



## Impact of International Trade and Government Expenditure on Economic Growth in Nigeria: An ARDL Approach

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### Abstract

International trade and government expenditure play key roles in stimulating economic growth of every country in the world, this is the reason every nation is striving hard to ease foreign trade and increase its spending in order to achieve higher economic growth. The current study investigates the relationship between international trade, Government expenditure and Economic growth in Nigeria using quarterly data from 2010Q1 to 2019Q4. The statistical property of the data was estimated using traditional unit root test and unit root test with structural breaks. The Augmented Dickey Fuller and Phillips Perron unit root test indicated all the variables employed are stationery at first difference except for import which is stationery at level. The Zivot-Andrew unit root test shows that gross domestic product, government expenditure and inflation are stationary at level while exchange rate, export and import are stationary at first difference. The Bound test has confirmed the existence of long run association among the variables employed. The Auto regressive Distributive Lag (ARDL) model indicates that in long run export has negative but statistically significant effects on gross domestic product in Nigeria. Import has negative effect on gross domestic product in Nigeria. Government expenditure has positive and statistically significant effect on gross domestic product in Nigeria. Exchange rate has positive and statistically significant effects on gross domestic product in Nigeria. Inflation rate has negative but statistically insignificant effects on gross domestic product in Nigeria. The study recommends that Nigerian government should provide incentives for exports commodities and eliminate trade barriers with the aim to increase international and achieve higher economic growth in the country. Government budgeting should be increased in both capital and recurrent expenditures but much attention should be placed on capital expenditure because via multiplier effect the aggregate demand would increase.

**Keywords:** International trade, Government expenditure, Economic growth.

**JEL Classification** F13, H50, O40

### Contribution to/Originality Knowledge

The study is one among the few studies which have examined the impact of International Trade and Government Expenditure on Economic Growth in Nigeria: An ARDL model using quarterly data from 2010q1 to 2019q4 and it is the first to employ unit root test with breaks.

### 1.0 Introduction

International trade and government expenditure play key roles in stimulating economic growth of every country in the world, this is the reason every nation is striving hard to ease foreign trade and increase its spending in order to achieve higher economic growth. International trade is the exchange of capital, goods and services across the international borders or territories. In most countries such trade represents a significant share of the Gross Domestic Product (GDP). Therefore, international trade has been an area of interest to policy makers as well as economists. It enables nations to sell their domestically produced goods to other countries of the world. International trade has been regarded as an engine of growth, which leads to steady improvement in human status by expanding the range of people's standard

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and preferences (Adewuyi, 2002). Since no country has grown without trade, international trade plays a vital role in restructuring economic and social attributes of countries around the world, particularly, the less developed countries (Yakubu & Akanegbu, 2015). The role of international trade in economic development is considerable. The classical and neoclassical economists attached so much importance to foreign trade in a nation's development that they regarded it as an engine of growth. Over the past several decades, the economies of the world have become greatly connected through international trade and globalization. Foreign trade has been identified as the oldest and most important part of a country's external economic relationships. It plays a vital and central role in the development of a modern global economy. Its impact on the growth and development of countries has increased considerably over the years and has significantly contributed to the advancement of the world economy. The impact of foreign trade on a country's economy is not only limited to the quantitative gains, but also structural change in the economy and facilitating of international capital flow. Trade enhances the efficient production of goods and services through allocation of resources to countries that have comparative advantage in their production. Foreign trade has been identified as an instrument and driver of economic growth (Frankel & Romer, 1999).

For decades the relationship between public sector expenditure and economic growth has continued to occupy series of debates among researchers and policy makers. The common consensus among the researchers is that public sector expenditure has been identified as an important instrument which the government uses to influence the performance of the economy (Omoke, 2009; Okemini, & Uranta, 2008). The channel through which public authorities satisfy the collective want of the people can be classified under public sector expenditure. Salawu (2005) observed that public expenditure is the expenses incurred by the government for the maintenance of itself, the economy and the society at large. Public expenditure is an important mechanism which the government uses to pilot significant effects on the general growth of the economy (Iheanacho, 2016). The nexus between government expenditure and economic growth has received considerable attention in recent years, especially for developing countries owing to the relevancy of government expenditure in accelerating growth and development, and the liquidity challenges befalling developing economies is a resultant effect of underdeveloped nature of the financial system. The expenditure pattern of the government tends to determine the pace of growth and development a country can attain at any point in time. Government expenditure on critical areas such as real sector, health, infrastructures and education among others will cause an upsurge in a country's aggregate productive capacity. Earnings from the foreign exchange would be enhanced in the long term provided that government gives agriculture a priority in her spending (Nwakoby, Okaro & Ananwude, 2016).

