

# Macroeconomic as Basis of Economic Growth : An ARDL Approach

I.J. Oluwafemi<sup>1\*</sup>, O. T. Laseinde<sup>2</sup>

<sup>1\*</sup>Department of Electrical & Computer Engr, Afe Babalola University, Ado Ekiti, Nigeria

<sup>1</sup>Postgraduate School of Engineering Management, University of Johannesburg, South Africa.

<sup>2</sup>Department of Mechanical and Industrial Engineering, University of Johannesburg, South Africa.

Corresponding Author; johnifetayo@gmail.com

## Abstract-

We examined the effect of some selected macroeconomic factors reflecting on Nigeria economic growth between the periods of the year 1981 to the year 2015 using Auto Regressive Distributed Lag denoted as ARDL method. Findings revealed that foreign direct investment, and trade openness were the major factors that determine real gross domestic product, especially in the short run. On this basis, this paper, therefore, concluded that increase in the net flow from foreign investors from the rest of the world has a significant effect on the Nigeria economy as it increases the capital inflow and improves economic growth.

**Keywords:** Foreign Direct Investment, Government Expenditure, Inflation Rate, Economic Growth, Nigeria

## 1. Introduction

There have been questions on what influences economic growth, why some nations develop much quicker than the other and the major reason for the unequal rates in the growth amidst some nations have received far-reaching attention in the economic literature. These issues have been some major underlying economic problems which are still under investigation by various researchers across the globe. Some fundamentals such as economic, institutional issues, social and cultural issues as well as political factors are identified as the main factors which have greatly contributed towards economic growth. These factors are well illustrated by many scholars in their respective studies but without emphasis on the major determinants of growth[1]. Growth is described as the end result of every economic activity in a country[2-4]. From an economic point of view, a nation's economic growth is usually affected by numerous macroeconomic variables such as money supply, amount of government expenditure, foreign direct investment, fixed capital formation, inflation rates, net export among others. The influence of these factors on a nation's economic growth varies, this is because some factors have a positive effect, while others have undesirable consequence on economic growth. These macroeconomic factors largely determine the macroeconomic policies that a country will target. The Economic growth of any nation is usually quantified by the rise in its gross domestic product always denoted by GDP and it transpires when a nation's economy's productivity ability rises, which in turn is used to produce more goods and services[5, 6]. A significant macroeconomic objective of an economy is to achieve a higher growth rate. In the last decade, the Nigerian economy has experienced a higher growth rate with crude oil production accounting over 80% of the entire income earned by the country. Thus, classified the economy as a mono-sector economy, which implies that it is a one sector



economy with little or no contribution from other sectors. However, in the year 2016, Nigerian economy experience a downturn in the growth rate and declared recessed, which did not to recover steadiness until the first quarter of 2017 with a little growth percentage of 1.5%. Significant simultaneous shocks in some macroeconomic variables have been attributed to the negative growth rate recorded in the first to third quarter of the year 2016, which is controlled by both internal and external factors. In the last few years, there has been a major policies reform by the present administration with the aim of improving other sectors of their Nigeria economy such as industrial sector, financial sector, communication sector among the objectives is to sustain the current growth rate. Several policies have been introduced toward increasing government spending, reducing inflationary pressure, and maintain a steady exchange rate to foster foreign direct investment in Nigeria. All these policies were initiated by the Nigerian government with the aim of improving the productivity of the country to accomplish economic growth.

Therefore, the need to understand the determining factors responsible for economic development is inevitable, its importance is not restricted to its advantage from the policy point of view, and it is one of the key elements of macro management. There have been different opinions in the literature on the consequence of macroeconomic circumstances in respect to economic improvement, especially in emerging nations as well as developed nations. More so, there have been contrasting views regarding which macroeconomic factor exerts greater influence on the economic growth or determines the nature of aggregate economic activities. For this reason, this seeks to examines the effect of some selected macroeconomic factors, which include overseas direct investment, government expenditure and inflation rates on the economic growth

## 2. An Overview of Nigerian Economy

The role of Foreign Direct Investment (FDI) plays in the pursuant of economic development is very crucial. FDI is known as one of the major contributors to economic growth, it regarded an instrument of economic growth in which its impact is inevitable[7-10]. The major impact Foreign Direct Investment has on economic growth is owing to the contribution of the new emerging technology and the contribution of capital growth. In Nigeria, before the 1970s, Foreign Direct Investment, which is widely accepted as an economic growth tool was not regarded in Nigeria as such. Shortly after this period, the country began to enjoy the economic advantage of FDI as well as its effects on Nigeria economy was remarkable. In a study, conducted by Oladipo in 1985, he enumerated the economic gain of the FDI in Nigeria at this era to be 434.1 million naira, which is equivalent to 1.2 million dollars which later drastically decreases between the year 1990 to 1995. The statistical percentage in the decrease was estimated to be 34% as against the 98% gain between the year 1985 to 1990. The loss, which is about 33.7% was assumed to be because of the farfetched rise in the economic policy implemented between the periods of 1993 to 1995. The dwindling trend noticed between the periods and the associated slow growth in the country economy was due to the hold in the Structural Adjustment Programme (SAP) by the government in the year 1994[11].

