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Tariff Policy and Economic Growth in Nigeria

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Abstract:
This study examined the impact of trade protectionism (tariffs) and economic growth /productivity in Nigeria between 1990-2021 using relevant time series data obtained from CBN Statistical Bulletin. Econometric techniques such as unit root, cointegration, and the ARDL model technique of analysis were adopted in order to determine the impact of the tariff and other variables such as exchange rate, export, import, foreign direct investment, and trade openness on economic growth/productivity in Nigeria.
The findings show that the coefficient of ECT is negative and indicates that 68.82% of the disequilibrium in the model is offset by the short-run annually to restore the long-run equilibrium. In the short run, at a 5% level of significance, the effect of TAR and IMP on RGDP is positive but statistically insignificant; TRO and LEXC have a negative and statistically insignificant effect on RGDP. However, the effect of EXP is negative but significant on RGDP. In the LR, the ARDL indicates that TAR, TRO, LEXC, EXP, and FDI positively affect RGDP. $_{TAR}$ and EXP are significant at the 5% level. IMP negatively affects RGDP. The R-squared shows that in the long run, 83.10% of the variation of the independent variables affects the dependent. The F-statistic (3.99) and a p-value (ρ) of 0.007827 show the existence of a strong linear dependency between the dependent and independent variables.
The conclusion is that tariffs and other trade variables stimulate economic growth. Since tariffs and exports are seen as sources of income to the government and FDI as a source of employment generation, they should be encouraged, and imports should be discouraged to a reasonable extent to help sustain economic growth and productivity. Trade policy should also be made to improve tariff imposition in Nigeria.

Keywords: *Tariffs, ECM, ARDL economic growth, Nigeria*

1. Introduction

1.1. Background to the Study

International Trade is an important part of international relations. The international trading system, which occurred globally in an unprecedented manner after the Second World War, resulted in an unprecedented increase in global economic growth. There exists a traditional controversy regarding trade liberalization and trade protectionism.

Government policy to limit or restrict international trade is known as protectionism, which aims to assist domestic industries. The goal of protectionist policy, when implemented, maybe to accelerate domestic economic activity for quality or standard. While implementing a protectionist policy, the government may focus majorly on imports. The policy may also be directed at subsidies, import quotas, product standards and so on.

While it has been argued by the protagonist that protectionist policy has an adverse effect on the people and society, it was aimed to protect by retarding economic growth and accelerating inflation; protectionism advocates the belief that aside from making the economy globally competitive, it generates domestic employment and increase the gross domestic product.

One important tool that the government adopts when trying to implement a protectionist policy is the import tariffs. Tariff policy refers to the set of regulations and measures implemented by a government to impose taxes on imported goods (Arinze et al., 2023). These taxes are duties or levies on imported products at the point of entry into the country. Tariffs serve multiple purposes, such as protecting domestic industries from foreign competition and thereby creating a conducive environment for the growth and development of the domestic industry by raising the domestic price of foreign commodities; by regulating trade flows, the tariff on imports influences the quantity and quality of imports into the country. This is because when the tariff on certain goods increases, their importation reduces, while the lower tariff on some imports encourages and promotes the entry of specific goods (Owoye & Onafowora, 2021). A significant aspect of tariffs is that they serve as a source of revenue generation for the government; this assists the government in its public expenditure and financing of government programmes. The generated revenue thus contributes to the overall government economic budget and assists in funding vast sectors and the development of education, infrastructure, health and social welfare (Oladipupo & Oladipo, 2022). Tariff revenues are influenced by factors such as the import elasticity of demand for the goods, the volume and values of imports, and the rate of tariff.

Some of the consequences or disadvantages of imposing excessively high tariffs are a decline in international competitiveness, trade retaliation from other countries and higher prices for consumers (Arinze & Odior, 2023). The effectiveness and efficiency of tariff measures in generating revenue and promoting economic development depend on the specific context, including the country's economic structure, trade dynamics, policy objectives, and global market conditions (Adefolake & Onadero, 2022). Tariff imposition favours big businesses and vested interests since they have the resources needed for effective lobbying.

Nigeria's economy has passed through several economic turbulences and shifts in policy over the past four decades. Traditionally, the Nigerian economy is heavily dependent on oil exports, which account for a large portion of government revenue generation and foreign exchange earnings. This dependence on a sole product is responsible for the vulnerability of the economy to global fluctuations in oil prices, which exposes the economy to economic volatility and fiscal imbalances (Obi et al., 2018).