The paper differs from other studies in two ways, firstly, it used quarterly data in the analysis which most of the previous studies do not take into account, like Elias, Ebere and Eze (2018), Afolabi, Jonathan and Azeez (2017) and Stephen and Obah (2017). Secondly, it used unit root with structural break which has not been explored before. Ignoring the possibility of a break in the trend may lead to the over-acceptance of the null hypothesis of a unit root in a time series which is in fact stationary (Perron, 1989). However, the main objective of the paper is to investigate the impact of international trade and government expenditure on economic growth in Nigeria. The specific objectives are to examine impact of export and import on economic growth in Nigeria and to examine the impact of government expenditure on economic growth in Nigeria. The rest of the paper is organised as follows: literature review which is the second part of the paper, methodology in which the objectives of the paper could be achieved and is the third part of the paper, part four of the paper is presentation and analysis of the empirical findings and the final section concludes the paper.



## **2.0 Theoretical Reviewed**

### **2.1 Comparative Cost Advantage theory**

there are several theories postulated with regards to international and economic growth, which are significant to this study and other research works. Therefore, the current study employed it as a theoretical framework. According to this theory, trade allows a more efficient use of the economy's resources by enabling imports of goods and services that could otherwise only be produced at home at higher resource costs. For instance, trade enables developing countries to import capital and intermediate goods – critical to long-run economic growth – that would be quite expensive to produce locally. The traditional case for the gains of trade is based on comparative advantage, in which a country that opens up can be assured the benefits of welfare gains in a static model. The Ricardian model explains the welfare gains if any country specializes in producing goods in which it has a comparative advantage. The Ricardian model assumes two countries, two commodities and that all factors of production can be reduced to a single one, that is, labor. Besides, the production of each commodity is carried out according to fixed technical coefficients. Technology explains, thus, the pattern of international trade. Assuming absent costs of transportation, the condition for international trade to take place is the existence of differences between comparative costs in production of both goods in both countries. Even if one country has absolute advantage in costs of production in both goods, international trade is an option better than autarky. Since both conditions are satisfied, if each country specializes in commodities they have less comparative cost, and engage in international trade, the welfare of both economies and, also, the world welfare will improve.

This simple static model representing the efficiency gains of international trade is widely discussed in international trade textbooks and it is not necessarily to restate it here. The basic aspect to take into consideration is the fact that having different comparative costs and different terms of trade, international trade will better off both countries in comparison with autarky. The condition stated in Ricardian static argument and the Viner (1937) version of the model shows that there is an improvement in income and welfare when countries engage in international trade. The textbook version of this model points out how international trade allows countries to go beyond the Production Possibility Frontier and shows a basket of goods that neither country could obtain in autarky.

### **2.2 The New Growth Theory**

The new growth theory commonly referred to as endogenous growth model postulate that both capital and output can grow indefinitely and the growth rate is not exogenously determine but rather determined endogenously (through saving and investments). They present a mechanism that generalized a positive relationship between scale and productivity. Through this process, a productivity growth can offset the effects of diminishing return, thereby, making production function lines straight indicating that there is no steady state. Such model are often referred to as  $Y = AK$  model simply because of the assumed linear relationship between capital per worker and output. From the model,  $K$  represents stock of technology, which is the same as TFP. Furthermore, the production function in this model assumes a constant marginal productivity of capital. This shows that improvements in productivity occurred because of investment in both physical and human capital. The model assumes that long run growth is a function of technology progress.

### **2.3 Theoretical Framework**

Based on the theories reviewed above, the current study adopts the endogenous growth model as a theoretical framework to analyze the impact of international trade and government expenditure on economic growth in Nigeria. The study appeals this model because it is the best-known model that



adequately addresses the shortcomings of the famous neoclassical growth model proposed by Solow (1956).

Therefore to address the shortcomings of the neoclassical growth model endogenous growth theory gives room for technical knowledge that emphasizes the incentives driving innovation, invention and creativity as the main pillars around which sustainable economic growth evolves. According to the proponent of endogenous the rate of growth of an economy is endogenously determined because it is related to the elements of total factor productivity. The model also predicts self-sustaining growth with exogenous technical progress in an economy in the long run. This growth rate may occur because in the long run tastes and preferences, state of technology, income, governance, and institutional arrangements are not likely to be static at the real world. Therefore, as long as international trade and government expenditure increase in Nigeria can affect any of these factors (for instance, income distribution, technological advancement, and preference) in the long run they can have not only level-effects but also growth-size effects in the economy at large.

To achieve the main objective of this paper a simple AK endogenous growth model is employed. Following Cobb and Douglas (1928), the mathematical expression of the AK production function takes the form:

$$Y = A K \dots\dots\dots(2.1)$$

Where Y is the per worker output, A is a stock of technology which is the same as Total Factor Productivity (TFP) and K is the capital stock.

