

# International Trade and Economic Growth of Nigeria: An Auto Regressive and Distributed LAG Bound Test Approach

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**To cite this article:**

Amade Akpai Muhammed. International Trade and Economic Growth of Nigeria: An Auto Regressive and Distributed LAG Bound Test Approach. *Journal of Business and Economic Development*. Vol. 7, No. 4, 2022, pp. 100-110. doi: 10.11648/j.jbed.20220704.11

**Received:** September 22, 2022; **Accepted:** October 12, 2022; **Published:** December 8, 2022

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**Abstract:** In this paper, the study investigates the impact of international trade on economic growth of Nigeria applying an Auto Regressive and Distributed LAG Bound Test Approach between the periods of 1980 to 2020. To actualize the objective of this study, we estimated GDP as a function of imports, exports, gross fixed capital formation, inflation and exchange rate. The paper employed ADF unit root test, Johansen co-integration test, error correction technique, and the Granger causality test. The estimated coefficients of the variables showed that all the employed variables are integrated of the same order 1(1) exception of inflation which was integrated of order 1(0). The bound test shows that there is proof of the presence of a long run correlation among the variables used while the causality test displayed that exports actually granger causes economic growth in Nigeria. The outcomes from estimation depicts that there is short run and long run effect of export trade on economic growth of Nigeria. Based on these findings, the study recommends that the government should embark upon import substitution strategy and aggressive diversification of the country's economy by implementing policies that will encourage non-oil export, science and technology, manufacturing and agricultural sectors and in general promote the industrial growth of the economy.

**Keywords:** Nigeria, International Trade, Economic Growth, Exports, Imports, ARDL

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## 1. Introduction

Nigeria as a country is known to be the giant of Africa, in terms of the economy and population. This means that the country has the largest economy and largest population within the continent of Africa, and equally has the largest populated black race in the world. Nigerian economy has been propelled by the growth noticed in agriculture, telecommunication, and service sectors. Apart from these economic opportunities, the country is endowed with quantum deposit of natural resources such as oil. Oil and gas are the reliable sources of foreign exchange earnings and revenue generation for the government for many decades back [6, 16].

The role of international trade in economic growth in many developed and developing countries needs no emphasis because of its paramount importance. However, the concept of International trade being the heart of this study is popularly called 'foreign trade' or 'external trade'

respectively. International trade simply define as an exchange of goods and services between one country and the rest of the world. Importantly, foreign trade is, therefore, a mechanism that links different nations of the world via service flows, commodity trade, and factor movements across different international borders [7]. It is further broken down by Hye, Q. M., Omoju, O. and Adesanya, O. [17, 24] to include the inflow (import) and outflow (export) of goods and services in a country. However, Chen, D., Chen, S., & Härdle, W. [11] argue that a nation's exports and imports connote a large proportion of her GDP. Furthermore, Radha, R. and Reddy, V. S C. [25] point it out that there are two school of thoughts in connection to the role of international trade towards economic growth and development of nation, and the type of trade strategy to be followed in order to attain efficiency of economic growth. The first school of thought consider "trade as an engine of growth" popularly known as an outward-oriented strategy, is the strategy of export-led growth while the second school of thought view "trade as hand maiden of

growth”, popularly known as inward-oriented strategy, is the strategy of import substitution.

However, Atoyebi, et al. [5] argue that nations with large volumes of external trade and greater economic integration with the rest of the world seem to be more productive efficiently than nations that depend on their own domestic markets alone.

Interestingly, economic growth can simply be viewed as the process where the real per capita income of a given country rises over a time period. The economic growth which is proxy by GDP in this study is measured by the aggregates of goods and services produced in a country over a certain period of time. The aggregate economic growth is measured in terms of Gross Domestic Product (GDP) [9], and Balassa, B. [8] points out that Economic growth occurs in a country where there is a numerical increase in a country’s economic factor inputs and outputs over time. Hameed, G. et al. [15] demonstrate that economic growth is simply viewed as a qualitative increase in the capacity of an economy to produce goods and services, compared from one period of time to another. They analyze that this growth capacity is based on advanced modern technologies, the institutional and ideological advancement in an economic environment. Similarly, Ogunmuyiwa, M. S. and Solow R. M. et al. [23, 27] define economic growth to be a steady increase in productivity level in the economy. They argue that economic growth is an important macroeconomic objective of any country as it has a direct impact on the standard of living of

the entire population.

In reference to international institutions such as International Monetary Fund (IMF), World Bank and World Trade Organization (WTO), they emphasized vehemently at different fora that there is a positive close correlation between foreign trade and economic growth in many countries. On the other hand, the United Nations Conference on Trade and Development equally stressed that international trade is a potential driver for economic growth and development for both developed and developing countries. The relationship between international trade and economic growth is one of the most important debates in the economic literature in our present day generation [26, 29].

Statistically, Balassa, B. et al. [8, 21, 22] reported that in 2013 Nigeria imported 53.3 Billion Dollars and exported 94.8 Billion Dollars which resulted to a favourable balance of trade of 41.6 Billion Dollars. In the same year, the per capita income of Nigeria was 5.6 thousand Dollars and the GDP was 521 Billion Dollars. The components of export of Nigeria as at that period were Refined Petroleum (3.07 Billion Dollars), Cocoa Beans (561 Million Dollars), Crude Petroleum (75.3 Billion Dollars), Petroleum Gas (10.3 Billion Dollars), and special purpose ships (463 Million Dollars), while that of import components were Wheat (1.42 Billion Dollars), Rolled Tobacco (1.34 Billion Dollars), Refined Petroleum (9.5 Billion Dollars), Cars (1.87 Billion Dollars) and others. See key traded items in percentages below in 2016.