To overcome this vulnerability and promote sustainable economic growth, Nigeria has pursued diversification strategies with the aim of reducing dependence on oil and expanding non-oil sectors. Tariff policy plays a crucial role in supporting these diversification efforts by regulating trade, protecting domestic industries, and generating revenue for government expenditure. Nigeria's tariff policy has undergone several changes over the years, such as the adoption of an import substitution policy in the 1980s with the aim of promoting domestic production by imposing high tariffs on foreign goods (Arinze & Odior, 2023). However, due to heavy reliance on revenue from oil exports, little revenue was generated from the policy. The 1990s witnessed a policy shift to a liberalized trade policy that reduced import tariffs. The goal of the policy is to encourage foreign investment and diversify the economy away from oil exports. The government also introduced value-added tax (VAT) to increase revenue generation (Akinkunmi, 2017) through increased economic productivity. The Nigerian economy, in order to decrease the import tariffs on some important and essential goods such as raw materials and machinery while increasing tariffs on luxury goods to generate revenue, adopted a mixed tariff policy in the 2000s. There was the introduction of excise duties on such goods as tobacco and alcohol to increase productivity and generate additional revenue (Oladipupo & Oladipo, 2022). In order to align with international best practices, the Nigerian government has implemented a harmonized system of tariffs with the aim of improving trade relations and generating revenue (Akinkunmi (2017).

The association between economic growth and tariffs is determined by the characteristics of the economy concerned. This is because tariffs have an important influence on economic outcomes, and countries and sectors not directed at tariff imposition (Eugster, Jaumotte, MacDonald & Piazza, 2022). Tariffs, as the most prominent barrier to trade, increase transaction costs and decrease the existing trade between countries.

Given the contrasting opinions on tariffs due to their complexity and the prominent role they play in nation-building, the study investigates the possible association between tariffs, trade variables, and economic growth in Nigeria.

1.2. Statement of the Problem

The relationship between tariff policies and economic growth is not only multifaceted but also dynamic, changing as a result of response to economic priorities, global trade dynamics, and internal political pressures. As Nigeria seeks to balance its objectives of protecting domestic industries, generating revenue, and fostering economic growth, it faces numerous challenges and critiques in its tariff policy framework. The interplay of these policies with Nigeria's broader fiscal and economic landscape has significant implications for the country's development and international trade relations. Tariffs are a tool that can be used to protect new and existing industries in the economy. They can also result in inefficiencies in the protected industries. Tariffs can lead to an increase in prices and thus result in an additional burden on consumers. The existence of high poverty levels and high unemployment is a great challenge. Tariff imposition will have the effect of increasing poverty levels and reducing purchasing power and consumption.

1.3. Research Questions

To address the research problem, this study aims to answer the following research questions:

- Is there an association between tariffs and economic productivity in Nigeria?
- Do trade variables have a significant impact on economic productivity in Nigeria?

1.4. Objectives of the Study

The major objective of the study is to examine the effects of tariff policy on economic growth in Nigeria. Other specific objectives are:

- To determine the nature of association between tariff and economic growth in Nigeria.
- To determine how economic growth has been impacted by trade variables in Nigeria.

1.5. Research Hypothesis

The null hypothesis for the study is:

- H0: There is no significant impact of tariffs on economic growth in Nigeria.
- H0: Trade variables have no effect significant impact on economic growth in Nigeria.

2. Literature Review

2.1. Theoretical Framework

2.1.1. Mercantilism and Protectionism

The origin of trade theory is traceable to the Mercantilist Theory, otherwise known as Economic Doctrine of Nation Building. Mercantilism is a historical economic theory that rose to prominence in the 17th t and 18th centuries as a system of nationalistic economics that developed in Western Europe in the 1500s when modern states were emerging from feudal monarchs; it is characterized by the belief that a nation's wealth is measured by the accumulation of precious metals, particularly gold and silver because it was relatively fixed in supply and that a country (especially one that is not well-endowed) could only augment its gold stock at the expense of other nations. This accumulation was thought to be essential for a country's economic and military power. Gold and silver (capital) can be increased mainly through a positive trade balance with other nations. Since exports generate more inflow of precious metal, it was perceived as a blessing and imports a curse because it is a leakage. Thus, it advocates for a national policy of protectionism in order to govern the economy properly. The Mercantilist doctrine aligns with the principle of protectionism, which involves the use of tariffs and trade barriers to safeguard domestic industries and enhance the nation's balance of trade (Amah & Nwaiwu, 2018).