Based on the above equation the impact of international trade and government expenditure alongside other sources of growth can be captured through the TFP. Therefore the impact of international trade and government expenditure on economic growth is determined through changes in (A) and it is assumed that (A) is a function of export, import, government expenditure, exchange rate, and inflation which are the independent variables in this work and K represents capital stock proxy by GDP represents the constant elasticity of output relative to K.

## **2.4 Empirical Literatures**

A number of empirical studies have examined the impacts of international trade and government expenditure on economic growth in Nigeria and other countries using different variables and methodologies but the reviewed literatures indicate inconsistency of the findings, for example the work of Obisike, Onwuka and Okoli (2020) examined the impact of international trade on Nigeria's economic growth evidence from oil terms of trade. The study employed Ordinary Least Square (OLS) regression technique and included gross domestic product, oil terms of trade and non-oil terms of trade as variables in the model. The major finding of the study revealed that in the short run, the oil commodity terms of trade (OCTOT) and non-oil commodity terms of trade (NOCTOT) had positive impact on Nigeria's economic growth, while the granger causality test showed that OCTOT, NOCTOT and GDP were independent of each other.

Elias et al (2018) ascertained the impact of export trade on the Nigerian economy and to determine the impact of import trade on the Nigerian economy. Ordinary Least Square (OLS) regression was employed in the study and gross domestic product, export and import were used in the model. The results of the study showed a significant impact of export trade on the Nigerian economic growth. The study also revealed that no significant impact of import trade on the Nigerian economic growth.





Afolabi et,al (2017) examined the impact of international trade on economic growth in Nigeria, with the objective of identifying the major factors influencing economic growth through international trade and make policy suggestions using time series data. The study employed GDP, exchange rate, government expenditure, interest rate, foreign direct investment, import and export as variables and adopted Ordinary Least Square (OLS) regression. The major finding in the study indicates that government expenditures, interest rate, import and export are all positively significant while exchange rate and foreign direct investment are negatively insignificant to the growth process of the Nigerian economy.

Diyoke, Yusuf and Demirbas (2017) investigated the impact of government expenditure on economic growth in some selected countries in sub-Saharan Africa (SSA) using panel data. Generalized Methods of Moments (GMM) was adopted in the study and gross domestic product, export, investment, government expenditure, interest rate and oil export were used as variables. The result of the study showed that government expenditure, investment and oil exports were equally found to have impacted on growth in the region. Although, government expenditure has not contributed positively to economic growth in the region as it was negatively signed.

Kimaro, Keong and Sea (2017) analyzed the impact of government expenditure and efficiency on economic growth of sub Saharan African low income countries using panel data. The study employed Generalized Methods of Moments (GMM) and used gross domestic product, government expenditure, trade, labour and capital as variables in the model. The results demonstrate that increasing government expenditure accelerates economic growth of low income countries in Sub Saharan Africa. However, when government expenditure is interacted with government efficiency they find no evidence for government efficiency to boost the impacts of government expenditure on economic growth.

Stephen and Obah (2017) examined the effect of international trade on the economic growth of Nigeria from 1981 to 2015 using time series data. Variables used in the study include GDP, Non-oil import, Non-oil export, oil import and oil export and Ordinary Least Square (OLS) regression technique was employed. Findings in the study indicate that international trade has a significant positive impact on economic growth in Nigeria. The study recommends that government should reduce over-dependence on oil exports and increase and diversify its export base to earn more revenue.

Al Fawwaz (2016) measured the impact of government expenditures on economic growth in Jordan during the period between 1980-2013 using time series data. The study employed Ordinary Least Square (OLS) regression technique and include gross domestic product, total government expenditure, capital government expenditure and recurrent government expenditure as variables in the model. The results indicated a positive impact for both total government expenditure and current government expenditure on economic growth. The study recommended that capital government expenditure should be directed mainly to current productive economic activities in order to stimulate activities in the economic sectors.

Idenyi, Obinna, Promise and Ogonnaya (2016) examined the long run relationship between government expenditure and economic growth in Nigeria. Variables used in the study include real gross domestic product, Government capital expenditure, Government recurrent Expenditure, inflation and unemployment, Johansen co integration technique, Error correction mechanism and Pair wise Granger causality econometric tool of analysis. The results of the study indicated negative relationship among government capital expenditure, unemployment and economic growth. A positive correlation was found among government recurrent expenditure, inflation and economic growth. The results showed unidirectional causality running from government capital expenditure to gross domestic product and bi-



directional causality from government recurrent expenditure to gross domestic product. The causality result also indicated a unidirectional causality running from unemployment to real gross domestic product and government capital expenditure to unemployment.

Iheanacho (2016) examined the long and short run relationship between public expenditure and economic growth in Nigeria over the period of 1986-2014. The study used Johansen cointegration and error correction approach and employed real gross domestic product per capita, recurrent expenditure, capital expenditure and non-oil revenue as variables in the model. This study showed a negative and significant long run relationship between economic growth real gross domestic product per capita and recurrent expenditure co-exists with a positive short run relationship, highlighting the dual effects of recurrent expenditure on economic growth in Nigeria. For the capital expenditure, this study documented negative and significant long run effect of capital expenditure on economic growth in Nigeria.