Between the year 2000 to 2015, the FDI in Nigeria experiences a great increase while the country experiences a drastic decrease in the FDI which was said to be between 135.9% to 87%. This was because the Nigerian government recognized the prominence of domestic investment in enhancing growth. In lieu of this, the government put in place

numerous strategies which entail the implementation of incentives policies and ensured regulatory measures were adhered to strictly in order to promote domestic investments in the country[12].

The FDI in Nigeria between 2007 to 2016 was said to \$1353m, as at the year 2012, it experiences a great increase reaching about \$ 3084.90m in the 4<sup>th</sup> quarter of the year 2012 and later dropped as low as \$501.83m in the 4<sup>th</sup> quarter of the year 2016. The Foreign Direct Investment picked up to about \$1269.22m in the last quarter of the year 2016, all these illustrations are shown in figure 1. Below

**Figure 1. The Flow of FDI in Nigeria**



**Source: Culled from the Trading Economics, 2017**

In the 1960s, crude oil was uncovered in Nigeria in large quantity, this discovery of the crude oil boosted the economic performance of the country through the sales of crude oil to other countries.

**Figure 2. The Government Expenditure in Nigeria**



**Source: Culled from the Trading Economics, 2017**

Nigeria's oil income overwhelmingly tolerated huge federal government expenditure. An impressive jerk occurred in the Nigeria Capital expenditure between the year 1974 and 1980, this was a notable rise in the country income due to the satisfactory improvements in the global petroleum market. This era, therefore, perceived an increase in the delivery of the basic social infrastructure such as the construction of high ways, the building of airports and seaports, the establishment of new educational facilities. However, in 1980, the federal government Capital expenditure in GDP experiences a gradual decrease from

20.48% to 6.27% in 1995. This echoed the admittance of the recommendation made by SAP, which reflects the effect of oil's overabundance in the 1980s has on the income of the country, which by extension has on its expenditure. Owing to the huge proceeds of crude oil, the Nigeria government expenditure has perceived a high rise in its expenditure and this has increased the exigency of public utilities such as good infrastructure amenities. Also, it becomes highly imperative to make available adequate security for the entire country.

## 2.1 Theoretical Issues and Empirical Literature

There are mainly three categories of theories of growth which has been evolving over a long period of time. Each of these theories is building upon one another. These theories include the classical growth theory and neoclassical growth theory as well as new economic growth theory. It is quite evident that the origin of the classical theory of economic growth can be linked to Adam Smith's wealth of nations[13-15]. Adam Smith advocated division of labor and specialization, minimum government interference and emphasized the need for a stable legal framework. He believed that the economic development of a country is limited to the limits of the division of labor in that country. This view was succeeded by Thomas Malthus, John Stuart Mill, and David Ricardo. Generally, the success recorded in the economy of the nation was perceived to be because of the growth in the national treasure. Therefore, the theory of national advantage was considered a principal tool for economic policy[16].

### 2.1.1 Classical Theory on Economic Growth

Derivation of the classical theory was linked to Adam Smith's essay on the Wealth of Nations[16]. This essay basically advocated the division of labor and specialization using absolute advantage. Smith explained that the division of labor stimulates improvements in machinery and supported specialization which encourages international trade as a driver of growth. In the theory, progress was seen from the growth of national wealth. This was postulated to be achieved through several forces such as population growth, investment (capital accumulation), technological advancements and land growth. According to Smith, the main source of economic growth is the nation's workforce that is used in productive labor and capital accumulation, this is because, to have a high level of the workforce engaged in productive labor, the capital accumulation must be high. This will provide the conditions for the division of labor and specialization which are the main causes of economic growth. But, government expenditures were considered as unproductive. Thus, population growth was taking as endogenous since increasing population has the capacity to increase the workforce. The saving rate (investment) was endogenous because it is savings that produce investment and an increase in investment level yield growth. The theory explains that as soon as actual per capita GDP increases overhead the equilibrium level, a population blast would reverse actually per capita GDP to the equilibrium level. Thus, the real GDP growth is temporary, this theory was criticized on this basis. The historical evidence shows population increment proportion is not closely connected to its capital income and population development does not bring back income to equilibrium levels.