2.2. Empirical Literature

In the literature, vast research exists both on the theories of trade and evidence on the effects of trade on economic development. Dollar and Kraay's (2004) investigation of individual cases and a cross-country study indicated that open trade regimes promote growth faster. Thus indicating a strong positive effect of trade on growth. Frankel and Romer's (1999) study shows that trade increases income. Davies and Quinlivan's (2006) study on multi-country, multi-year panel data analysis provided evidence of a significant association between trade and social welfare improvements. In 1980, Krueger showed the significance of international market access in providing an avenue for increasing rapid growth.

Romer (1986) examined how trade openness affected economic performance, poverty, and inequality in 73 developing nations. In determining the quickest emerging nations to have globalized, two factors were considered: the rate at which trade's proportion of GDP has increased and tariff reductions. Evidence indicates that the top three emerging nations that liberalized the most in the sample of seventy-three countries by these measures increased their trade share from 16 to 33 per cent and reduced their tariffs, from 57 to 35 percent, by 22 percent. Romer (1986) thus suggested that government should implement consistent policies to promote economic growth.

Research has indicated that the impediments to development are caused by trade barriers, including protectionist policies. Protectionism is justified by the effects of protectionist barriers on firms that trade internationally.

Eargenia (1972) examined trade liberalization strategies using ten developing nations; his research indicates that the most important variables contributing to the growth of those nations were the removal of tariffs and non-tariff import obstacles. The findings indicate that trade liberalization had an effect on economic growth in those nations; hence, it was determined that those nations should prioritize doing away with all export duties and protection tariffs.

Using econometric models and regressions, Yanikkaya (2003) investigated the growth effect on 108 economies of various trade openness metrics. The findings indicate that trade volumes positively and significantly correlate with trade openness and growth. Similarly, the results demonstrated a strong and positive correlation between trade obstacles and growth. Yanikkaya (2003) concluded that trade restrictions, such as tariffs, may exist because economic development and protectionist or liberal trade policies are not always correlated.

Orji and Ugwuanyi's (2017) investigation of the effect of tariffs on economic expansion from 1980 to 2013 using OLS indicated that tariff policy, as well as other factors such as trade openness, real GDP, exports, and exchange rate, have a statistically significant effect on economic growth in Nigeria.

Okechukwu et al. (2023) studied the impact of tariffs on economic growth in Nigeria between 2000 and 2020 using OLS. The result of their investigation shows that tariffs and other variables, such as exchange rate trade openness, have a positive and statistically significant effect on economic growth in Nigeria.

Arogundade et al.'s (2015) investigation of Nigeria's manufacturing sector's infant industries using OLS techniques from 1988 to 2010 indicated that tariffs have a beneficial influence on the sector's growth, while imports, interest rates, and inflation have a negative impact. The major driver of the manufacturing sector inefficiency identified is the high lending rates.

David-Wayas (2014) empirically investigated the relationship between trade barriers and economic growth in Nigeria between 1970-2006. By employing ordinary regression techniques and using data on GDP, import duty and export duty, aggregate export and import, and the ratio of export to GDP. The outcome of the investigation indicates that tariff barriers, openness and aggregate exports are positively associated with economic growth, while the ratio of exports to GDP and aggregate imports are negatively associated with economic growth.

Simeon et al. (2019) looked into how Nigerian imports were affected by tariffs from 1981 to 2016. The order of integration of each variable was examined using the Augmented Dickey-Fuller Unit root test based on data from secondary sources, and a long-run connection was tested using the Bound test Approach. The analysis's conclusion that all but tariff was stationary at first difference provided justification for estimating the ARDL (Autoregressive Distributed Lag) model. The model has a long-term association, as demonstrated by the Bound test. Additionally, the projected long-run and short-run ARDL regression findings demonstrated that, in the short run, tariffs had an insignificantly negative impact on total imports, whereas the exchange rate and degree of openness had an insignificantly beneficial impact. Once more, over the

sampling period, the Gross Domestic Product-based income level proxy had a considerable positive impact on total imports.

According to Ibrahim et al. (2019), imposing higher tariffs on specific commodities can actually boost income and offer some protection for home companies. This study makes a compelling argument for putting these policies into action to boost the domestic economy. They discovered that increasing taxes on particular commodities can contribute to revenue growth while preserving domestic industries. This study is significant because it provides policymakers with information on how to advance their nation's economy while also safeguarding domestic companies.