Al Gifari (2016) examined the relationship between government expenditure and economic growth in Malaysia using panel data. The study employed fixed effect model and used GDP, trade openness, exchange rate, labour and capital as variables. The result indicated a negative correlation between government expenditure and economic growth in Malaysia for the last 45 years. Moreover, the classification of government expenditure indicates that only housing sector expenditure and development expenditure significantly contributed to a lower economic growth.

Lahirushan and Gunasekara (2015) identified the impact of government expenditure on economic growth in Asian Countries using panel data. The study employed Random effects model used variables like GDP and government expenditure. Findings in the study indicated a momentous positive impact of government expenditure on gross domestic production in Asian region. Secondly, government expenditure and economic growth indicated a long-run relationship in Asian countries. In conclusion, there was a unidirectional causality from economic growth to government expenditure and government expenditure to economic growth in Asian countries.

Friday, Fidelis, Udemé, and Olumide (2016) assessed the impact of government capital expenditures on economic growth in Nigeria during 1970 and 2012. The study employed error correction and cointegration specifications, and used the following variables in the study such as GDP, capital expenditure on agriculture, capital expenditure on education, capital expenditure on health, capital expenditure on economic infrastructure. Findings in the study indicated that government capital expenditures had differential effects on economic growth. Capital expenditures on agriculture did not exert any significant influence on growth both in the long run and short run. Similarly, the corresponding short-run and long-run impacts on growth of capital expenditures on education were 0.45 and 0.48, respectively. These results were positive and statistically significant at the 5% level. The short-run impact of health capital expenditures on economic growth was 0.21, while the long-run impact was 0.16. These impacts were negative and insignificant. Expenditures on economic infrastructure had significant positive impacts on growth of 0.28 in the short-run and 0.32 in the long-run.

Yakubu et.al. (2015) examined the impact of international trade on economic growth in Nigeria for the period 1981 to 2012. Variables used in the study include gross domestic product, trade openness, interest and exchange rate and Ordinary Least Square (OLS) regression technique was used as a model. The result shows that all the variables except interest rate were statistically significant. Therefore, the study recommends that policy makers should adopt policies on trade liberalization such as reduction of non-tariff barriers, reducing tariffs, reducing or eliminating quotas that will enable the economy to grow at spectacular rates.

### 3.0 Methodology

The paper examines the short run dynamics and the long run relationship among international trade, government expenditure and economic growth in Nigeria from 2010Q1 to 2019Q4, i.e quarterly data.

The model of the paper is adopted from the work of Afolabi et,al (2017), the model can be shown as

$$GDP = F(EX, IM, GE, EXRATE, INTR \text{ and } FDI) \dots\dots\dots(3.1)$$

The model is modified by removing interest rate and foreign direct investment and included inflation due to its significance international trade or economy at large.

$$RGDP = F(EX, IM, GE, EXRATE \text{ and } INFL) \dots\dots\dots (3.2)$$

Where the real Gross Domestic Product (RGDP) is used as a proxy that measured economic growth, EX is the export measured as percentage to GDP, IM is the import measured as percentage to GDP, GE is the general government expenditure is which is measured as percentage of GDP, EXRATE is official exchange rate is measured as real exchange rate and it is a control variable in the model, INFL is the inflation measured as consumer price percentage and it is also a control variable in the model.

In order to properly estimate the parameters of the postulated models and minimize the series, we logged the variables by transforming them into a log-log-linear model as follow;

$$\text{Log} (RGDP_t) = \alpha_0 + \alpha_1 \text{Log}(EX_t) + \alpha_2 \text{Log} (IM_t) + \alpha_3 \text{Log} (GE_t) + \alpha_3 \text{Log} (EXRATE_t) + \alpha_3 \text{Log} (INFL_t) + U_t \dots\dots\dots(3.3)$$

### 3.1 AutoRegressive Distributed Lag (ARDL) Model

For the purpose of achieving the objectives of the paper, the study employed Auto Regressive Distributed Lag (ARDL) Model. When variables are found to be stationary at different order of cointegration then the suitable test for such model is ARDL (Asteriou & Hall, 2007). However, one must test for both cointegration and stability to ensure long-run relationship among the variables and that the data-generation process conforms with the model, respectively (Asteriou & Hall, 2007). If the variables are cointegrated then there is the need to test for Error correction model (ECM) which shows how much of the disequilibrium is being corrected over a period; what is called ‘adjustment effect’ (Asteriou & Hall, 2007). Error correction model (ECM) possesses advantages of resolving the problem of spurious regression because it eliminates trend in the variables involved; and that the disequilibrium error term is stationary variable, which is prevented from exploding over time (Asteriou & Hall, 2007). The general autoregressive distributed lag (ARDL) ECM is presented in equation

$$\Delta y_t = \mu + \sum_{i=1}^{n-1} a_i \Delta y_{t-i} + \sum_{i=0}^{m-1} \gamma_i \Delta x_{t-i} - \pi \hat{e}_{t-1} + \varepsilon_t \dots\dots\dots (3.4)$$

