation on the effects of the inflow of foreign direct investment which could be positive or negative, depending upon incentives offered by the investing country via its trade policies. In a panel of developing economies, Henrick and Rand (2006) [13], established a positive contribution of gross domestic product in the foreign direct investment. Investors anticipate the return on invested capital and significant trends of economic and financial indicators compel the foreign investors to make considerable initiatives for investment in a country. In the same vein Mahmood (2016) [16], investigated the major macroeconomic determinants, including democracy as a proxy for institutional quality, of twenty-four major foreign direct investment's investing countries by applying pool mean group estimators over 1985-2014 periods. The study found that income levels of investors in recipient countries and trade openness were positively related to foreign direct investment from investing countries in the long run while there was no significant long-run impact of democracy but the significant short-run impact of democracy was found.

Majeed and Ahmad (2008) [21] analyzed the effect of foreign direct investment's elements in twenty-three developing economies. Foreign direct investment's determinants were examined at both micro and macro levels such as human capital, government spending, military spending, market size and urbanization. The result of the study indicated that there was a significant relationship among foreign direct investment's elements at both micro and macro levels in the case of the selected economies. Ghazali (2010) [12] found that there was two-way relation between domestic investment and gross domestic investment and one-way relation from gross domestic product to foreign direct investment while studying foreign direct investment in developing country while foreign direct investment not only supplements domestic investment but stimulates economic growth and further argues that a country has to create an encouraging atmosphere for foreign investors. Mahmood and Chaudhary (2012) [18] investigated this relationship for Pakistan by utilizing the ARDL cointegration for the 1972-2010 periods. Result proved that there exists a negative association between foreign and domestic investments while reporting that foreign and domestic investments were found to be substitutes instead of complements of each other in Pakistan. Therefore, the relationship between domestic and foreign investments can be substituted or complemented thereby making it an empirical question to be tested.

While studying the various factors of foreign direct investment in Kenya, Elijah (2006) [11] concludes that both trade openness and human capital led to a pleasant impact on foreign direct investment. Foreign direct investment was attracted by the availability of cheap labour in developing countries. But the availability of cheap labour is not enough, to avail the opportunity of foreign direct investment; the educated and skilled labour with entrepreneurs' capabilities are also required. Rihab and Lotfi (2011) [29] evaluated the level of foreign direct investment by using various variables including human resources in seventy-one developing countries during the period 2001-2006 and conclude that human resource development is a tool that has a positive association with foreign direct investment inflows.

Therefore, based on the literature review, this paper intends to identify whether the investment can serve as leading means to a faster and sustainable channel for modern economic growth, particularly through capital formation, productivity, infrastructural development and export; thereby making domestic investors automatically seek out the most favourable investment opportunity. Based on these, the study would add to the existing literature on the relationship between foreign direct investment, domestic investment and economic growth using the autoregressive distributed lag (ARDL) model for the data analysis covering the 1981-2018 periods.

3.0 Methodology

This section provides the step by step followed in achieving estimated empirical findings on the impact of foreign direct investments in place of domestic investment on the economic growth of Nigeria for the 1981-2018 periods. The process employed include the unit root tests, optimum lag selection test, ARDL bounds test, ARDL long-run model, short-run and error correction model as well as vector error correction (VECM) model granger causality test.

This paper used foreign investment (FDI), domestic investment (DIV), financial development (FDV) and trade openness (TOP) as independent variables in Nigerian economic growth model.

$$ECG_t = f(FDI_t, DIV_t, FDV_t, TOP_t) \quad (1)$$

Where ECG_t represents economic growth measured as GDP per capita (constant USD 2010), FDI_t reflect the inflows of foreign investment in Nigeria in billion dollars, DIV_t is representing domestic investment in Nigeria measured as gross fixed capital formation ratio of GDP, FDV_t is the financial development measured as a credit to private sector % of GDP and TOP_t is the trade openness measured as trade ratio of GDP, t is the time frame (1981-2018), and all data were sourced from World Development Indicators.

Equation 1 is the functional equation of the model that does not contain the drift parameter, slopes parameters and stochastic error term. As such, Equation 2 is the econometric form of the relationship that contains drift parameter, slopes parameters and the stochastic error term.

$$ECG_t = \varphi_1 FDI_t + \varphi_2 DIV_t + \varphi_3 FDV_t + \varphi_4 TOP_t + \varepsilon_t \quad (2)$$

Where ECG_t is economic growth at time t, FDI_t is the foreign direct investment at t, DIV_t is the domestic investment at time t, FDV_t represent financial market development at time t, TOP_t represent trade openness at time t, and ε_t is the error term.