### 2.1.2. Neoclassical Growth Theory

The contributions made to this growth theory were made by Tobin, Solow, Swan, Meade, and Johnson. The basic assumptions here include the existence of perfect competition in factor and commodity markets, factor payments equal their marginal revenue, productivity, the capital output ratio is subject to variation and there is full employment. There is an assertion in the model, it is assumed that if there is a continuous upturn in the capital investment, the growth rate tends to increase for the time being due to the percentage of money to labor that goes up [17]. The insignificant product of the extra units of capital is presumed to fall off and the economy experiences a sustainable growth. The GDP appreciates along with workforce productivity, which signifies a notable improvement in productivity. Neoclassical growth theory stated that actual GDP per person increases due to technological advancement which enhances the productivity of labor and capital increase, thereby balancing savings and investment that enables capital per hour of labor appreciates or grow. The variations in the level of technological advancement explain much of its impact on the economic growth amidst developed nations. Neo-classical model regards an increase in productivity in form of exogenous variable, this means productivity is presumed as self-determining of capital investment[18].

## 2.2 Empirical Review

Many economist scholars have examined the determining factor of economic growth employing numerous macroeconomic factors, most of these researches have characterized what strikes or hampers economic development in emerging or advanced nations[19]. Reviews of relevant literature on the influence of macroeconomic features on economic progress are presented in this section.

### 2.2.1 Government Expenditure and Economic Growth

Okoro [20], surveyed the impact of government spending or expenditure on the Nigeria economic growth, adopting data of a period of 32 years, 1980-2011. The dependent variable used in his study was real gross domestic product while government capital spending was adopted as the independent variables as well as government recurrent expenditure. From the findings, it was revealed that there is a continuous relationship that exists amidst government spending. In his study, the short-run dynamics forces adjust at a fast rate of 60% per year to the long-run equilibrium relationship.

Moreover, Ebong et al [21], evaluated the effect of government spending in Nigeria on economic growth from 1970 to 2012. He adopted 'Multiple Regression Model' founded on a revised endogenous growth outline to determine the interrelationship between capital spending on economic growth development, agriculture, health amenities, and education. Leveraging on 'Error Correction model and Cointegration test', Ordinary Least Squares was employed to scrutinize the annual time series. The impact of government capital spending in the short and long-run period was projected on the economic growth. He concluded that capital expenditure has a variance impact on economic output. The capital expenditure exerted on agriculture does not have any tangible impact on growth. Also, the



consistent short-run and long-run effect on the increase in the capital spending exerted on education was said to be 0.45 and 0.48. These outcomes were encouraging and are highly significant statistically. Short-run effect of health capital spending was 0.21, the long-run effect of health capital spending exerted on economic development was 0.21, the long-run effect was said to be 0.16. These effects on economic growth were quite dissatisfactory and highly insignificant. The spending exerted on economic infrastructural development has an explicit effect on the growth, which was said to be 0.28 at the short-run and 0.32 in the long-run. Besides, these spending did not exclude the private investment. From his findings, it was observed government spending on human capital development directly exerted on social services sector tends to raise economic growth unlike the one exerted on agriculture. Despite the agricultural sector serves as the key provider of employment opportunities which also serves as an essential channel of economic growth. The Nigeria agricultural sector needs to be given priority in terms of increase in government budget on agriculture, in a bit to improve the agricultural outputs of the country.

In the same vein, Olulu *et al* [22], investigated the genuine relationship that exists amidst government spending and economic growth. He classified government expenditure to be public expenditure, expenditure exerted on health, education as well as total government expenditure. He adopted Ordinary Least

Square to deduce 'short-run relationship' amidst variables, nevertheless, the Augmented Dicky-Fuller test was employed to determine the 'long run relationship' amidst the variable in his equation. The outcome of the test indicates a contrary relationship exists between the government spending on health as well as economic growth while spending the government exerted on the educational sector is considered inadequate to enhance the expansion of the educational sector in Nigeria. Part of his findings deduced that adequate government expenditure can encourage both foreign and local investments in Nigeria. He concluded by recommending to the government to engage in more spending on adequate macro-variables like the power sector, the health sector as well as provision of infrastructural amenities. By so doing, adequate government expenditure will influence positively the transformation program of the government and, stimulate growth in the country economy.