Where  $\Delta$  is the difference operator,  $y_t$  is a vector of dependent variable,  $x_{t-i}$  is the matrix of lag values of explanatory variables and  $\pi$  is the adjustment effect or error correction coefficient which is expected to be negative for the error to be corrected. Specifically, the ECM model to be tested is specified in equation.

$$\Delta RGDP_t = \mu + \sum_{i=1}^{n-1} a_i \Delta RGDP_{t-i} + \sum_{i=0}^{m-1} \beta_i \Delta EX_{t-i} + \sum_{i=0}^{m-1} \gamma_i \Delta IM_{t-i} + \sum_{i=0}^{m-1} u_i \Delta GE_{t-i} + \sum_{i=0}^{m-1} v_i \Delta EXRATE_{t-i} + \sum_{i=0}^{m-1} w_i \Delta INFL_{t-i} - \pi \hat{e}_{t-1} + \varepsilon_t \dots\dots\dots (3.5)$$

If  $\pi = 1$  then 100% of the adjustment takes place within single period (instantaneous/full adjustment).  
If  $\pi = 0$  then there is no adjustment. Thus, any other value is interpreted accordingly; a value of  $\pi$  closer to 1 implies quick adjustment, and value closer to 0 implies slow adjustment.  
The null and alternative hypotheses for bound test concerning the test for cointegration are:

Ho:  $\alpha_i = \beta_i = \gamma_1 = u_i = v_i = \omega_i = 0$  (No long run relationship).

H1:  $\alpha_i \neq \beta_i \neq \gamma_1 \neq u_i \neq v_i \neq \omega_i \neq 0$  (there is long run relationship).

Decision rule: If F-statistics is greater than any of the critical values of all bounds, reject the null hypothesis otherwise to accept the alternative hypothesis.

## 4.0 Empirical Results and Discussion

### 4.1 Descriptive statistics

**Table 4.1 Descriptive statistics**

Statistics	LRGDP	LGE	LEXRATE	LINFL	LEX	LIM
Mean	7.2079	2.6721	223.8041	11.8202	3.7250	3.6030
Median	7.2083	2.6343	196.9500	11.4018	3.7628	3.6231
Std. Dev.	0.0461	0.1906	75.1746	2.6684	0.1763	0.1242
Skewness	-0.3788	-0.0242	0.3978	0.4533	-0.4845	-0.2810
Kurtosis	2.6007	2.5151	1.4061	2.6003	1.9337	2.6376
Jarque-Bera	1.2834	0.4154	5.5537	1.7179	3.6333	0.7828
Probability	0.5263	0.8124	0.0622	0.4235	0.1625	0.6761
Observations	42	42	42	42	42	42

**Source:** Researchers' computation using E-views 10.

Table 4.1 shows the result of descriptive statistics of the study, it indicates that the standard deviations of the variables employed are far away from their means. The Skewness of the distribution shows negative values of gross domestic product, government expenditure, export and import, this indicates that, these variables are skewed to the left and are normally distributed, because their values are less than zero. Exchange rate and inflation rate shows positive values but less than one, it implies that, these variables are skewed to the right are normally distributed. For Kurtosis all the variables are normally distributed because are less than 3. The Jarque-Bera test for normality is also estimated. It indicates that all the variables employed are normally distributed as their p-values are greater than 5%.

### 4.2 Unit root test

#### 4.2.1 Augmented Dickey Fuller (ADF) and Phillips Perron (PP)

The study estimated Augment Dickey Fuller and Phillips Perron in order to identify the order of integration among the variables of interest.





**Table 4.2: Augmented Dickey Fuller (ADF), Phillips Perron (PP)**

Variables	Test at level		Test at first difference		Order of Integration
	ADF Statistics	PP Statistics	ADF Statistics	PP Statistics	
LRGDP	-0.5618	-1.0947	-6.6085**	-8.8435**	I(1)
LEX	-0.8031	-1.8967	-5.2760***	-5.2760***	I(1)
LIM	-3.8172**	-3.8875**			I(0)
LGE	1.3182	0.7129	-9.2434**	-17.8286**	I(1)
LEXRATE	-1.9547	-2.0418	-5.5929**	-5.5446**	I(1)
LINFL	-2.6752	-0.4808	-3.5296***	-2.3232***	I(1)

**Source:** Researchers' computation using E-views 10.

Asterics \*\*, \*\*\* indicates stationary at 5% and 10% level of significance.