Transforming Equation 2 into a simple natural logarithmic equation would help in achieving linearity assumption and prevent other regression analysis problems since the estimated coefficients of the series would be interpreted in terms of elasticity coefficients (Musa *et al*., 2019; Maijama'a and Musa, 2020) [24].

$$\ln ECG_t = \varphi_1 \ln FDI_t + \varphi_2 \ln DIV_t + \varphi_3 \ln FDV_t + \varphi_4 \ln TOP_t + \varpi_t \quad (3)$$

Where $\ln ECG_t$ is the natural logarithm of economic growth at time t, $\ln FDI_t$ is the natural logarithm of foreign direct investment at t, $\ln DIV_t$ is the natural logarithm of domestic investment at time t, $\ln FDV_t$ represent the natural logarithm

of financial market development at time t, $\ln TOP_t$ represent the natural logarithm of trade openness at time t, and white noise is given as ε_t

3.1 Unit Root Test

To capture the impact of modeled variables in Equation 2, this research is going to utilize the ARDL model developed by Pesaran *et al*. (2001) [26]. But before that, we are interested in identifying unit root problem in variables in Equation 2. For this purpose, Augmented Dickey Fuller (ADF, 1981) and Philip Perron (PP, 1988) unit root tests were utilized and the unit root equations based on autoregressive regressive (AR) model were given in Equations 4 to 6.

$$K_t = \chi_0 + \chi_1 K_{t-i} + \sum_{i=1}^{b} \chi_{1i} K_{t-i} + \varpi_t \quad (4)$$

$$K_t = \chi_0 + \theta t + \chi_1 K_{t-i} + \sum_{i=1}^{b} \chi_{1i} K_{t-i} + \varpi_t \quad (5)$$

$$K_t = \sum_{i=1}^{b} \chi_{1i} K_{t-i} + \varpi_t \quad (6)$$

K_t assumes a time series to be tested. A negative parameter, χ_1, can ensure the evidence of stationarity of a time series with a null hypothesis of χ_1 =0 (non-stationarity). $\sum_{i=1}^{b} \chi_{1i} K_{t-i}$ is used to remove endogeneity in the equation for robust results. Equation 4 is the ADF equation with intercept only on the other hand, Equation 5 is both with intercept and linear trend while Equation 6 is with no constant and linear trend.

3.2 Optimum Lag Selection Model

Following the application of the unit root test to determine the order of integration of the variables, it is necessary to determine the best number of lags that will give the best cointegration and model estimation results. To avoid getting spurious regression, the maximum lag determined must be free regression problems such as serial correlation, etc. Therefore, the optimal lag is determined using the framework of vector autoregressive (VAR) model, as shown in systems of equations:

$$\ln ECG_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} \ln ECG_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \ln FDI_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \ln DIV_{t-i} + \sum_{i=0}^{k} \alpha_{4i} \ln FDV_{t-i} + \sum_{i=0}^{k} \alpha_{5i} \ln TOP_{t-i} + \varpi_{1t} \quad (7)$$

$$\ln FDI_t = \alpha_6 + \sum_{i=1}^{k} \alpha_{7i} \ln FDI_{t-i} + \sum_{i=0}^{k} \alpha_{8i} \ln ECG_{t-i} + \sum_{i=0}^{k} \alpha_{9i} \ln DIV_{t-i} + \sum_{i=0}^{k} \alpha_{10i} \ln FDV_{t-i} + \sum_{i=0}^{k} \alpha_{11i} \ln TOP_{t-i} + \varpi_{2t} \quad (8)$$

$$\ln DIV_t = \alpha_{12} + \sum_{i=1}^{k} \alpha_{13i} \ln DIV_{t-i} + \sum_{i=0}^{k} \alpha_{14i} \ln ECG_{t-i} + \sum_{i=0}^{k} \alpha_{15i} \ln FDI_{t-j} + \sum_{i=0}^{k} \alpha_{16i} \ln FDV_{t-i} + \sum_{i=0}^{k} \alpha_{17i} \ln TOP_{t-i} + \varpi_{3t} \quad (9)$$

$$\ln FDV_t = \alpha_{18} + \sum_{i=1}^{k} \alpha_{19i} \ln FDV_{t-i} + \sum_{i=0}^{k} \alpha_{20i} \ln ECG_{t-i} + \sum_{i=0}^{k} \alpha_{21i} \ln FDI_{t-i} + \sum_{i=0}^{k} \alpha_{23i} \ln DIV_{t-i} + \sum_{i=0}^{k} \alpha_{24i} \ln TOP_{t-i} + \varpi_{4t} \quad (10)$$

$$\ln TOP_t = \alpha_{25} + \sum_{i=1}^{k} \alpha_{26i} \ln TOP_{t-i} + \sum_{i=0}^{k} \alpha_{27i} \ln ECG_{t-i} + \sum_{i=0}^{k} \alpha_{28i} \ln FDI_{t-i} + \sum_{i=0}^{k} \alpha_{29i} \ln DIV_{t-i} + \sum_{i=0}^{k} \alpha_{30i} \ln FDV_{t-j} + \varpi_{5t} \quad (11)$$

where ln is the natural logarithmic sign, k is the maximum lag, t is the time trend (1990-2019), $\phi_0 \ldots \phi_{30}$ include the constant and slopes parameters to be estimated, $\ln ECG_t$ is the natural logarithm of economic growth at time t, $\ln FDI_t$ is the natural logarithm of foreign direct investment at t, $\ln DIV_t$ is the natural logarithm of domestic investment at time t, $\ln FDV_t$ represent the natural logarithm of financial market development at time t, $\ln TOP_t$ represent the natural logarithm of trade openness at time t, and white noise vectors given as $\varpi_{1t} \ldots\ldots \varpi_{5t}$