3. Methodology

3.1. Sources of Data and Identification of Variables

The data for the variables identified in this study was obtained from the Central Bank of Nigeria Statistical Bulletin. The dependent variable, Economic Growth, is a proxy by Real Gross Domestic Products (RGDP)) and the independent variables are Tariff (TAR), Trade Openness (TRO), Exchange Rate (LEXCH), Export (EXP), Import (IMP), Foreign Direct Investment (FDI).

3.2. Model Specification

Orji (2017), in his work "The Impact of Tariff on Economic Growth in Nigeria between 1980 and 2013 specified the model depicted below:

RGDP = f (TAR, TOP, EXR and EXP) (1)

Where:

RGDP = Real gross domestic product, TAR = Tariffs, TOP = Trade openness, EXR = Exchange rate and EXP = Export

To empirically analyze the effect of Tariffs and other trade variables on Economic Growth in Nigeria between 1990 and 2020, this study adopted the model specified above by Orji (2017) and specified in explicit form as below:

$RGDP_t = f(TAR_t, TRO_t, LEXC_t, EXP_t, IMP_t, FDI_t)$ (2)

Where;

RGDP= Real gross domestic product, TAR = Tariffs, TRO = Trade openness, LEXC = Natural log of Exchange Rate, EXP = Export, IMP = Import, FDI = Foreign Direct Investment.

In equation (2), economic growth (proxy by RGDP) is expressed explicitly as a function of the tariff

$RGDP_t = TAR_t + TRO_t + LEXC_t + EXP_t + IMP_t + FDI_t$ (3)

In order to account for other factors that determine economic growth aside from the predictor variables specified in the above equation, the random term was introduced to take cognizance of the unexplained variations in the dependent variable. Therefore, the new equation was stated as:

$RGDP_t = \alpha_0 + \alpha_1 TAR_t + \alpha_2 TRO_t + \alpha_3 LEXC_t + \alpha_4 EXP_t + \alpha_5 IMP_t + \alpha_6 FDI_t + \mu_t$ (4)

μ_t indicates the stochastic element, that is a real random term that explains the variation in the regression which is not explained by the reggressors while $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, and\ \alpha_6$ are the parameter coefficients.

3.2.1. A Priori Expectations

Based on economic theory, the independent variables are expected to have the following signs in relation to the dependent variable: $\alpha_1 > 0, \alpha_2 > 0, \alpha_3 > 0, \alpha_4 > 0, \alpha_5 > 0, and\ \alpha_6 > 0$

3.3. Method of Data Analysis

The study employs econometric analysis techniques and regression techniques. A correlation analysis was conducted to determine how the variables are related to one another in the model using the 5% level of significance, while the results of the unit root test prompt the appropriate use of the model for the study. The ARDL method of estimation was also adopted

3.4. Data Source

To ensure the collection of relevant and reliable data, this study adopted the use of secondary data obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin. The data relevant for this study spanned between the period 1990 and 2021.

4. Data Analysis and Presentation

4.1. Descriptive Statistics

The descriptive statistics of the research on such information as the means, standard deviations, minimum and maximum values for continuous variables, and frequencies and percentages for categorical variables are provided in table 1. It provides basic information about the variables and highlights potential relationships within the data set.

	RGDP	TARIFF	TRADE_ OPENNESS	LEXCEATE	EXPORT	IMPORT	FDI
Mean	4.320114	17.13844	18.76047	2.005847	21.11458	15.04558	1.657719
Median	4.430627	10.05000	24.46973	2.091492	21.13515	13.41463	1.494671
Maximum	15.32916	185.5500	59.89538	2.638489	36.02327	22.81126	5.790847
Minimum	-2.035119	0.000000	-187.3987	0.868644	8.118312	8.233875	0.501679
Std. Dev.	4.017196	32.46578	39.28643	0.467366	6.929245	4.021386	1.177715
Skewness	0.435426	4.533455	-4.677263	-1.115497	-0.020561	0.475728	1.943358
Kurtosis	3.286568	24.14189	25.30508	3.708166	2.443857	2.209139	7.116621
Jarque-Bera	1.120671	705.5847	780.0314	7.305115	0.414648	2.040972	42.73750
Probability	0.571017	0.000000	0.000000	0.025925	0.812756	0.360420	0.000000
Sum	138.2437	548.4300	600.3351	64.18709	675.6666	481.4587	53.04701
Sum Sq. Dev.	500.2737	32674.83	47846.12	6.771358	1488.448	501.3178	42.99739
Observations	31	31	31	31	31	31	31