Table 4.2 presents the result of Augment Dickey Fuller and Phillips Perron unit root test, it clearly shows that all the variables employed are stationery at first difference, i.e are I(1) process in both ADF and PP test except for import which is stationery at level i.e I(0) process. Therefore, there is mixture of order of integration among the variables employed.

#### 4.2.2 Zivot and Andrew Unit Root Test

The paper used Zivot and Andrew unit root test in order to confirm the order of integration among the variables employed, because ignoring unit root test with break may lead the acceptance of null hypothesis where is supposed to be rejected.

**Table 4.3 Zivot-Andrew Unit Root Test**

Variables	First difference			
	Level		First difference	
	Statistics	Break point	Statistics	Break point
LRGDP	-10.9653**	2016q1		
LEX	-2.6482	2014q4	-6.5155	2016q4
LIM	-3.9757	2016q3	-11.9138	2012q4
LGE	-7.8342 **	2012q2		
LEXRATE	-6.4001	2016q2	-6.3779	2016q4
LINFL	-4.6893**	2016q2		

**Source:** Researchers' computation using E-views 10.

Asterisk \*\* indicates stationary at 5% level of significance.

Table 4.3 indicates inconsistent result with traditional unit root test. Evidence from Zivot-Andrew unit root test indicates that gross domestic product, government expenditure and inflation are stationary at level i.e. I (0) process, the break date for gross domestic product is 2016q1, may be is due to recession which the country found itself in that particular period, the break date for government expenditure is 2012q2 perhaps due to the global economic crisis which most of the countries in the witnessed its effect and the break date for inflation is 2016q2 may be due to the increase in exchange rate which causes the



increase in the general price of commodities. Furthermore, exchange rate, export and import are stationary at first difference i.e. I (1) process, the break date of exchange rate is 2016q4 may be due the fall of crude oil price, the break date of export is 2016q4 perhaps because of the recession and the break date of import is 2012q4 may be because of global economic crisis that occurred in that period. Conclusively, in both the unit root tests conducted indicates mixture of order of integration among the variables employed.

### 4.3 Bound Test for Long run

The test is conducted in order to ensure the existence of long run association among the variables employed.

**Table 4.4 Result of Cointegration Bounds test**

Statistics	Value	Critical bounds			
<b>F-statistics</b>	35.0555 **	1%	2.5%	5%	10%
	I(0) Bound	3.73	2.7	2.39	2.08
	I (1) Bound	4.15	3.06	3.38	3

**Source:** Researchers' computation using E-views 10.

From table 4.4, the result of co-integration bound test indicates a higher value of F-statistics than any of the critical values of all bounds 35.0555. Therefore, there is a strong evidence of cointegration in the model. This provides evidence of adopting Autoregressive Distributed Lag (ARDL) model in the study.

### 4.4 Results of Autoregressive Distributed Lag (ARDL) model

As a result of unit root tests and bounds test conducted in the study which suggests the use of ARDL model. The appropriate model (number of lags) is selected automatically using Akaike Information Criterion (AIC) which is seen as more robust model. Below, both short run and long run parameters of the model are presented.

#### 4.4.1 Short run Relationship

Below the result of short run parameters of the ARDL model is presented. AIC suggests a (4, 2, 4, 2, 3, 1) model after testing for up to 12500 different models.

**Table 4.5 Short run parameters of the ARDL model**

Variables	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta(\text{LRGDP}(-1))$	0.1599	0.0430	3.0827	0.0000
$\Delta(\text{LRGDP}(-2))$	0.0488	0.0366	0.8340	0.0000
$\Delta(\text{LRGDP}(-3))$	0.0475	0.0420	0.7968	0.0000
$\Delta(\text{LEX})$	0.0540	0.0089	6.0120	0.0000
$\Delta(\text{LEX}(-1))$	-0.0062	0.0095	-0.6542	0.5222
$\Delta(\text{LEX}(-2))$	0.0389	0.0115	3.3850	0.0038
$\Delta(\text{LIM})$	0.0117	0.0070	1.6586	0.1167
$\Delta(\text{LGE})$	-0.0279	0.0064	-4.3450	0.0005
$\Delta(\text{LGE}(-1))$	0.0164	0.0056	2.8930	0.0106



$\Delta$ (LEXRATE <sub>-</sub> )	0.0240	0.0283	0.8479	0.4090
$\Delta$ (LEXRATE(-1))	-0.0182	0.0281	-0.6482	0.5260
$\Delta$ (LEXRATE(-2))	0.0270	0.0281	0.9604	0.3511
$\Delta$ (LEXRATE(-3))	0.0829	0.0306	2.7048	0.0156
$\Delta$ (INFL)	0.0037	0.0043	0.8481	0.4089
$\Delta$ (INFL(-1))	-0.0074	0.0040	-1.8463	0.0834
CointEq(-1)	-0.3681	0.0200	18.3687	0.0000
R-squared	0.9946			
Adjusted R-squared	0.9875			