Furthermore, Thompson researched the influence of Nigeria government expenditure on her economic growth, this is to establish if the government spending brings about economic development. A time series data was gathered between 1981-2014, this data was analyzed using Ordinary Least Square estimation procedure. The researcher adopted 'Real Gross Domestic Product as his dependent Variable and used government Capital' as well as her recurrent expenditure as its independent variables. The regression analysis from these findings indicated that the government capital, as well as its recurrent expenditure, have a reasonable impact in real GDP increase. He recommended in his study that the government should channel more of its recurrent expenditure one economic and community services knowing this foster economic growth. He deduced that the agricultural sector and the industrial sector plays an important role in increasing the country's industrial activities. Hence, bringing employment opportunities to the masses. Also, Kiprop *et al*, empirically surveyed the impact government spending has on economic development in the eastern part of Africa, leveraging on existing studies which

has examined the same objective with some conflicting outcomes. His research employed a time series data of 1980 to 2010 and his findings indicated the tangible impact government allocation and spending on health, as well as the defense sector, has on economic growth. His findings were in total contrast to earlier findings where other researchers emphasized need to exert more funds into the agricultural and educational sector. He recommended that the eastern African should embrace policies that support more concentration on increment in government spending in the health and defense sector while little attention should be given to another sector.

### 3. Method and Data

This paper adopted new growth theory, this is because the theory is a new substitute of growth theory that embraces a various form of theoretical, empirical study that arose in the 1980s. It is also an endogenous growth model that differentiates its characteristics presumably from the neoclassical growth. The contributing factor of growth based on the new growth theory is a tenacious innovation and non-diminishing returns. The theory predicts that economic growth will never end because human indefinite wants will lead to decisions that will bring increased productivity and continuous economic growth. Likewise, New Growth theorists propose that the government must also fund or seek for funding for the execution of infrastructure projects, like the construction of new roads, construction of railway lines and establishing modern markets, modern hospitals. The theory also emphasizes that foreign direct investment increases long-run development endogenously through boosting Total Factor Productivity in the manufacturing and production process.

#### 3.1 Data Descriptions

This study makes use of time-series data in its analysis. The sample consists of annual data from 1980 to 2015. The dataset was obtained through secondary sources. The data was sourced from the Central Bank of Nigeria Statistical bulletin as well as National Bureau of Statistics.

In this study, we empirically examined the long-run and short-run dynamic relationships between the selected variables. This study adopted autoregressive distributed lag as well as Bounds cointegration test to establish the long-run connection among the non-stationary variables. This involves equalizing the rate of the non-stationarity of the variables in an equation to be stationary such that, its error term is eliminated. Despite specific variables may be non-stationary, it is likely for a linear combination of non-stationary variables to be co-integrated. Therefore, supposing a long-run symmetry connection exists among a set of variables, it is expected that those variables are co-integrated (Studenmund, 2014). However, since time series data is used, stationarity of the variables and cointegration among the variables are tested prior to estimation using ADRL. Conferring to Pesaran (1997), Pesaran and Shin (1998), ARDL  $(p, q_1, q_2, \dots, q_k)$  can be written as

$$\alpha(L, p)y_t = \alpha_0 + \sum_{i=1}^k \beta_i(L, q_i)x_{i,t} + \varepsilon_t \quad (1)$$

Where  $\alpha_0$  is said to be constant,  $y_t$  denotes dependent variable,  $L$  is the lag operator,  $\varepsilon_t$  is the disturbance term (where  $i = 1, 2, \dots, k$ ) and  $x_{i,t}$  as the vector of regressors

**Model (1), long run relationship model is**

$$\ln RGDP_t = \alpha_0 + \gamma \ln RGDP_t + \delta \ln FDII_t + \varphi \ln GOVE_t + \tau \ln INFR_t + \vartheta EXCR_t + \mu TOPN_t + \varepsilon_t \quad (2)$$

**Model (2), the short run relationship is**

$$\Delta \ln RGDP_t = \alpha_0 + \gamma \Delta \ln RGDP_t + \delta \Delta \ln FDII_t + \varphi \Delta \ln GOVE_t + \tau \Delta \ln INFR_t + \vartheta \Delta EXCR_t + \mu \Delta TOPN_t + \sum_{i=0}^p \gamma_i \Delta \ln RGDP_{t-i} + \sum_{i=0}^{q_1} \delta_i \Delta \ln FDII_{t-i} + \sum_{i=0}^{q_2} \varphi_i \Delta \ln GOVE_{t-i} + \sum_{i=0}^{q_3} \tau_i \Delta \ln INFR_{t-i} + \sum_{i=0}^{q_4} \vartheta_i \Delta EXCR_{t-i} + \sum_{i=0}^{q_5} \mu_i \Delta TOPN_{t-i} + \rho ECM_{t-1} + \varepsilon_t \quad (3)$$

$\Delta$  is denoted as the first-difference operator while  $\gamma, \delta, \varphi, \tau, \vartheta$ , and  $\mu$  being its coefficients.