Table 1: Descriptive Statistics
Source: Author's Computation Using E-Views (10)

Table 1 explains the descriptive statistics of the data series from 1990-2021, which revealed an observation period of 31 years. The mean value explains the average value for each of the variables. The observed mean average value of the RGDP is 4.320114, while the median value is 4.430627 within the period under study. The minimum and maximum values of -2.035119 and 15.32916 were observed, respectively. The standard deviation for RGDP is 4.017196, which indicates the deviation from the sample mean with respect to the variables. The skewness of the variables measures the degree of asymmetry. The RGDP shows a normal skewness with a value of 0.435426, which implies that the distribution is symmetric around its mean. The kurtosis measures the peakness of the variables, and for the RGDP, it is 3.286568. The Jarque-Bera value indicates the difference between the skewness and kurtosis of those from the normal distribution, and below the Jarque-Bera value is the probability value for each of the variables. The Jarque-Bera statistic shows if a variable is normally distributed or not. Therefore, for the RGDP, the Jarque-Bera value is 1.120671 with a probability value of 0.571017, which is greater than the probability value of 0.05; this implies that the series for RGDP has a normally distributed curve.

The Tariff has an average value of 17.13844 within the period under study. It has the lowest and highest values of 0.000000 and 185.5500, respectively, and a median value of 10.05000. The value of the standard deviation for Tariff is 32.46578, and the skewness value is 4.533455, which also shows that the distribution is symmetric around its mean. The kurtosis value is leptokurtic at 24.14189. The Jarque-Bera value of 705.5847 with a probability value of 0.000000 shows that the Tariff is not normally distributed.

The mean value of Trade Openness (TRO) is 18.76047, with associated minimum and maximum values of -187.3987 and 59.89538, respectively. The median value of the time series data for Trade Openness is indicated as 24.46973, and the standard deviation value is 39.28643. As such, unlike the distributions for RGDP and Tariff, Trade Openness indicates a negative skewness, implying that it has a long-left tail. It has a long-left tail because its value of -4.677263 is a lower value than the sampled mean. However, the variable shows itself to be leptokurtic because its value at 25.30508 is greater than 3, which implies that the variable is a peaked curve. The Jarque-Bera value for Trade Openness at 780.0314 shows that it is not normally distributed, having a probability value of 0.000000, which is less than 0.05 significant level.

The Exchange Rate result shows that for the study period 1990-2021, the mean value is 2.005847, and the minimum and maximum values are 0.868644 and 2.638489, respectively. The median value was 2.091492, and the standard deviation value was 0.467366. The Exchange Rate shows negative skewness because of its value of -1.115497, which is lower than the sampled mean. However, the variable shows itself to be leptokurtic at 3.708166. The Jarque-Bera value for Exchange Rate of 7.305115 with its probability of 0.025925 shows that it is not normally distributed.

Export has an average value of 21.11458. Its lowest and highest values are 8.118312 and 36.02327, respectively, and its median value is 21.13515. The standard deviation for Export is 6.929245, and the skewness value is -0.020561, which is negatively skewed and also shows that the distribution is asymmetric around its mean. The kurtosis value is platykurtic at 2.443857. The Jarque-Bera value of 0.414648 shows that Export is normally distributed, having a probability value of 0.812756, which is greater than a 0.05 significance level.

Import has an average value of 15.04558 within the scope of 1990 to 2021. It has the lowest and highest values of 8.233875 and 22.81126, respectively, and a median value of 13.41463. The value of the standard deviation for Import is 4.021386, and the skewness value is 0.475728, which is positively skewed and also shows that the distribution is symmetric around its mean. The kurtosis value is platykurtic at 2.209139. The Jarque-Bera value of 2.040972 shows that Import is normally distributed, having a probability value of 0.360420, which is greater than the 0.05 significance level.

Lastly, the mean value for FDI has an average value of 1.657719 within the scope of 32 years. The minimum and maximum values are 0.501679 and 5.790847, respectively, and a median value of 1.494671. FDI also has a standard deviation of 1.177715 and a positive skewness because its value of 1.943358 is a higher value than the sampled mean. The kurtosis value is leptokurtic because its value at 7.116621 is greater than 3, which implies that the variable has higher values above its sampled mean value. Additionally, the result revealed the Jarque-Bera value for FDI at 42.73750 and that its probability value at 0.000000 is less than 0.05, which then shows that the series for FDI is not normally distributed.