3.3 Autoregressive Distributed Lag Model

After the establishment of unit root test using ADF, PP and subsequent optimum lag length determination, the economic growth model is estimated using autoregressive distributed lag (ARDL) model as this technique is applied to exploit the benefit of its efficiency and consistency for mixture order of integration of the interest series. The ARDL bound test equation can be written in the following way:

$$\begin{aligned}\Delta \ln ECG_t = \delta_0 &+ \sum_{k=1}^{l} \delta_{1i} \Delta \ln ECG_{t-k} + \sum_{k=0}^{m} \delta_{2i} \Delta \ln FDI_{t-k} + \sum_{k=0}^{n} \delta_{3i} \Delta \ln DIV_{t-k} + \sum_{k=0}^{p} \delta_{4i} \Delta \ln FDV_{t-k} \\ &+ \sum_{k=0}^{q} \delta_{5i} \Delta \ln TOP_{t-k} + \chi_1 \ln ECG_{t-k} + \chi_2 \ln FDI_{t-k} + \chi_3 \ln DIV_{t-k} + \chi_4 \ln FDV_{t-k} \\ &+ \chi_5 \ln TOP_{t-k} + \varpi_{1t}\end{aligned} \quad (12)$$

Where natural logarithmic sign is given by ln; $\delta_1 \ldots . \delta_5$ are coefficients of short-run parameters to be estimated; $\chi_1 \ldots . \chi_5$ are coefficients of long-run parameters to be estimated; Δ is the differenced sign; $\sum$ is the summation sign; ECG is the economic growth; FDI is the foreign direct investment; DIV is the domestic investment; FDV is the financial development; TOP is the trade openness; white noise is given by ϖ all at time frame t (1981-2018).

Equation 6 is used to obtain long-run equilibrium result. At first, the bound test could be performed on a null hypothesis of no-cointegration $\chi_1 = \chi_2 = \chi_3 = \chi_4 = \chi_5 = 0$ against the alternative hypothesis of cointegration relationship $\chi_1 \neq \chi_2 \neq \chi_3 \neq \chi_4 \neq \chi_5 \neq 0$. Furthermore, long-run effects of independent variables (FDI, DIV, FDV, TOP) can be captured through normalized coefficients of independent variables normalized with estimated coefficient of ECG_{t-1} in Equation 13.

$$\begin{aligned}\Delta \ln ECG_t = \delta_0 &+ \sum_{k=1}^{l} \delta_{1i} \Delta \ln ECG_{t-k} + \sum_{k=0}^{m} \delta_{2i} \Delta \ln FDI_{t-k} + \sum_{k=0}^{n} \delta_{3i} \ln \Delta DIV_{t-k} + \sum_{k=0}^{p} \delta_{4i} \ln \Delta FDV_{t-k} \\ &+ \sum_{k=0}^{q} \delta_{5i} \Delta \ln TOP_{t-k} + \vartheta ECT_{t-k} + \varpi_{2t}\end{aligned} \quad (13)$$

Where natural logarithmic sign is given by ln; $\delta_1 \ldots . \delta_5$ are coefficients of short-run parameters to be estimated; Δ is the differenced sign; $\sum$ is the summation sign; ECG is the economic growth; FDI is the foreign direct investment; DIV is the domestic investment; FDV is the financial development; TOP is the trade openness; white noise is given by ϖ all at time t.

The coefficients of differenced variables from Equation 13 can be estimated for the short-run effects of the explanatory variables on the explained variable. ECT_{t-1} is the lagged error term in error correction model and its negative coefficient may ensure the short-run relationship in the proposed model and it can also be an alternative way of declaring cointegration relationship in the model (Pesaran *et al*., 2001) [26].

The error correction equation can be obtained separately by extracting the ECT_{t-1} from Equation 13 and make it the subject of the equation as shown in Equation 14:

$$ECT_{t-k} = \Delta \ln ECG_t - \left[\begin{aligned} &\delta_0 + \sum_{k=1}^{l} \delta_{1i} \Delta \ln ECG_{t-k} + \sum_{k=0}^{m} \delta_{2i} \Delta \ln FDI_{t-k} + \sum_{k=0}^{n} \delta_{3i} \ln \Delta DIV_{t-k} + \sum_{k=0}^{p} \delta_{4i} \ln \Delta FDV_{t-k} \\ &+ \sum_{k=0}^{q} \delta_{5i} \Delta \ln TOP_{t-k} + \varpi_{2t} \end{aligned} \right] \quad (14)$$

Where ECT_{t-1} value measured the speed of adjustment or convergence from dynamic short-run disequilibrium path to equilibrium path in the model. And for the coefficient to be able to measure the speed of adjustment, it must be negative, statistically significant and less one in value (Pesaran *et al*., 2001) [26].

3.4 Granger Causality Model

To determine the direction of causality among the study's variables, Granger causality, a technique developed by Granger (1969) was utilized, and the modeling composition is given in the form of a vector autoregressive (VAR) model system of equations, where each of the independent variables in the main model is considered as a dependent variable in the subsequent models, as shown in the form of system equation model given in equation:

$$\ln ECG_t = \phi_0 + \sum_{i=1}^{k} \phi_{1i} \ln ECG_{t-i} + \sum_{i=1}^{k} \phi_{2i} \ln FDI_{t-i} + \sum_{i=1}^{k} \phi_{3i} \ln DIV_{t-i} + \sum_{i=1}^{k} \phi_{4i} \ln FDV_{t-i} + \sum_{i=1}^{k} \phi_{5i} \ln TOP_{t-i} + \varpi_{1t} \quad (15)$$