*RGDP = Real Gross Domestic Product.*

*FDII = Foreign Direct Investment Inflow.*

*GOVE = Government Expenditure.*

*INFR = Inflation Rate.*

*EXCR = Exchange Rate.*

*TOPN = Trade Openness.*

The structural lags were founded by means of minimum Akaike's information criteria (AIC).

**Economic A-Priori Expectation for both the Long-run as well as Short-run Models**

This refers to expected signs of the autonomous variables present in the model. Economic development or growth is indicated by RGDP and so the expected signs for each of the independent variables are:  $\alpha_0$ : this will be the intercept of the regression line.

$\delta$ : which is the coefficient of the foreign direct; it is projected to have an encouraging connection with economic growth.

$\varphi$ : which is the coefficient of government expenditure; it is projected to have an undesirable connection with the GDP.

$\tau$ : which is the coefficient of inflation; it is expected to have a negative relationship with the gross domestic product.

$\vartheta$ : which is the coefficient of exchange; it is expected to have a positive relationship with the gross domestic product.

$\mu$ : which is the coefficient of trade openness; it is projected to have an encouraging connection with the GDP.

## 4. Results

### 4.1 Augmented Dickey-Fuller

The outcome of the Augmented Dickey-Fuller (ADF) examination is presented in Table 1 and it is observed that the variables were nonstationary as they are integrated of order one, I(1) with the exemption of Inflation rate which is I(0). This, therefore, emphasizes



the need to conduct a cointegration test to see if a long run connection or relationship exists between the variables by means of the ARDL bound assessment approach.

**Table 1.: Stationary Test Result**

Variables	ADF @ Level				ADF @ 1 <sup>st</sup> Difference				Decision
	Test stat	Test Critical Value at 5%	Prob	Remark	Test Stat	Test Critical Value at 5%	Prob	Remark	
LOG(GDP)	2.215	-3.548	0.466	N S	-3.684	-3.548	0.037	S	I(1)
LOG(FDI)	0.852	-3.548	0.950	N S	-14.848	-3.548	0.000	S	I(1)
LOG(GOVE)	2.188	-3.595	0.476	N S	-3.636	-3.588	0.027	S	I(1)
INFR	3.592	-3.548	0.045	S	-5.594	-3.553	0.000	S	I(0)
EXCR	2.541	-3.544	0.308	N S	-5.776	-3.548	0.000	S	I(1)
TOPN	1.702	-3.544	0.729	N S	-4.571	-3.558	0.005	S	I(1)

*Sourced from: Author's Computation, underlying statistics from the Central Bank of Nigeria Statistical Bulletin and NBS*

## 4.2 Descriptive Statistics

The descriptive statistics outcome of the variables is obtainable in Table 2. The table illustrated the average values of Real Gross Domestic Product (RGDP), Foreign Direct

Investment (FDI), Government Expenditure (GOVE), Exchange Rate (EXCR), Inflation Rate (INFR) and Trade openness (TOPN) in Nigeria are 30437.75, 306.41, 1244.89, 76.34, 20.17 and 0.30 respectively. The least and highest values of individual variable illustrate that RGDP has the highest maximum value of 69780.69 with a minimum value of 13779.26, while the lowest maximum value is recorded for TOPN. The symmetrical normal distribution of the variables also shows that TOPN is negatively skewed while another variable skewed positively. The probability value of Jarque Bera established that all the variables are normally distributed except for EXCR.

**Table 2. Descriptive Result**

	RGDP (N'B)	FDI (N'B)	GOVE (N'B)	EXCR	INFR	TOPN
Mean	30437.75	306.41	1244.89	76.34	20.17	0.30
Maximum	69780.69	1325.17	5185.32	196.99	76.76	0.59
Minimum	13779.26	-0.40	4.99	0.55	0.22	0.07
Std. Dev.	17478.67	407.49	1658.48	64.40	18.72	0.13
Skewness	1.00	1.16	1.23	0.04	1.58	-0.12
Kurtosis	2.63	2.98	3.07	1.47	4.46	2.22
Jarque-Bera	6.24	8.09	9.12	3.50	18.11	1.01
Probability	0.04	0.02	0.01	0.17	0.00	0.60
Observations	36	36	36	36	36	36

*Sourced from: Author's Computation, underlying data from CBN Statistical Bulletin and NBS*

### 4.3 Empirical Analysis

#### 4.3.1 Examining the Long Run Effect of Macroeconomic Variables on Economic Development or Growth in Nigeria

To survey the long run impact of foreign direct investment, government spending and inflation rates on economic development, the cointegration test using bound test approach was performed and the outcomes are illustrated in table 3.