*Table 1. Traded Items in Percentages.*

Export Products	Percentage of Total Export	Import Products	Percentage of Total Export
Crude Petroleum	79.4 percent	Refined Petroleum	17.9percent
Petroleum Gas	10.9 percent	Cars	3.51percent

During this period, Nigerian economic performance was stable and the GDP valued N89043.62b which made her to be the largest economy in Africa (World Bank, 2013; NBS, 2017 and Central Bank of Nigeria, 2017).

Nigerian Bureau of Statistics (NBS) (2015) reported that in the last quarter of the year 2015, imports to Nigeria decreased by 24.7 percent year-on-year to N507.4 million. In the same period, purchases declined by 22.4 percent. The average imports in the country stood at N164, 266.67 million from 1981 until 2015, reaching N1, 554,732.90 million in first quarter of 2011 and a record low of N167.88 million in second quarter of 1984. Nigeria imports industrial supplies which stood at 27 percent of total, in 2014, fuel and lubricants was 14 percent, food and beverage was 17 percent, consumer goods was 7 percent, capital goods was 23 percent, and transport equipment and parts was 12 percent. However, 43 percent of Nigerian imports total came from Asia; 34 percent from Europe; 15 percent from America and 7 percent from Africa respectively.

However, witnessing the rapid economic growth, Nigeria has now become one of the emerging market economies of Africa in terms of trade.

*Objectives of the Study:*

In fact, for this research paper to be properly guided towards attainment of accuracy, the following objectives are itemized and streamlined below:

- 1) To assess the impact of international trade on economic growth of Nigeria.
- 2) To determine the impact of exports on economic growth of Nigeria.
- 3) To examine the impact of exchange rate on economic growth of Nigeria.

It is on this note that the research study intends to analyze empirically the correlation between international trade and economic growth in Nigeria from 1980 to 2020 with the help of Autoregressive Distributive Lag (ARDL) model.

Conclusively, this research paper is organized into five core sections. Precisely, section one captures the introduction of the research study, section two covers the literature review, section three maintains the methodology, section four comprises analyses of data and interpretation of results, and section five includes conclusion and recommendations.

## 2. Literature Review

The topic of international trade has drawn the attention of

many erudite scholars from different academic institutions around the world with different approaches.

## 2.1. Theoretical Literature

### 2.1.1. The Solow Growth Theory

The Solow model of growth theory was enunciated by a popular Nobel Prize winner called Robert Solow in 1956. It is an economic growth model in which the growth of total Gross Domestic Product is a direct function of population increase, technical progress and investment, Mathematically written as;  $GDP = F(POP, TECH, INV)$  where GDP= Gross Domestic Product, TECH= Technical Progress and INV=Investment. In Solow growth model, there is full employment, with an aggregate production level displaying constant returns to scale. During the course of economic growth, Adeleye, J. O., Adeteye, O. S., & Adewuyi, M. O. [2] argue that for an economy to generate efficient growth, there should be an aggregation of demand and supply sides of the economy.

In summary, the popular Solow model is neo-classical growth model. The Solow model points it out that economic growth can best be explained from supply side of the economy which exhibits  $Q = F(AK^\alpha L^{1-\alpha})$ . The theory assumes that savings is directly correlated with income (when savings increases, income increases in the same proportion, and vice versa) and argue that capital does not depreciate readily like other variables and the rate of increase of capital stock is determined by investment. Mathematically, savings = investment, and labour as one of the factors of production grows at a constant rate while the level of technology is exogenously given. One of the main assumptions of this theory is that, in a closed economy capital is subjected to the law of diminishing returns. The opponents of this model criticized on the ground that there can be technological progress in a country where closed economic system is practiced using Chinese closed economy of 1980's as a case study. China witnessed tremendous increase in technology and the economic growth within these periods [2]. Despite the weaknesses exposed by the critics, the Solow growth model is still very pertinent to this study as it lists out the significance of international trade as drivers of economic growth of nations.

### 2.1.2. Hecksher – Ohlin Theory of Trade (Or the Theory of Factor Proportion)

Eli Hecksher and Bertil Ohlin are two prominent Swedish economists that promulgated the theory of Hecksher-Ohlin theory of trade popularly called the theory of factor proportion in 1933. The theory vividly explained how different nations have different factor endowments. Invariably, countries have the tendency to produce goods and services abundantly from the factor inputs they have comparative advantage and exchange those goods and services internationally while at the same time import those goods and services in which they have comparative disadvantage. Heckcher and Ohlin, 1933 cited in the study of Babatunde, A. et al. [7]. The theory pinpoints out the concept

of economic advantage in the context of costs of factors of production and endowment. The Hecksher – Ohlin theory of trade presents the following assumptions:

- 1) Factors of production such as labor and capital move readily between sectors;
- 2) The resource endowments in two nations differ, that is, different in labour and capital;
- 3) Technology is the same among nations;
- 4) Similarity of taste among countries.