**Source:** Researchers' computation using E-views 10.

The result from table 4.5 indicates positive and significant autoregressive of dependent variable i.e GDP at lag 1, lag 2 and lag 3, it shows that gross domestic product depends largely on itself in short run. Export depicts positive effect on gross domestic product Nigeria, at lag 1 indicates negative and statistically insignificant while at lag 2 indicates positive and statistically significant effect. Import shows positive and statistically effect on gross domestic product in Nigeria in the short run. Government expenditure indicates negative and statistically significant effect on gross domestic product in Nigeria, at lag shows positive and statistically significant effect on gross domestic product in Nigeria. Exchange rate shows positive but statistically insignificant effect on gross domestic product in Nigeria, at lag 1 it is negative and insignificant, at lag 2 and 3 positive but insignificant while at lag 3 shows positive and significant. Inflation rate shows positive but statistically insignificant effect on gross domestic product at lag 1 indicates negative and statistically insignificant. The beautiful thing in the model is that error correction term (ECT) meets all the theoretical and statistical requirements both in the sign and size. The ECT coefficient is -0.368138 and significance at 5%. This indicates that at 36.81% of the disequilibrium due to the shock in the previous years is adjusted back to the long run equilibrium in the current year.

The R-squared and its adjusted value are very high 0.994606, this implies that 99% change in gross domestic product is explained by government expenditure, exchange rate, inflation rate, export and import in Nigeria.

#### 4.4.2 Long run and Error Correction Result

As a result of bound test, which confirm the existence of long run relationship among the variables of interest.

**Table 4.6 ARDL Long run form Results**

Variables	Coefficient	Std. Error	t-Statistic	Prob.
LEX	-0.1662	0.0462	-3.5930	0.0024
LIM	-0.0935	0.0370	-2.5218	0.0227
LGE	0.1541	0.0575	2.6780	0.0165
LEXRATE	0.1373	0.0638	2.1515	0.0470
INFL	-0.0129	0.0055	-2.3531	0.0317

**Source:** Researchers' computation using E-views 10.

The result from table 4.6 indicates that export has negative but statistically significant effects on gross domestic product in Nigeria. This means that one percent increase in export will cause 0.16% decrease in gross domestic product in Nigeria, this is in contrary to appriori expectation which assumed the positive relationship between exports and gross domestic product in Nigeria. The negative finding is contrary with the findings of Afolabi et al. (2017), Stephen et al. (2017) and Yakubu et al. (2015). Furthermore, import indicates negative effect on gross domestic product in Nigeria. This is in line with appriori expectation which assumed the negative relationship between imports and gross domestic product in Nigeria. this implies that one percent increase in imports will bring about 0.09% decrease in gross domestic product in Nigeria, the negative finding is contrary with the findings of Afolabi et al. (2017), Stephen et al. (2017) and Yakubu et al. (2015). Government expenditure indicates positive and statistically significant effect on gross domestic product in Nigeria. This implies that one percent increase in government expenditure will bring about 0.15% increase in gross domestic product in Nigeria. this in line with economic appriori expectation that government expenditure affect gross domestic product positively in Nigeria, the positive finding is similar with the findings of Diyoike et al. (2017), Kimaro et al. (2017), Friday et al. (2016) and Al Fawwaz (2016). Exchange rate shows positive and statistically significant effects on gross domestic product in Nigeria. By implication one percent increase in exchange rate will cause 0.13% increases in gross domestic product in Nigeria, the positive finding is similar with the finding of Afolabi et al. (2017). Inflation rate depicts negative but statistically insignificant effects on gross domestic product in Nigeria.

#### **4.4.3 Post estimation tests**

**Table 4.7 Post estimation tests**

<b>Tests</b>	<b>P-value</b>
Serial correlation	0.2116
Heteroscedastics	0.2914
Normality	0.7695
Ramsey test	0.5481