#### Co-integration Test (Bounds Test Approach)

**Table 3: Bounds Co-Integration Test**

Critical value	F- Statistics	Lower Bound Value	Upper Bound Value
10%	6.32	2.26	3.35
5%	6.32	2.62	3.79

2.5%	6.32	2.96	4.18
1%	6.32	3.41	4.68

**Source:** Author's Computation, underlying data from CBN Statistical Bulletin and NBS

Table 4 presents the result of ARDL bound test for cointegration. Given the computed F-statistics 6.32, ( $F > \text{Upper Bound Value}$ ) the result indicates refusal of acceptance of the null hypothesis of no cointegration; thereby establishing the presence of a long-run relationship among the variables.

**Table 4. The Result of the ARDL Model**

Variable	Coefficient
LOG(RGDP(-1))	0.818***(0.0507)
LFDII	0.0255*(0.0148)
LFDII(-1)	0.0364**(0.0145)
LOG(GOVE)	0.0042(0.0038)
INFR	-0.0005(0.0004)
EXCR	-0.0003(0.0004)
TOPN	-0.1567*(0.0844)
TOPN(-1)	-0.1731*(0.0859)
TOPN(-2)	-0.217**(0.0785)
C	2.6277***(0.7687)
<b>Model Criteria / Goodness of Fit</b>	
R-squared	0.998
Adjusted R-squared	0.997
F-statistic	1093.913
Prob(F-statistic)	0.000
Durbin-Watson stat	1.812
<b>Diagnostic Test</b>	
Jarque-Bera	0.140 [0.932]
Ramsey RESET	0.126 [0.881]
LM (Serial Correlation Test)	1.290 [0.295]
Breusch-Pagan-Godfrey (Heteroskedasticity Test)	0.659 [0.737]
ARCH (Heteroskedasticity Test)	0.977 [0.452]

*Sourced from: "Author's Computation, primary data" obtained from CBN Statistical Bulletin and NBS*

ARDL model is illustrated in table 4. As presented in the table,  $R^2$  (coefficient of determination) designates that about 99.8% of the differences in RGDP is elucidated by the dependent variables. This is, however, a good fit. To further confirm the suitability of the model, the fine-tuned  $R^2$  confirms that peradventure the entire unobserved variables remain encompassed inside the model, 99.7% of the discrepancies in RGDP will be described through the descriptive variables. Also, the Durbin Watson statistics of 1.812 (approximately 2) suggests the absence of serial correlation. This indicates that there is no correlation among the error term of each of the variables. It was observed that the F-statistics is exceedingly substantial by 1% degree of significance. These endorse high analytic ability and utility of the model. The diagnostic tests, the familiarity of residual terms (JarqueBera), Ramsy RESET for functional form, Lagrange Multiplier (LM) for serial correlation Breusch-Pagan-Godfrey and ARCH effects for heteroscedasticity reported recommended that the model goes through all analytical tests. That is no indication of serial correlation, autoregressive conditional heteroscedasticity. The useful system of the model is well itemized and is well distributed.

**Table 5. Long-Run Impact of Macroeconomic Variables on Economic Growth**

Variable	Long Run Coefficients
LOGFDII	0.3402***(0.0732)
LOG(GOVE)	0.0229(0.0206)
INFR	-0.003(0.0021)
EXCR	-0.0014(0.0021)
TOPN	-3.0047***(0.4678)
C	14.4388***(0.3637)

*Sourced from: Author's Computation, primary data sourced from CBN Statistical Bulletin and NBS*

From the result of the long run ARDL in table 5, the Government Expenditure (GOVE), Inflation Rate (INFR) and Real exchange rate (EXCR) are statistically insignificant. The Government Expenditure is positive to Real Gross Domestic Product (RGDP), while inflation, as well as exchange rate, are negatively related to RGDP in Nigeria. That is to say that, in the long run, if Government Expenditure, Inflation Rate, and Real Exchange Rate were to increase by 1 percent, there will be a respective 2.3%, 0.3%, and 0.1% increase and decrease in Real Gross Domestic Product respectively in Nigeria. However, the Foreign Direct Investment (FDI) and Trade Openness (TOPN) are found to be positively and negatively related to RGDP in Nigeria respectively, meaning that a 1 percent increase in FDI and TOPN will bring about a respective 34% and 300% increase and a decrease in RGDP.