In as much as there is global acceptability of this theory, it is still enveloped with some weaknesses which can easily be traced to unrealistic assumptions streamlined above. According to the theory, Technology is the similar among nations. This does not actually hold in reality as different trading countries are classified according to their level of technological development into industrialized poor nations. Despite this short comings in the assumptions, the theory is still significant to this research paper as it lays emphasizes on different factor endowments which have accounted for reasons why different countries to engage in international trade.

## 2.2. Empirical Literature

Many empirical studies at different time periods in different places have investigated the impact of international trade on economic growth and development of nations. Some of these empirical studies equally examined the impact of export and import on economic growth while others investigated the impact of other variables such as Foreign Direct Investment and oil price respectively. Importantly, the empirical research results may not be completely consistent, but the common point is that foreign trade is correlated to the economic growth.

Radha, R. and Reddy, V. S C. [25] investigate an Appraisal of the Impact of International Trade on Economic Growth of India from 1991 to 2017. The study employs the Augmented Dickey Fuller (ADF) Test for unit root and Autoregressive Distributive Lag Model (ARDL) cointegration approach which entails the Wald Test, Long run OLS estimation test, Error Correction and short Run relationship estimation test, as well as the short run Causality test. The authors conclude a positive impact of international trade on India's economic.

Adeleye, J. O. et al. [2] examines the Relationship between International Trade and Economic Growth in China from 1980 to 2018. The study employed the vector auto regression (VAR) model. The author uses five variable such as the gross domestic product, exports (EXP), imports, oil price, and net inflow of foreign direct investment in China. The Granger causality test results show bidirectional causality relationships between exports, imports, oil price, FDI and GDP in the short and long run meaning that there is a positive impact of international trade on Chinese economy from 1980 to 2018.

Arodoye, O., and Iyoha, O. [4] investigate the effect of international trade on economic growth of Ghana from 1998 to 2018. The study employs the VAR stability model and other econometric techniques such as unit root test, co-

integration test and causality of the Granger. The variables used are exports, imports, exchange rate, inflation rate and GDP, and the study concludes that international trade has positive impact on Ghanaian economy.

Uzonwanne, M. C. [28] examines international trade and economic growth in Nigeria from 1981 to 2017. The variables used are real GDP, export, imports, unemployment rate exchange rate and gross fixed capital formation. The paper employs the ARDL model and other cointegration tests. The Findings clearly showed that export granger causes economic growth in Nigeria.

AlYousif, Y. K. [3] examine the impact of international trade on economic growth in Nigeria from 1981 to 2015. The study employs multiple regression estimation techniques for analysis. The variables used are GDP, oil imports, Non-oil exports, and oil exports. The findings of the study clearly revealed that international trade has a significant positive effect on economic growth in Nigeria.

Emeka, E. J. et al. [13] investigate macroeconomic impact of trade on Nigerian economic growth from 1970 to 2008 using a combination of bi-variate and multivariate models. The empirical examination points out that exports and Foreign Direct Investment inflows have positive and significant impact on economic growth of Nigeria.

Arodoye, O., and Iyoha, O. [4] investigate the relationship between international trade and economic growth of Nigeria from 1981 to 2010 employing quarterly data. The Ordinary Least Square results showed that there is positive long run correlation between international trade and economic growth in Nigeria and authors conclude that trade policies which stimulate export should be encouraged since exports are drivers of economic growth.

Adel Shakeeb Mohsen [1] examines the impact of exports and imports on the economic growth of Syria from 1980 to 2010. The paper employs ADF unit root test, impulse response functions (IRF), variance decomposition (VD) analysis Granger causality test and other cointegration tests. The results displayed that export is positively and significantly related to economic growth in Syria. The Granger causality test indicates bidirectional causality relationships between exports, imports and economic growth in the short and long run. The paper recommends to improve the quality of exports and increase its diversity, as well as simplify export procedures.

AlYousif, Y. K. [3] studies the relationship between export and economic growth in Libya covering the time period 1980 – 2007. An econometric model was developed and estimated in order to determine the direction of causality in both, short and long run. The findings indicate that the income, exports and relative prices are cointegrated. The study result indicates that the export promotion policy contributes to the economic growth in Libya.

Gokmenoglu, K. K., et al. [14] conducted a research to investigate the relationship among international trade, financial development and economic growth in Pakistan. The ADF and PP tests are used to check the order of integration of the variables and Johansen co-integration methodology is

employed to investigate the long run relationship among these variables. The results indicate that international trade and financial development spur economic growth in Pakistan.

Cetintas, H., & Barisik, S. [12] investigate the relationship between exports, imports, domestic investment and economic growth in Egypt between 1965 and 2015. The study employed Johansen co-integration analysis of Vector Error Correction Model to explore the long run and the short run relationships between these variables. The empirical results indicate that in the long run domestic investment and exports have negative impact on economic growth, however imports have positive effect on the economic growth. In the short run, empirical analyses show that only imports cause economic growth. The findings present the critical situation of Egypt, which requires an entry of urgent economic reforms.

Adnan Hye, Q. M., and Boubaker, H. B. H. [18] investigate the export-led growth, growth-led export, import-led growth, growth-led import and foreign deficit sustainability hypothesis in the case of China, using annual time series data from 1978-2009. The study applies the Phillips Perron unit root tests to examine the level of integration and the autoregressive distributed lag (ARDL) approach was employed to determine the long run relationship, and the direction of long run and short run causal relationship is examined by using modified Granger causality test. The results confirm the bidirectional long run relationship between the economic growth and exports, economic growth and imports, and exports and imports. These findings guided the authors to conclude that the exports-led growth, growth-led exports, imports-led growth and growth-led imports hypothesis is valid, and foreign deficit is sustainable for China.