$$\ln FDI_t = \beta_0 + \sum_{i=1}^{k} \beta_{1i} \ln FDI_{t-i} + \sum_{i=1}^{k} \beta_{2i} \ln ECG_{t-i} + \sum_{i=1}^{k} \beta_{3i} \ln DIV_{t-i} + \sum_{i=1}^{k} \beta_{4i} \ln FDV_{t-i} + \sum_{i=1}^{k} \beta_{5i} \ln TOP_{t-i} + \varpi_{2t} \quad (16)$$

$$\ln DIV_t = \gamma_0 + \sum_{i=1}^{k} \gamma_{1i} \ln DIV_{t-i} + \sum_{i=1}^{k} \gamma_{2i} \ln ECG_{t-i} + \sum_{i=1}^{k} \gamma_{3i} \ln FDI_{t-j} + \sum_{i=1}^{k} \gamma_{4i} \ln FDV_{t-i} + \sum_{i=1}^{k} \gamma_{5i} \ln TOP_{t-i} + \varpi_{3t} \quad (17)$$

$$\ln FDV_t = \partial_0 + \sum_{i=1}^{k} \partial_{1i} \ln FDV_{t-i} + \sum_{i=1}^{k} \partial_{2i} \ln ECG_{t-i} + \sum_{i=1}^{k} \partial_{3i} \ln FDI_{t-i} + \sum_{i=1}^{k} \partial_{4i} \ln DIV_{t-i} + \sum_{i=1}^{k} \partial_{5i} \ln TOP_{t-i} + \varpi_{4t} \quad (18)$$

$$\ln TOP_t = \vartheta_0 + \sum_{i=1}^{k} \vartheta_{1i} \ln TOP_{t-i} + \sum_{i=1}^{k} \vartheta_{2i} \ln ECG_{t-i} + \sum_{i=1}^{k} \vartheta_{3i} \ln FDI_{t-i} + \sum_{i=1}^{k} \vartheta_{4i} \ln DIV_{t-i} + \sum_{i=1}^{k} \vartheta_{5i} \ln FDV_{t-j} + \varpi_{5t} \quad (19)$$

Where ln is the sign of natural logarithm, the drift parameters are given by $\phi_0, \beta_0, \gamma_0, \partial_0 \text{ and } \vartheta_0$; $\sum$ is the summation sign, t is the time frame (1981-2018), $\phi_j^{th}, \beta_j^{th}, \gamma_j^{th}, \partial_j^{th} \text{ and } \vartheta_j^{th}$ are the slope parameters or the coefficients of granger causalities to be estimated, FDI is the foreign direct investment; DIV is the domestic investment, FDV is the financial development, TOP is the trade openness and $\varpi_{1t} \ldots . \varpi_{5t}$ are the stochastic error terms.

4.0 Result and Discussions

This section offered discussions on the empirical findings regarding the impact of foreign direct investments and domestic investment on economic growth in Nigeria for the period of 1981 to 2018. The discussions of empirical findings started with trend graphical analysis of the variables, followed by descriptive statistics and correlation analysis, unit root tests, optimum lag selection result, the bounds test result, long-run and short-run ARDL results, granger causality test result and diagnostic checks results.