**Source:** *Researchers' computation using E-views 10.*

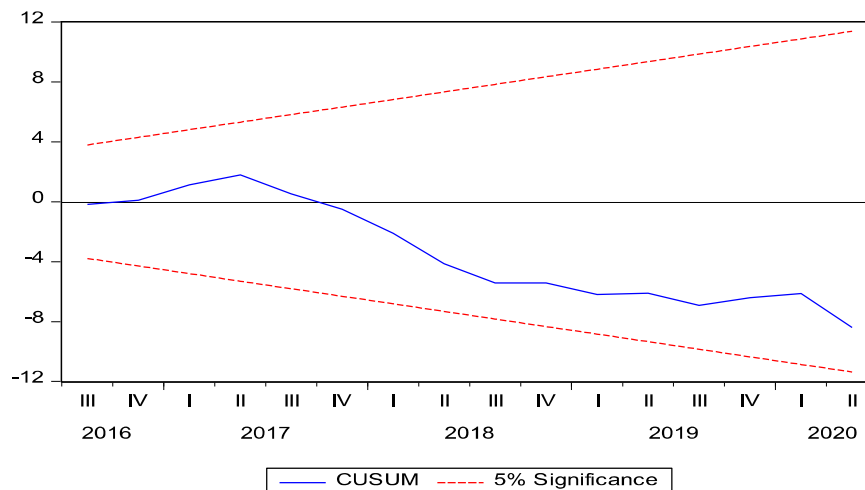
The model passed all post estimation test such as serial correlation, Heteroscedasticity, Ramsey and normality test, as their probability values are greater than 5%. We can conclude that the model is robust.

#### **4.4.4 Stability**

Stability test of the model is employed in order to ensure the data generating process is compatible with the estimated coefficient of the model.



**Figure 4.1:** CUSUM Plot Recursive Residuals of ARDL model.

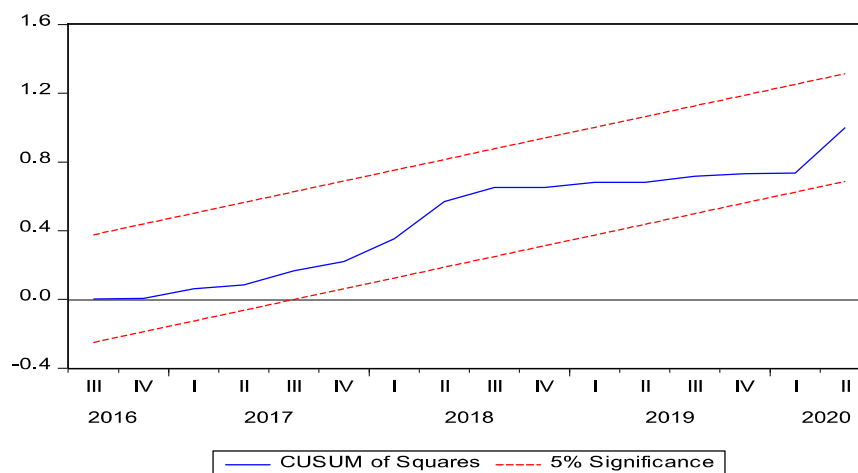


**Source:** Researchers' computation using E-views 10.

From Figure 4.1, the CUSUM plot is within 5% level of significant, this means that the model is stable. This shows that there is no chance of having spurious regression.

**Figure 4.2 CUSUM SQUARE Plot Recursive Residuals of ARDL model.**

From Figure 4.2, the Cumulative sum square plot is within 5% level of significant, this means that the model is stable. This shows that there is no chance of having spurious regression.



**Source:** Researchers' computation using E-views 10.

From Figure 4.2, the Cumulative sum square plot is within 5% level of significant, this means that the model is stable. This shows that there is no chance of having spurious regression.

## 5.0 Conclusions and Recommendations

The paper investigates the relationship among international trade, government expenditure and economic growth in Nigeria using quarterly data from 2010Q1 to 2019Q4. The Auto Regressive Distributive lag (ARDL) model has been used to investigate this. The short run result shows that export itself has positive effect on gross domestic product in Nigeria, at lag 1 indicates negative and statistically



insignificant while at lag 2 indicates positive and statistically significant effect. Import has positive and statistically effect on gross domestic product in Nigeria. Government expenditure itself has negative and statistically significant effect on gross domestic product in Nigeria, at lag 1 it is positive and statistically significant effect on gross domestic product in Nigeria.

Exchange rate itself has positive but statistically insignificant effect on gross domestic product in Nigeria, at lag 1 it is negative and insignificant, at lag 2 and 3 positive but insignificant while at lag 3 has positive and significant. Inflation rate itself has positive but statistically insignificant effect on gross domestic product in the short run at lag 1 indicates negative and statistically insignificant. Moreover, the long run result shows that export has negative but statistically significant effects on gross domestic product in Nigeria. Import has negative effect on gross domestic product in Nigeria. Government expenditure has positive and statistically significant effect on gross domestic product in Nigeria. Exchange rate has positive and statistically significant effects on gross domestic product in Nigeria. Inflation rate has negative but statistically insignificant effects on gross domestic product in Nigeria. The ECT coefficient is -0.368138 and significant at 5%, this indicates that at 36.81% of the disequilibrium due to the shock in the previous years is adjusted back to the long run equilibrium in the current year.

The paper recommends that Nigerian government should provide incentives for exports commodities and eliminate trade barriers with the aim to increase international and achieve higher economic growth in the country. Government budgeting should be increased in both capital and recurrent expenditures but much attention should be placed on capital expenditure because via multiplier effect the aggregate demand would increase.

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