Jawaid, S. T., and Raza, S. A. [20] investigate the effect of terms of trade on economic growth of India from the period of 1980 to 2010 using the annualized time series data. The ARDL bound testing cointegration confirms the significant positive relationship between terms of trade and economic growth in the long run as well as in the short run. Results of Granger causality confirm the bidirectional causal relationship between terms of trade and economic growth in India. Rolling window estimation indicates that the terms of trade is having positive long-run coefficients throughout the sample period. It is suggested that beneficial terms of trade is better for economic growth in India.

Hye, Q. M., and Bel Haj Boubaker, H. [19] investigate the export-led growth, import-led growth and foreign debt sustainability hypotheses in the case of Tunisia by using annual time series data for the period 1960-2008. Autoregressive Distributed Lag (ARDL) approach was employed to determine the long-run relationship or direction of long-run causality between exports, imports and GDP, and the strength of causal relationship is examined by using variance decomposition method. The results indicate unidirectional causality from exports to economic growth and bidirectional relationship between imports and economic growth. Thus, both export-led growth and import-led growth are valid for Tunisia.

Berasaluce, J., & Romero, J. [10] study empirical analysis of the Korean external sector between 1980 and 2015. The purpose is to identify the potential relationships between economic growth, exports, imports and foreign direct investment. The results of four-variable vector autoregressive model suggest that exports and foreign direct investment are not driving economic growth in Korea. Therefore, one should be cautious about policies that promote such investment and export tools to boost economic growth.

### 3. Methodology

#### 3.1. Research Design

Ex-post facto research design was adopted as it handles event that had taken place. For clarity, the researchers have no bases at all to influence the outcome of the variables employed for this study. To examine the relationship among the variables, the paper depends solely on secondary data which was collected and gathered over time. Gross Domestic Product (GDP) was pegged as dependent variable proxy for economic growth while exports, imports, exchange rate, inflation and gross fixed capital formation were all represent independent variables of the study. The variables were estimated by applying ARDL technique. The annualized time-series data that cover a long range of observations was used, the paper tested for stationarity of the series using

Augmented Dickey-Fuller (ADF) test.

#### 3.2. Method of Data Analysis

This paper employs the techniques of Augmented Dickey Fuller (ADF) Test for unit root, Autoregressive Distributive Lag Model (ARDL), cointegration test which contains the Wald Test, test of normality short Run relationship estimation test, as well as the short run Causality test. E-view 10 econometric software was used for the estimation of the variables.

#### 3.3. Sources of Data Collection

Data for this research study covered from the periods 1981 - 2020 and were sourced from World Bank data base- World Development Indicator and Central Bank of Nigeria Statistical Bulletin of 2019 respectively.

#### 3.4. Model Specification

The paper adopts the model used by [25]. The model was intentionally employed to analyze the impact of international trade on economic growth of Nigeria. According to them, economic growth which was proxy for GDP is a function of exports, imports, exchange rate, inflation rate and gross fixed capital formation. Mathematically written as follows:

$$\text{GDP} = f(\text{IMP}, \text{EXP}, \text{EXR}, \text{INF}, \text{GFCF}) \quad (1)$$

Where:

GDP = Gross Domestic Product.

IMP = Imports.

EXP = Exports.

INF = Inflation.

EXR = Exchange Rate.

GFCF = Gross Fixed Capital Formation.

By modifying equation (1) into econometric model, it becomes:

$$\text{GDP} = \alpha + \beta_1 \text{IMP} + \beta_2 \text{EXP} + \beta_3 \text{EXR} + \beta_4 \text{INF} + \beta_5 \text{GFCF} + U \quad (2)$$

Where:

$\alpha$  = Regression constant.

$\beta_1, \beta_2, \beta_3, \beta_4$  and  $\beta_5$  are the coefficients of the independent variables.

U = random term.

However, as the paper adopts the work of Radha and Reddy (2020) we used the log form of the variables written as follows:

$$\ln \text{GDP} = \alpha + \beta_1 \ln \text{IMP} + \beta_2 \ln \text{EXP} + \beta_3 \ln \text{EXR} + \beta_4 \ln \text{INF} + \beta_5 \ln \text{GFCF} + U \quad (3)$$

Where

ln = Log.

U = error term.

### 4. Data Analysis and Interpretation of Results

*Table 2. Descriptive Statistics of variables of study.*

	LNIMP	LN GDP	LNEXPT	LNCF	INF	EXCH
Mean	13.42374	26.09267	13.75963	9.037904	22.45248	100.8726
Median	13.96104	25.87784	14.40607	9.012711	18.35081	107.0243

	LNIMP	LNGDP	LNEXPT	LNCF	INF	EXCH
Maximum	16.99995	26.89112	16.97323	9.667111	76.75887	358.8108
Minimum	8.696778	25.39887	8.922992	8.642745	0.220000	0.610025
Std. Dev.	2.688622	0.524161	2.710200	0.216729	17.01088	100.7597
Skewness	-0.467440	0.313864	-0.573058	0.523432	1.520125	0.885317
Kurtosis	1.838007	1.546778	1.906661	3.403741	4.887679	2.987523
Jarque-Bera	3.707048	4.176493	4.181618	2.098221	21.34409	5.225496
Probability	0.156684	0.123904	0.123587	0.350249	0.000023	0.073333
Sum	536.9496	1043.707	550.3852	361.5162	898.0993	4034.904
Sum Sq. Dev.	281.9189	10.71505	286.4621	1.831884	11285.44	395947.8
Observations	40	40	40	40	40	40

Source: Author Computation 2021.