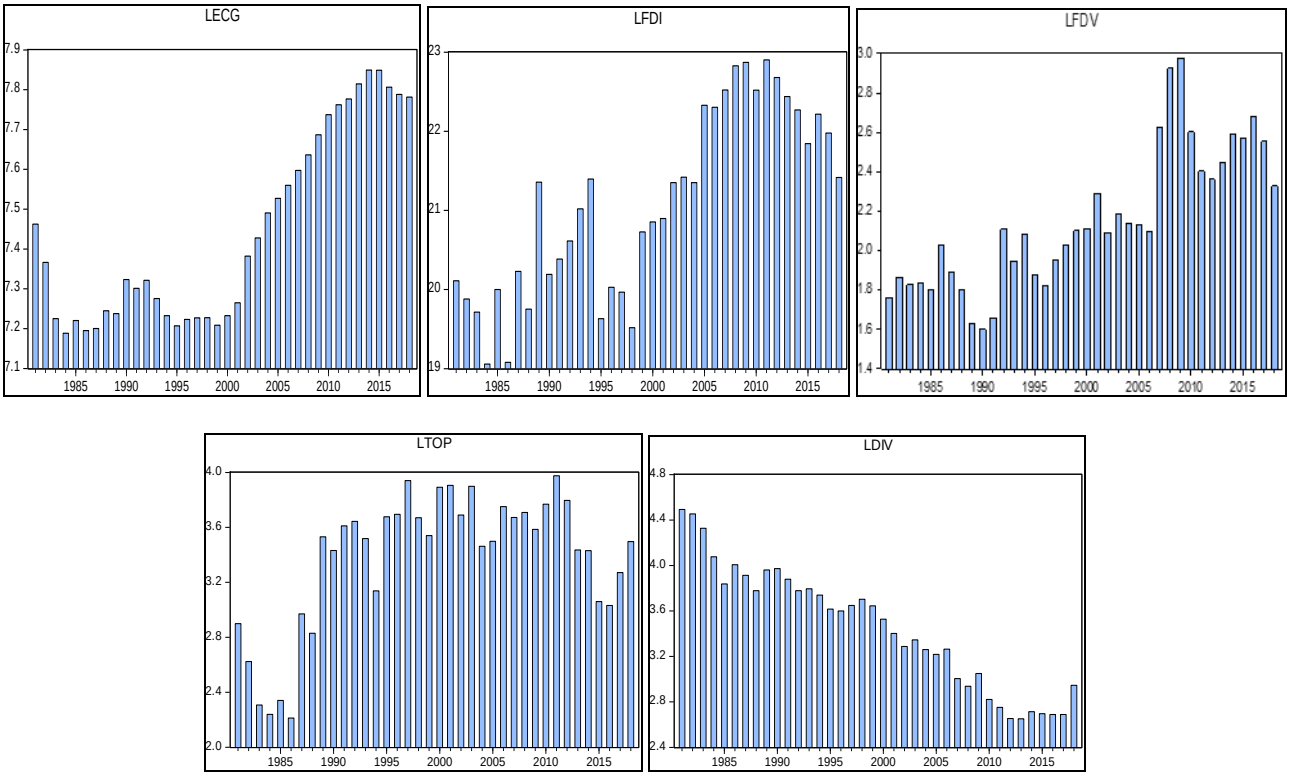

Fig 2: Graphical presentation of the variables used in the model

4.1 Descriptive Statistics and Correlation Analysis

The descriptive statistics and correlation analysis were reported in Table 1. Under descriptive statistics, the areas of description include mean, median, maximum and minimum values, standard deviation, kurtosis and skewness, Jarque-Bera value and its probability values.

Table 1: Data Description and Correlation Analysis

	ln ECG_t	**ln FDI_t**	**ln DIV_t**	**ln FDV_t**	**ln TOP_t**
Mean	7.443	21.096	3.450	2.149	3.372
Median	7.344	21.185	3.563	2.097	3.524
Maximum	7.849	22.902	4.492	2.976	3.975
Minimum	7.188	19.058	2.651	1.600	2.212
SD.	0.238	1.166	0.538	0.354	0.499
Skewness	0.517	-0.012	0.024	0.556	-1.071
Kurtosis	1.656	1.746	1.991	2.524	3.117
JB (P-values)	4.548 (0.102)	2.487 (0.288)	1.613 (0.446)	2.31 6 (0.313)	7.291 (0.026) **
OB.	38	38	38	38	38
lnECG	1.000				
lnFDI	0.822	1.000			
lnDIV	-0.844	-0.836	1.000		
lnFDV	0.785	0.790	-0.833	1.000	
lnTOP	0.246	0.519	-0.490	0.310	1.000

Note: JB =Jarque-Bera, SD.=Standard Deviation, OB=Observations, ** is 5% level of significant

The standard deviation values for all the variables indicated that the variables are distributed far below their mean and median values on a comparative basis. All the variables were positively skewed as indicated by the variables' skewness coefficients. All the variables were normally distributed within the study period of 1981-2018 as shown by the insignificant Jarque-Bera probability values except for trade openness. The correlation analysis indicated that positive correlations exist between foreign direct investment, financial development and economic growth whereas there was a negative correlation between domestic investment and economic growth.

4.1 Unit Root Test Result

To make a decision with regards to the most appropriate test to conduct for the variables of interest, the time series data need to be examined for their stationarity properties (Ali *et al*., 2017) even though the application of the ARDL method does require a formal unit root test for the variables but the test is performed just to be sure that none of the series is stationary at second difference i.e. I(2). Therefore, for the purpose of this study, the variables' stationary properties were inspected using ADF and PP unit root tests and their results were reported in Table 2.

Table 2: Unit Root Tests Results

	Augmented Dickey Fuller				
	Level		**First Difference**		
Variables	**C**	**C & T**	**C**	**C & T**	**Conclusion**
$lnECG_t$	-0.881 (0.782)	-1.510 (0.806)	-3.825 (0.000) ***	-3.006 (0.145)	I(1)
$lnFDI_t$	-1.814 (0.368)	-3.098 (0.121)	-9.930 (0.000) ***	-9.823 (0.000) ***	I(1)
$lnDIV_t$	-1.838 (0.356)	-2.31 (0.41)	-5.414 (0.000) ***	-5.626 (0.000) ***	I(1)
$lnFDV_t$	-1.728 (0.409)	-4.000 (0.018) **	-5.430 (0.000) ***	-5.317 (0.000) ***	I(0)
$lnTOP_t$	-1.866 (0.342)	-1.984 (0.590)	-7.251 (0.000) ***	-7.259 (0.000) ***	I(1)
Philip-Perron					
$lnECG_t$	-0.264 (0.920)	-3.172 (0.105)	-3.825 (0.006) ***	-3.741 (0.032) ***	I(1)
$lnFDI_t$	-1.528 (0.508)	-3.210 (0.098) *	-9.922 (0.000) ***	-9.825 (0.000) ***	I(1)
$lnDIV_t$	-1.850 (0.351)	-2.242 (0.453)	-5.410 (0.000) ***	-5.569 (0.000) ***	I(1)
$lnFDV_t$	-1.636 (0.454)	-2.295 (0.425)	-7.890 (0.000) ***	-7.753 (0.000) ***	I(1)
$lnTOP_t$	-1.869 (0.342)	-1.904 (0.632)	-7.264 (0.000) ***	-7.510 (0.000) ***	I(1)

Note: C = Constant, C & T = Constant & Trend, *** & ** 1% and 5% level of significance.