The Coefficient of both FDI and Trade Openness (TOPN) are statistically substantial at 1 percent degree of significance. From the analysis, the result of the long run ARDL model shows that in the long run, FDI and Trade Openness (TOPN) stimulates economic output significant in Nigeria. This indicates that growth in the overall inflows of investment in Nigeria from foreign investors and trade liberalization in Nigeria brings about a resultant growth in the ratio of output and invariably expanding private investment in Nigeria. These results are consistent with some findings in the literature such as Chirwa and Odhiambo (2016) and Udeaja and Onyebuchi (2015). However, the insignificance of the government expenditure and inflation rate may be attributed to the high level of

government recurrent expenditure, which has often had little or no impact on economic growth.

In table 6 below, the table illustrates the short-run impact of macroeconomic variables on economic growth.

**Table 6.: Short-Run and Long-Run Coefficients**

Variable	Coefficient
DLOG(FDII)	0.0255*(0.0148)
DLOG(GOVE)	0.0042(0.0038)
D(INFR)	-0.0005(0.0004)
D(EXCR)	-0.0003(0.0004)
D(TOPN)	-0.1567*(0.0844)
D(TOPN(-1))	0.2170*** (0.0785)
CointEq(-1)	-0.1820*** (0.0507)

*Sourced from: Author's Computation, primary data sourced from CBN Statistical Bulletin and NBS.*

The short-run dynamic model depicts the speed of convergence to equilibrium once the equation is shocked. The cointegration model of the long run effect has been established, the short run active parameter within the ARDL Framework was equally surveyed. Thus, the lagged value of the variable, which shows a linear combination of the dependent and independent is represented through the error-correction term retained as ECM(-1) within the ARDL model. The results of the appraised Error correction model by means of the ARDL technique were illustrated in table 6 above. From the results, the value of ECM was -0.1820 which can also be denoted as the speed of adjustment which is significant at 1% degree of significance and correctly signed. The result indicates that the speed of convergence in relation to equilibrium is 18.2%. This can also be interpreted as 18.2% percent of the short-run variations are being modified and integrated into the long run relationship, indicating that the present value of RGDP will correct to changes in the Foreign Direct Investment (FDI), Government

Expenditure (GOVE), Inflation Rate (INFR) and Real exchange rate (EXCR) and Trade Openness (TOPN). Although Government Expenditure (GOVE), Inflation Rate (INFR) and Real exchange rate (EXCR) are not significant, the outcomes illustrate that FDI and Trade Openness (TOPN) have positive and negative relationships Real Gross Domestic Product (RGDP) in Nigeria in the short-run. This indicates that a 1% increase in FDI, GOVE, INFR, EXCR, TOPN, and past value of TOPN will lead to about 2.6%, 0.4%, 0.05%, 0.03%, 15.7% and 21.7% increase and a decrease in RGDP respectively. Foreign Direct Investment (FDI) and Trade Openness (TOPN) and the past value of Trade Openness (TOPN(-1)) are statistically significant at 10% and 5% level of significance. From the above analysis, it is evident that the result of the short run dynamic model shows that in the short run, Foreign Direct Investment (FDI) and Trade Openness (TOPN) and the past value of Trade Openness (TOPN(-1)) are positively and adversely related to RGDPs in Nigeria.



## 5. Conclusion and Recommendations

This paper studied the impact of some selected macroeconomic factors on economic development or growth in Nigeria between the periods of 1981-2015. Both the Long-run as well as short-run dynamics impact of FDI, government expenditure as well as inflation rate upon economic growth were examined. Unit root test was carried out using the ADF test to check for the level of stationarity of the variables. The Bound test cointegration approach was employed to determine the presence of a long-run relationship among the variables. ARDL approach was employed to determine both long runs as well as the short-run dynamic impact of foreign direct investment, government expenditure and inflation rate on economic growth.

The unit root results established that some of the variables were nonstationary at level but stationary at first difference. Also, co-integration results show that variables were cointegrated. Hence, this result guarantees the likelihood of long-run connection amid the variables involved in the model specified in this research. Long-run impact of FDI, government expenditure as well as the inflation rate on economic growth show that FDI and trade openness significantly influence economic growth. It was observed that FDI positively impacted economic growth, while trade openness has an adverse consequence on economic growth in the long run. Furthermore, the results for the shortrun dynamics of the effect of FDI, government expenditure as well as inflation rate have on economic growth show that 18.2% of the short run, irregularities were corrected and integrated into the long run relationship among FDI, government spending, inflation rate, as well as economic growth. Furthermore, it was discovered that FDI, trade openness and past value of trade openness are the factors that determine RGDP in the short run. As obtained under the long run analysis, FDI also has a good impact on the economic output, while trade openness and its past value have negative effects on economic growth.

From the findings and conclusion arrived at in this study, it becomes highly imperative for the government to determinedly grow business environment through the delivery of essential infrastructure, this will eventually lesser the price of accomplishing business in Nigeria. Following the recent sales of Nigeria electric power holding company, this has enhanced services improvements in the power sector, hence this is considered a right step was taken by the government. This step will attract foreign investors into the country and encourage domestic industries. This paper has established that foreign direct investment has a great impact on the Nigerian economic growth.