Table 2 describes the five variables used for this study. The descriptive statistics results demonstrate that the mean of imports, gross domestic product, exports, gross fixed capital formation, inflation and exchange rate stand at N13.42374 billion, N26.09267 billion, N13.75963 billion, N9.037904 billion, N22.45248 billion and N100.8726 billion to a dollar respectively. The minimum of the variables for imports, gross domestic product, exports, gross fixed capital formation, inflation and exchange rate were N8.696778 billion, N25.39887 billion, N8.922992 billion, N8.642745, N0.220000 billion and N0.610025 billion. But the maximum

for imports, gross domestic product, exports, gross fixed capital formation, inflation and exchange rate were N16.99995 billion, N26.89112 billion, N16.97323 billion and N9.667111 billion, N76.75887 billion and N358.8108 billion respectively. The standard deviation for imports, gross domestic product, exports, gross fixed capital formation, inflation and exchange rate were N 2.688622, N0.524161, N2.710200, N 0.216729, N17.01088 and N100.759, this shows that deviations from the averages of these variables employed suggest that the variables are not static, but varies from one period to another.

Table 3. Correlation Matrix.

Correlation						
t-Statistic						
Probability						
Observations	LNIMP	LNGDP	LNEXPT	LNCF	INF	EXCH
LNIMP	1.000000					
	-----					
	40					
LNGDP	0.923839	1.000000				
	14.87779	-----				
	0.0000	-----				
	40	40				
LNEXPT	0.992153	0.902924	1.000000			
	48.91549	12.95021	-----			
	0.0000	0.0000	-----			
	40	40	40			
LNCF	0.370224	0.473983	0.303302	1.000000		
	2.456788	3.318248	1.962102	-----		
	0.0187	0.0020	0.0571	-----		
	40	40	40	40		
INF	-0.171525	-0.188218	-0.180011	-0.183308	1.000000	
	-1.073260	-1.181366	-1.128087	-1.149462	-----	
	0.2899	0.2448	0.2664	0.2575	-----	
	40	40	40	40	40	
EXCH	0.851156	0.917339	0.818134	0.464822	-0.236751	1.000000
	9.995698	14.20441	8.770574	3.236208	-1.502136	-----
	0.0000	0.0000	0.0000	0.0025	0.1413	-----
	40	40	40	40	40	40

From table 3 above, all the five variables were correlated such that, import had about 92% correlated with GDP, 99% correlated with export, 37% correlated with capital formation, -0.17% correlated with inflation and 85% correlated with exchange rate. While GDP had about 90%

correlated with export, 47% correlated with capital formation, -0.18% correlated with inflation and 90% correlated with exchange rate respectively. Export had about 30% correlated with capital formation, -0.18% correlated with inflation and 81% correlated with exchange. Capital

formation had about -0.18% correlated with inflation and -0.24% correlated with exchange rate. 0.46% correlated with exchange rate while inflation only had

**Table 4.** Unit root test table (ADF).

Variables	Level	First Difference	Probability Value	Integration Order
Import		-7.1941	0.0000	I(1)
GDP		-3.7783	0.0066	I(1)
Export		-6.1203	0.0000	I(1)
Capital Formation		-5.0831	0.0002	
Inflation	-3.4298		0.0158	I(0)
Exchange rate		-4.1264	0.0026	I(1)

Source: variables are significant at \*\*\* 0.05 per cent significant level.

The ADF test shown in table 4 above indicates that the variables' order of integration were a combination of I (1) and I (0) respectively. In that case, the appropriate estimation technique to be employed for analyses is the Auto Regressive Distributed Lag (ARDL) Model.

**Table 5.** Lag Length result.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-389.6905	NA	78.37395	21.38867	21.64990	21.48077
1	-176.9602	344.9680*	0.005719*	11.83569	13.66430*	12.48036*
2	-150.5591	34.25009	0.011276	12.35455	15.75054	13.55179
3	-100.4079	48.79583	0.008313	11.58961*	16.55298	13.33943

Source: Authors' computation, 2021.

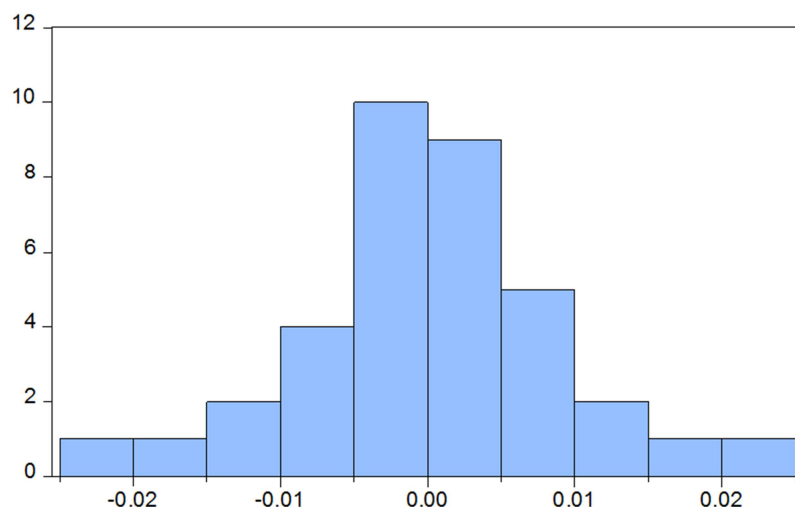
The depicted results shown in table 5 above present the lag length minimizes SC and HQ and this means that our optimal lag length is lag one. Having our optimal lag length, we proceed to test for long-run correlation between the variables employed in this research study using the bound test approach.