The unit root test results using ADF revealed that all the variables were not stationary at level but became stationary after first differencing with the exception of financial development (FDV) while under PP all the variables were stationary at first difference. Hence, all the variable that is stationary at a level were said to be integrated of order zero or more formally as I(0) variables whereas those that are stationary at first difference were said to be integrated of order one or I(1) variables. In summary, four variables were I(1) and one is I(0) under ADF while under PP all the variables were I(1). This is a perfect combination for the application of cointegration using the bounds test.

Optimum Lag Selection

To determine the optimum lag that is free from serial correlation and other regression problems, the study have utilized VAR optimum lag selection test and the outcome is presented in Table 3.

Table 3: Optimum Lag Selection Result

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-17.264	NA	0.000	1.272	1.494	1.348
1	96.591	188.676	0.000	-3.805	-2.472*	-3.345*
2	115.611	26.085	0.000	-3.463	-1.019	-2.619
3	156.124	43.984*	0.000*	-4.349*	-0.794	-3.122

Note. * denote lag selected by different criterion.

From the optimum lag selection result presented in Table 3, two information criterion (SC and HQ) selected lag 1 as indicated by the asterisks while the other three information criterion (LR, FPE, AIC) selected lag 3 also as indicated by the asterisks. Therefore, to be consistent with the majority of the information criteria, the study selected lag 3 as the maximum lag.

4.3 Bounds Test Result

After the test for the presence of unit root in the variables as presented in Table 2 that gave the best combination for the application of bounds test and the determination of optimum lag length for this study, Table 4 presented the bounds test result for cointegration relationship among the variables of the study.

Table 4: Bounds test result

Model Specification	Period	Optimal lag length	F-statistic
$ECG_t = f(FDI_t, DIV_t, FDV_t, TOP_t)$	1981-2018	ARDL (1, 0, 0, 0, 2)	4.856**
Critical value bounds	10%	5%	1%
I0 Bound (K = 4)	2.45	2.86	3.74
I1 Bound (K = 4)	3.52	4.01	5.06

Optimal lag length for the ARDL model was chosen based on Schwarz criterion (SIC); restricted intercept and no trend; ** indicate 5% level of significant.

From Table 4 the calculated F-statistic value of 4.86 is greater than lower bound and upper bound values at 5% level of significance and at this point, we strongly reject the null hypothesis that says there is no cointegration relationship among the variables and accepts the alternative hypothesis that says there is cointegration relationship among the variables. Therefore, both explained and explanatory variables are moving together in the long run.

4.4 Long-Run and Short Run Results

The strong existence of a cointegration relationship among the variables as reported in Table 5 gave the courage for investigating the long-run and short-run coefficients and the estimated long-run and short-run coefficients were reported in Table 5.

Table 5: Long-Run and Short Run Results

Model: $\ln ECG_t = \delta_1 \ln FDI_t + \delta_2 \ln DIV_t + \delta_3 \ln FDV_t + \delta_4 \ln TOP_t + \varpi_t$				
Variables	**Coefficients**	**Std. Error**	**t-Statistic**	**P-value.**
Long-run estimates				
$\ln FDI_t$	0.087**	0.035	2.429	0.021
$\ln DIV_t$	-0.481***	0.093	-5.144	0.000
$\ln FDV_t$	-0.101	0.113	-0.894	0.378
$\ln TOP_t$	-0.063	0.055	-1.142	0.262
Constant	7.698***	0.947	8.125	0.000
Short-run estimates				
$\Delta \ln FDI_t$	0.022**	0.019	2.318	0.027
$\Delta \ln DIV_t$	-0.126***	0.034	-3.697	0.000
$\Delta \ln FDV_t$	-0.021	0.033	-0.904	0.378
$\Delta \ln TOP_t$	-0.019	0.022	-0.434	0.667
$\Delta \ln TOP_{t-1}$	0.055**	0.020	2.742	0.010
ECT_{t-1}	-0.262***	0.061	-4.276	0.000

*** is 1% level of significance.

** is 5% level of significance.

The estimated outcomes reported in Table 5 showed that there is a significant positive impact of foreign direct investment on economic growth in the long-run and short run. Precisely, a percentage increase in foreign direct investment inflow is associated with a 0.087 per cent increase in economic growth in the long run while a 0.022 per cent increase in economic

growth in the short-run horizon. These empirical findings are in line with the findings of Agosin and Mayer (2000) [2] and Iya and Aminu (2015) [14] who documented a positive relationship between foreign direct investment and economic growth.
Moreover, domestic investment appeared to be negative and significantly associated with economic growth at a 1 per cent level of significance in the long-run and short run. Particularly, a one per cent increase in domestic investment is associated with 0.481 per cent decreases in economic growth in the long run while a 0.126 per cent decrease in economic growth in the short-run period. This contradicts the findings of some researchers such as Abdulmumini and Tukur (2012) [1] and Iya and Aminu (2015) [14] who reported the existence of a positive relationship between domestic investment and economic growth.
Furthermore, trade openness appeared negative and insignificant with economic growth in the long run while exerting significant positive with economic growth in the short run. This implies that if the economy is one per cent trade-open it would bring about a 0.055 per cent increase in economic growth in the short-run only. This result corroborates the finding Iya and Aminu (2015) [14] who reported a positive relationship between domestic investment and economic growth.
Satisfying the econometric requirements of been statistically significant, negative and less than one in value of error correction term (ECT) makes it possible for the existence of the short-run coefficients and also served as a confirmation for the existence of cointegration relationship among the variables. Hence, the ECT value of -0.262 implies that the speed of convergence to equilibrium position due to the existence of short-run dynamic disequilibrium is at 26.2% every year.