## References

- [1] K. B. Ajide, (2014) "Determinants of economic growth in Nigeria," *CBN Journal of Applied Statistics*, vol. 5, (2), pp. 147-170.
- [2] R. M. Hartwell, (2017) *The Industrial Revolution and Economic Growth*. Routledge.
- [3] M. Kaur and L. Singh, (2016) "Knowledge in the economic growth of developing economies," *African Journal of Science, Technology, Innovation and Development*, vol. 8, (2), pp. 205-212.
- [4] D. Saccone, (2017) "Economic growth in emerging economies: what, who and why," *Applied Economics Letters*, vol. 24, (11), pp. 800-803.
- [5] E. Brynjolfsson, W. E. Diewert, F. Eggers, K. J. Fox and A. Gannamaneni, (2018) "The digital economy, GDP and consumer welfare: Theory and evidence," in *ESCoE Conference on Economic Measurement, Bank of England*, pp. 16-17.
- [6] M. Leimbach, E. Kriegler, N. Roming and J. Schwanitz, (2017) "Future growth patterns of world regions—A GDP scenario approach," *Global Environ. Change*, vol. 42, pp. 215-225.
- [7] S. Iamsiraroj and M. A. Ulubaşoğlu, (2015) "Foreign direct investment and economic growth: A real relationship or wishful thinking?" *Econ. Model.*, vol. 51, pp. 200-213.
- [8] S. Iamsiraroj, (2016) "The foreign direct investment—economic growth nexus," *International Review of Economics & Finance*, vol. 42, pp. 116-133.
- [9] M. Sornarajah, (2017) *The International Law on Foreign Investment*. Cambridge University Press.
- [10] Y. Su and Z. Liu, (2016) "The impact of foreign direct investment and human capital on economic growth: Evidence from Chinese cities," *China Economic Review*, vol. 37, pp. 97-109.
- [11] S. O. Akinmulegun, (2012) "Foreign direct investment (FDI) trends in developing nations: Nigeria experience in a globalization era," *International Business and Management*, vol. 4, (1), pp. 146-156.
- [12] A. M. Kunle, S. Olowe and F. O. Oluwafolakemi, (2014) "Impact of foreign direct investment on Nigeria economic growth," *International Journal of Academic Research in Business and Social Sciences*, vol. 4, (8), pp. 234.
- [13] O. Adeniyi and G. Ogunsola, (2014) "Cocoa production and related social-economic and climate factors: A case study of Ayedire local government area of Osun State, Nigeria," *Agricultural Science*, vol. 2, (4), pp. 1-13.

- [14] R. Schumacher, (2012) "Adam Smith's theory of absolute advantage and the use of doxography in the history of economics," *Erasmus Journal for Philosophy and Economics*, vol. 5, (2), pp. 54-80.
- [15] M. Skousen, (2015) *The Making of Modern Economics: The Lives and Ideas of Great Thinkers*. Routledge.
- [16] S. N. Durlauf and L. Blume, (2008) *The New Palgrave Dictionary of Economics*. Palgrave Macmillan Basingstoke.
- [17] A. Verbeek and K. Debackere, (2006) "Patent evolution in relation to public/private R&D investment and corporate profitability: Evidence from the United States," *Scientometrics*, vol. 66, (2), pp. 279-294.
- [18] A. Verbeek and K. Debackere, (2006) "Patent evolution in relation to public/private R&D investment and corporate profitability: Evidence from the United States," *Scientometrics*, vol. 66, (2), pp. 279-294.
- [19] T. G. Chirwa and N. M. Odhiambo, (2016) "Macroeconomic determinants of economic growth: A review of international literature," *South East European Journal of Economics and Business*, vol. 11, (2), pp. 33-47.
- [20] A. Okoro, (2013) "Government spending and economic growth in Nigeria (1980-2011)," *Global Journal of Management and Business Research*.
- [21] F. Ebong, F. Ogwumike, U. Udongwo and O. Ayodele, (2016) "Impact of government expenditure on economic growth in Nigeria: A disaggregated analysis," *Asian Journal of Economics and Empirical Research*, vol. 3, (1), pp. 113-121.
- [22] R. M. Olulu, E. K. Erhieyovwe and U. Andrew, (2014) "Government expenditures and economic growth: The Nigerian experience," *Mediterranean Journal of Social Sciences*, vol. 5, (10), pp. 89.

Reproduced with permission of copyright owner. Further reproduction prohibited without permission.