**Table 6.** Cointegration Test.

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.370422	10%	2.75	3.79
k	5	5%	3.12	4.25
		2.5%	3.49	4.67
		1%	3.93	5.23
		10%	2.75	3.79

Author's computation 2021

Table 6 above represents the bounds testing to cointegration between the variable of interest. We reject the null hypothesis at 10%, 5%, 2.5% level of significance respectively, and then conclude that there is a long run relationship among the variables under closed investigation.



Series: Residuals	
Sample 1985 2020	
Observations 36	
Mean	-1.45e-14
Median	0.000246
Maximum	0.023336
Minimum	-0.022671
Std. Dev.	0.008954
Skewness	-0.017968
Kurtosis	3.821738
Jarque-Bera	1.014816
Probability	0.602054

**Figure 1.** Normality Test.

This normally test is conducted mainly to ensure that the data used in this research paper are normally distributed. Viewing from the normality chart in figure 1 above, as well as the Jaque Bera value of approximately 1.014816 which is >5% significant level, confirms that the data used are

normally distributed. The skewness value of 0.6 is said to be moderately skewed, since it value falls between 0.5 and 1. The kurtosis value of approximately 3.8 supports that the variables are normally distributed since the kurtosis value falls in between -3 and 3 respectively.

*Table 7. Serial Correlation.*

<b>Breusch-Godfrey Serial Correlation LM Test:</b>			
F-statistic	3.960771	Prob. F (4,2)	0.2116
Obs*R-squared	31.96482	Prob. Chi-Square (4)	0.0000

Source: Author's analysis using e-view 10 output with data in Appendix.

Following the rules, the Breusch-Godfrey Serial Correlation LM Test table above depicts that the probability values of 0.2116 and 0.0000 are statistically insignificant at

5% level of significance. This means that the model is completely free from serial correlation.

*Table 8. Test for Heteroskedasticity.*

<b>Heteroskedasticity Test: White</b>			
F-statistic	1.105855	Prob. F (29,6)	0.4946
Obs*R-squared	30.32621	Prob. Chi-Square (29)	0.3979
Scaled explained SS	1.188508	Prob. Chi-Square (29)	1.0000

Source: Author's analysis using e-view 10 output with data in Appendix.

The Heteroskedasticity test shown above indicates that the variables are completely free from the problem of Heteroskedasticity since the p-values of F-stat. and Obs\*R-squared of 0.4946 and 0.3979 respectively are > 5%

significance level. This results is strengthened by the p-value of the Scaled explained SS indicating the absence of Heteroskedasticity.

*Table 9. Long/Short Run Relationship of the Model.*

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
Shot Run				
D (LNEXPT)	0.297494	0.086500	3.439222	0.0138
D (LNEXPT (-1))	0.153757	0.054113	2.841422	0.0295
D (LNEXPT (-2))	0.150082	0.050529	2.970219	0.0250
D (LNIMP)	-0.126006	0.064878	-1.942214	0.1001
D (LNIMP (-1))	0.161688	0.068119	2.373626	0.0552
D (LNIMP (-2))	0.068927	0.057564	1.197388	0.2763
D (LNIMP (-3))	0.206784	0.057680	3.585038	0.0116
D (LNCF)	0.119543	0.097650	1.224197	0.2668
D (LNCF (-1))	-0.804830	0.259274	-3.104172	0.0210
D (LNCF (-2))	-0.544151	0.163720	-3.323674	0.0159
D (LNCF (-3))	-0.374917	0.132853	-2.822055	0.0303
D (INF)	0.002212	0.000947	2.337547	0.0580
D (INF (-1))	0.003199	0.001000	3.200307	0.0186
D (INF (-2))	0.002954	0.000700	4.219668	0.0056
D (INF (-3))	0.000529	0.000711	0.743635	0.4852
D (EXCH)	0.001912	0.001015	1.882831	0.1087
D (EXCH (-1))	0.000703	0.000390	1.805641	0.1210
D (EXCH (-2))	0.000802	0.000578	1.387078	0.2147
D (EXCH (-3))	0.002940	0.000969	3.032697	0.0230
ECT (-1)	-0.549874	0.079306	-6.933588	0.0004
Long Run				
LNEXPT	0.264137	0.161958	1.630894	0.1540
LNIMP	-0.623305	0.213575	-2.918441	0.0267
LNCF	2.110103	0.639126	3.301544	0.0164
INF	-0.006535	0.003816	-1.712211	0.1377
EXCH	-0.009267	0.003076	-3.013279	0.0236
R-squared	0.942417	Mean dependent var		0.040949
Adjusted R-squared	0.816783	S.D. dependent var		0.037314
S.E. of regression	0.015972	Akaike info criterion		-5.232727



Sum squared resid	0.002806	Schwarz criterion	-4.133061
Log likelihood	119.1891	Hannan-Quinn criter.	-4.848914
F-statistic	7.501243	Durbin-Watson stat	2.924352
Prob (F-statistic)	0.000656		

Source: Author Computation.