Diagnostic Checks Results
After the estimation of the cointegration relationship among the variables using the bounds test, long-run and short-run coefficients brings about the need for the estimation of some reliability tests in order to determine the strength of the estimated model, therefore the result is offered in Table 6.

Table 6: Reliability tests

Test statistics	F Version	LM version
A: Serial correlation	1.26 (0.29)	3.18 (0.20)
B: Heteroscedasticity	1.24 (0.31)	8.55 (0.28)
C: Normality	0.51 (0.77)	Not applicable
D: Functional Form	2.87 (0.10)	1.69 (0.10)
CUSUM	Stable	
CUSUMSQ	Stable	

A: Breusch-Godfrey Serial Correlation LM test
B: Based on Breusch-Pagan-Godfrey
C: Based on Jarque-Bera test
D: Ramsey RESET test using squares of fitted values

Diagnostic tests outcome presented in Table 6 revealed that for all the tests employed, their null hypotheses could not be rejected since their p-values were greater than 0.05 and this is a sign of a good model since the estimated model has passed all the reliability tests. But one important thing with regard to passing all the diagnostic tests is the stability of the model. The stability test as suggested by Brown *et al*. (1975) [6] was implemented and the result showed that there is stability among the variables throughout the study periods as illustrated in Figure 3.

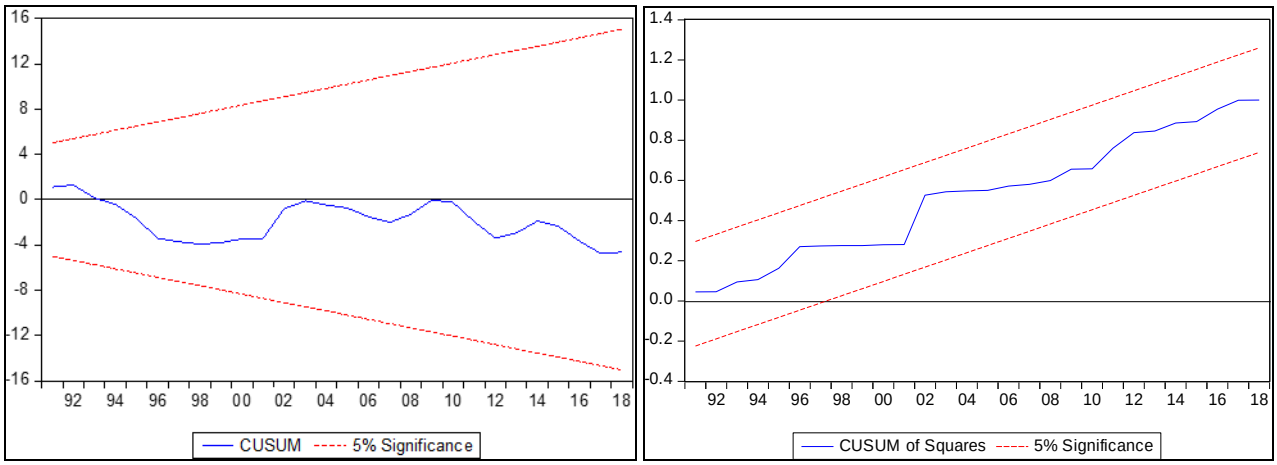

Fig 3: Plots of CUSUM and CUSUMSQ for model stability.

5.0 Summary, Conclusion and Policy Recommendation
This paper investigated the relationship between economic growth, domestic and foreign investments in Nigeria. The ADF and PP techniques were employed to determine the unit root property of the series while the ARDL technique was employed estimation. The results that there was a combination of I(0) and I(1) variables. The ARDL result revealed that foreign investment exerts a positive impact on economic growth in the long-run and short-run while domestic investment impacted economic growth in the long-run and short-run but trade openness impacted positively on economic growth in the short-run. The ECT result confirmed the existence of a long-run relationship between economic growth, foreign direct investment and

domestic investment. The speed of adjustment was found to be 26.2% every year for the long-run equilibrium. This paper found that there is no problem of serial correlation using Breusch-Godfrey serial correlation test, absence of heteroscedasticity by means of Breusch-Godfrey test, the model is normally distributed using Jarque-Bera test, errors in the model were specified using Ramsey RESET test and errors were stable using CUSUM and CUSUMSQ.

In conclusion, this paper found a positive and significant relationship between economic growth, foreign investments and trade openness in Nigeria alongside a negative relationship between economic growth and domestic investment. Therefore, it is recommended that concerted effort should be made by the government, policymakers and relevant authorities to formulate policies aiming at creating a conducive investment environment so that Nigerians and non-Nigerian investors alike would be encouraged to increase their propensity to invest in the country. Policymakers should also take a step to ensure that there is foreign exchange stability and improve trade openness (liberalization of the economy) so as to achieve meaningful economic growth.

Conflict of Interest

The authors declare no potential conflict of interest regarding the publication of this work.

Funding

The author(s) received no financial support with regards to the research, authorship and publication of this paper.