The table above depicts that the variables have an impact on the dependent variable. The results indicate that the model has a high coefficient of determination represented by R-squared (94%) and the adjusted R-squared (827%). The R-squared measures the percentage of variations in the dependent variable that was accounted for by variations in the independent variables. This proved that the data is fitted in the model. The value of the F-statistic is 7.501243 and its related probability value is 0.000656 which is less than one percent. This explains that the regression model is statistically significant at 1% level. Durbin-Watson stat. of 2.9 suggests that the variables are free from auto-correlation and is close to 3. The estimated coefficients of the independent variables agree to our a priori expectation except for import. The result indicates that export, capital formation, inflation and exchange rate all had positive impact on gross domestic product of Nigeria exception of import that is inversely related in the short run period but in the long run period, all the variables are having negative figures except export and capital formation. In the long run, capital formation is elastic in nature, a percent increase in capital formation would bring about 211 percent in GDP.

The result further revealed that a percentage increase in import would bring about a 13 percent decrease in gross domestic product in short run and 62 percent in the long run. This means that import is not an ideal strategy for a vibrant economy, when import increases, economic growth decreases, and vice versa. The economic growth and import are inversely

related. Also, a percentage increase in export would bring about a 30 percent increase in gross domestic product in the short run and 26 percent in the long run. This means that export granger causes economic growth in Nigeria between 1981 and 2020, the period covered by the study, export and economic growth are directly related, and this means that as export increases, economic growth increases as well. However, a percentage increase in capital formation would bring about 12 percent increase in gross domestic product in the short run period and 211 percent in the long run, this means that a steady growth of capital formation varies directly with investment, and which in turn varies directly with economic growth. A percent increase in inflation would bring about 0.2 percent in gross domestic product, this means that inflation has a very insignificant impact to economic growth, in the long run, inflation is inversely related with GDP but very insignificant. Finally, a percent increase in exchange rate would bring about a 0.2 percent increase in gross domestic product in the short run period but inversely related in the long run, but the relationship is very insignificant. This shows that exchange rate has a positive figure but had insignificant impact on the economic growth of Nigeria in the short run. This research findings corresponded with the work of Radha, R. and Reddy, V. S C. [25] whose inferential results showed that international trade impacted significantly on economic growth of Nigeria between 1981 and 2019. This goes a long way to cement the reliability of the outcome of this research work.

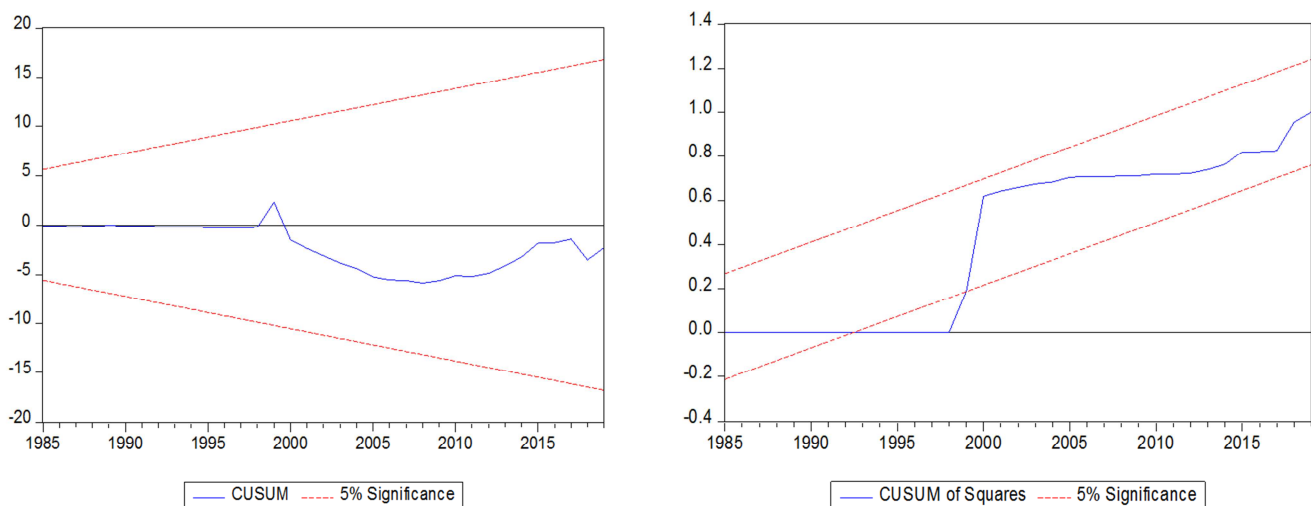


Figure 2. Graphical plots for CUSUM and CUSUM-Square stability test.

Figure 2 above depicts plot of cumulative Sum of Squares of recursive residuals which demonstrates stability.