References

1. Abdulmumini BA, Tukur G. The relationship between domestic investment and economic growth in Nigeria. International Journal of Research in Social Sciences, 2012;2(3):256-279.
2. Agosin MR, Mayer R. Foreign investment in developing countries does it crowd in domestic investment? Department of Economics, University of Chile, Santiago 2000.
3. Akanbi OA. Role of governance in explaining domestic investment in Nigeria. Working paper number 168. Department of Economics, University of Pretoria, South Africa 2010.
4. Ali W, Abdullah A, Azam M. Re-visiting the environmental Kuznets curve hypothesis for Malaysia: fresh evidence from ARDL bounds testing approach. Renewable and Sustainable Energy Review 2017;77:990-1000.
5. Ayanwale AB. Foreign direct investment and economic growth: Evidence from Nigeria. AERC research paper 165. African Economic Research Consortium, Nairobi 2007.
6. Brown RL, Durbin J, Evans JM. Techniques for testing the constancy of regression relations over time. Journal of the Royal Statistical Society, Series B, 1975;37:149-163.
7. Central Bank of Nigeria Economic Reports First Half of 2020, 73. Retrieve from https://www.cbn.gov.ng
8. Chakraborty C, Basu P. Foreign direct investment and growth in India: A cointegration approach. Applied Economics 2002;34(9):1061-1073.
9. Dickey DA, Fuller WA. Likelihood ration statistics for autoregressive time series with a unit root. *Econometrica* 1981;49:1057-1071
10. GP Pokhariyal. Importance of moderating and intervening variables on the relationship between independent and dependent variables. Int J Stat Appl Math 2019;4(5):01-04.
11. Elijah OK. Determinants of Foreign Direct Investment in Kenya. Dakar: Institute African de Développement Economique et de Planification 2006, BP3186-CP1824. Dakar.
12. Ghazali A. Analyzing the relationship between foreign direct investment, domestic investment and economic growth for Pakistan. International Research Journal of Finance and Economics 2010;47(1):123-131.
13. Henrick H, Rand J. On the causal links between FDI and growth in developing countries. The World Economy 2006;29(1):21-41.
14. Iya IB, Aminu U. An investigation into the impact of domestic investment and foreign direct investment on economic growth in Nigeria. International Journal ofHumanities Social Sciences and Education, 2015;2(7):40-50.
15. Li X, Xiaming L. Foreign direct investment and economic growth: An increasingly endogenous relationship. World development 2004;33(3):393-407.
16. Mahmood H. Determinants of bilateral foreign direct investment inflows in Pakistan from major investing countries: A dynamic panel approach. Journal of Applied Economic Sciences 2016;11(7:45):1471-1476.
17. Mahmood H, Alkhateeb TTF. Foreign direct investment, domestic investment and oil price nexus in Saudi Arabia. International Journal of Energy Economics and Policy 2018;8(4):147-151.
18. Mahmood H, Chaudhary AR. Foreign direct investment and domestic investment nexus in Pakistan. *Middle*-East Journal of Scientific Research, 2012;11(11):1500-1507.
19. Maijama'a R, Musa KS. Crude oil price fluctuation and unemployment nexus in Nigeria: evidence from VECM technique. Energy Economics Letters 2020;7(2):94-109. https://doi.org/10.18488/journal.82.2020.72.94.109
20. Maijama'a R, Musa KS, Yakubu M, Usman SH. Petroleum pump price and interest rate on food prices in Nigeria: ARDL approach. International Journal of Scientific and Research Publications. 2019;10(3):275-294. http://dx.doi.org/10.29322/IJSRP.10.03.2020.p9930
21. Majeed MT, Ahmad E. Human capital development and FDI in developing countries. Journal of Economics Cooperation 2008;29(3):79-104.
22. Miankhel AK, Thangavelu SM, Kalirajan K. foreign direct investment, exports, and economic growth in south Asia and selected emerging countries: A multivariate VAR analysis. CCAS, Working 2009;23:1-28.

23. Musa KS, Maijama'a R. Causal relationship between renewable energy consumption and unemployment in Nigeria: evidence from Toda and Yamamoto causality technique. Energy Economics Letters 2020;7(1):46-60. https://doi.org/10.18488/journal.82.2020.71.46.60
24. Musa KS, Maijama'a R, Shaibu HU, Muhammad A. Crude oil price and exchange rate on economic growth: ARDL Approach. Open Access Library Journal 2019; 6(5):1-16. https://doi.org/10.4236/oalib.1105930
25. Ozturk I, Huseyin K. Foreign direct investment and growth: An empirical investigation based on cross-country comparison. *Economia Internazionale* 2007;60(1):75-82.
26. Pesaran MH, Shin Y, Smith R. Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics 2001;16(3):289-326.
27. Phillip PCB, Perron P. Testing for a unit root in time series regression. Biometrika 1988;75(2):335-346.
28. Qin D, Cagas MA, Quising P, He XH. How much does investment drive economic growth in China? Journal of Policy Modelling 2006;28(7):751-774.
29. Rihab B, Lotfi B. The institutional and cultural determinants of foreign direct investment in transition countries. Journal of Research in International Business and Management 2011;1(2):171-182.
30. Villa S. Economic growth, investment and government consumption in Italy: A VAR Analysis. Journal of Applied Economics 2008;7(4):23-32.
31. World Development Indicators of World Bank. Available online at https://data.worldbank.org/indicator
32. Ekperiware CM. Oil and nonoil FDI and economic growth in Nigeria. Emerging trends in Economics and Management Sciences 2011;2(4):333-343.