The Figure 1 and table 6 above contain the results of the diagnostic tests of the model showing that the model is normally distributed, well specified and is homoscedastic in

nature, that is absence of heteroskedasticity. The Ramsey reset test, CUSUM and CUSUM of square (CUSUMsq) statistic tests were carried out as depicted in figure 2 above, all confirming the stability of the model.

## 5. Conclusion and Policy Recommendations

**Conclusion:** The purpose of this study was to determine the impact of international trade on economic growth of Nigeria between 1981 and 2020. Gross domestic product was employed as a proxy for economic growth of Nigeria, while import, export, gross fixed capital formation. Inflation and exchange rate were employed as explanatory variables. The findings of the inferential analyses indicated that export had a significant positive impact on economic growth of Nigeria.

**Policy recommendation:** Since international trade has a positive impact on economic growth of Nigeria within the period under review and it has contributed immensely to the growth of GDP, however, from the stand point of policy initiation and implementation, it is pertinent for Nigerian government to discourage over dependency on imported goods and encourage import substitution strategy in order to stimulate economic growth of the country.

Secondly, the government needs to diversify its economy into agriculture, manufacturing and science and technology base so as to export these manufactured and agricultural products abroad for the good health of the economy.

## Appendix

*Table 10. Data of Variables used for this research.*

YEAR	TOTAL EXP	TOTAL IMP	EXR	G F C F	GDP (Constant 2010 US\$)	INFLATION
1981	12,839.60	11,023.30	0.61	15,789.67	130707610046.245	219.002844
1982	10,770.50	8,206.40	0.67	12,893.67	121815063124.406	14.80255191
1983	8,903.70	7,502.50	0.72	10,198.26	108507882039.608	19.56894989
1984	7,178.30	9,088.00	0.76	7,121.28	107297342914.22	5.653664097
1985	7,062.60	11,720.80	0.89	6,032.26	113641864269.32	6.927769148
1986	5,983.60	8,920.60	2.02	6,045.46	113711123610.793	5.415452591
1987	17,861.70	30,360.60	4.02	5,668.87	117350022236.436	19.6694756
1988	21,445.70	31,192.80	4.54	6,047.75	125956502777.93	20.17712612
1989	30,860.20	57,971.20	7.39	6,441.90	128374088334.158	28.96967339
1990	45,717.90	109,886.10	8.04	7,331.16	143492558283.965	6.668941872
1991	89,488.20	121,535.40	9.91	7,240.29	144006767603.816	18.8639068
1992	143,151.20	205,611.70	17.30	7,277.43	150675998868.22	46.75235536
1993	165,629.40	218,770.10	22.05	7,825.69	147609563324.76	41.63905872
1994	162,788.80	206,059.20	21.89	7,633.27	144930561220.046	43.29646429
1995	755,127.70	950,661.40	21.89	7,126.18	144825247765.892	75.40165319
1996	562,626.60	1,309,543.40	21.89	7,610.32	150902005160.521	26.49108986
1997	845,716.60	1,241,662.70	21.89	8,055.21	155334147078.485	5.055345931
1998	837,418.70	751,856.70	21.89	8,167.45	159343716123.037	6.009344303
1999	862,515.70	1,188,969.80	92.69	8,385.96	160274485623.743	13.43057163
2000	985,022.39	1,945,723.30	102.11	8,996.91	168313749255.077	22.6737374
2001	1,358,180.33	1,867,953.85	111.94	6,860.44	178274026161.332	10.07647724
2002	1,512,695.33	1,744,177.68	120.97	7,559.73	205601929272.338	21.10905001
2003	2,080,235.27	3,087,886.39	129.36	9,178.17	220707903878.763	9.804323771
2004	1,987,045.27	4,602,781.54	133.50	7,348.34	241124617041.963	22.36834148
2005	2,800,856.33	7,246,534.80	132.15	7,520.47	256649465356.273	19.85849477
2006	3,108,519.32	7,324,680.63	128.65	10,557.89	272200955002.138	23.86438113
2007	3,911,952.63	8,309,758.32	125.83	8,246.21	290142074789.495	7.099730995
2008	5,605,232.11	10,441,487.81	118.57	8,031.72	309768656455.714	7.921387201
2009	5,465,224.09	8,567,597.23	148.88	8,828.81	334664531364.212	0.686098874
2010	8,123,586.34	11,950,728.78	150.30	9,183.06	361456622215.721	16.34276633
2011	10,943,106.15	15,164,174.20	153.86	8,425.76	380642465752.065	9.778458097
2012	9,718,635.46	15,063,885.88	157.50	8,640.77	396743874911.807	9.947636706
2013	9,392,828.46	15,186,644.35	157.31	9,320.35	423211989457.897	4.964745716
2014	10,491,555.47	12,924,989.08	158.55	10,570.47	449915475309.982	4.662622917
2015	11,020,975.63	8,801,427.15	193.28	10,432.23	461850352958.58	2.863665122
2016	9,678,528.17	8,783,295.43	253.49	9,927.26	454382838006.505	9.54367007
2017	12,938,561.19	16,750,073.75	305.79	9,631.70	458044648499.498	11.11891807
2018	15,929,796.86	22,165,039.19	306.08	10,569.60	466851735606.204	10.22848509
2019 <sup>1</sup>	24,153,673.89	23,516,823.92	306.92	11,445.86	477161826016.253	10.38477919
2020 <sup>2</sup>	21,905,499.46	13,737,083.62	358.81	10,581.27	468600335245.226	7.849142046

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