After testing for normality, it was found that all variables followed a normal distribution from 1990 to 2021, with the exception of RGDP, Export and Import, which did not follow a normal distribution. The Jarque-Bera test revealed that the p-values for these variables were not significantly different from zero. The standard deviation values reveal that all variables observed in this study, exchange rate, exports, tariffs, imports, trade openness, real GDP growth, and foreign direct investment, are most susceptible to change in Nigeria. This means that fluctuations in these areas can have a significant impact on the Nigerian economy.

4.2. Correlation Analysis

In order to determine the significant relationship between the variables, a correlation analysis was done, and this is depicted in table 2.

Variables	RGDP	TARIFF	TRADE_OPENNESS	LEXCEATE	EXPORT	FDI	IMPORT
RGDP	1						

TARIFF	-0.0493	1					
	-0.2702	-----					
	0.7888	-----					
TRADE_OPENNESS	0.23433	-0.8889	1				
	1.32022	-10.629	-----				
	0.1967	0	-----				
LEXCEATE	-0.0406	-0.1638	-0.0365	1			
	-0.2226	-0.9096	-0.1999	-----			
	0.8254	0.3703	0.8429	-----			
EXPORT	0.39347	0.20568	0.12614	-0.3228	1		
	2.34424	1.15119	0.69648	-1.8682	-----		
	0.0259	0.2587	0.4915	0.0715	-----		
FDI	-0.0741	-0.1747	0.09462	-0.4313	0.1366	1	
	-0.407	-0.9718	0.52059	-2.6187	0.75524	-----	
	0.6869	0.3389	0.6065	0.0137	0.456	-----	
IMPORT	0.2137	0.08421	0.09251	0.11425	0.43173	-0.1125	1
	1.19814	0.46289	0.50886	0.62987	2.6216	-0.6201	-----
	0.2402	0.6468	0.6146	0.5335	0.0136	0.5399	-----

Table 2: Correlation Analysis
Source: Author's Computation

Table 2 shows that EXP, TRO and IMP positively correlate with RGDP; only EXP was revealed to be significant at 5%. However, other variables do not correlate with RGDP and are also not significant at 5%.

4.3. Pre-Estimation Tests

4.3.1. Optimal Lag Length Selection

The optimal lag length selection is used to avoid misspecification errors, multi-collinearity, and serial correlation. Table 3 shows the results of the lag order selection criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-484.8801	NA	6571304.	32.72534	33.00558	32.81499
1	-378.8691	162.5502*	65069.88*	28.05794*	30.01961*	28.68549*
2	-343.5682	40.00769	93451.87	28.10454	31.74766	29.27001
* Denotes the lag order that the criteria chose.						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Table 3: Lag Order Selection Criteria Results
Source: Author's Computation (2024)

To determine and select the optimal lag order for the model, the study adopts the AIC since it has the least value at 28.05794 of the lag lengths of one (1) period as the optimal lag, as jointly suggested by LR, AIC, SC, HQIC, and FPE. This means that the study relies on AIC to proceed with Lag 1. As such, the model adopts the AIC lag length for its unit root test and model estimation, as shown in table 3.

4.4. Unit Root Test

The ADF test was utilized to conduct the unit root test, which verifies the accuracy of the data used for analysis in this study. Table 4 shows the summary result of the ADF unit root test at trend and intercept. In table 4, the variables for RGDP, TAR, TRP, IMP and FDI were all stationary at levels, that is, I(0), while LEXR and EXP were stationary at the initial difference, or I(1). Therefore, the ADF unit root test result shows a mixed stationary at trend and intercept.

Variables	Test Form	ADF Test Statistics	Test Critical Value at 5%	Probability	Order of Integration	Remarks
RGDP	Level	-3.541832	-3.562882	0.0522	*I(0)*	Non-Stationary
	First difference	-	-	-		
TAR	Level	-6.281814	-3.562882	0.0001	*I(0)*	Stationary
	First difference	-	-	-		
TRO	Level	-5.017098	-3.562882	0.0017	*I(0)*	Stationary
	First difference	-	-	-		
LEXC	Level	-2.415920	-3.562882	0.3647	*I(1)*	Non-Stationary
	First difference	-4.913406	-3.568379	0.0023		Stationary
EXP	Level	-3.320131	-3.562882	0.0817	*I(1)*	Non-Stationary
	First difference	-5.446619	-3.574244	0.0007		Stationary
IMP	Level	-4.261640	-3.562882	0.0106	*I(0)*	Stationary
	First difference	-	-	-		
FDI	Level	-3.924414	-3.568379	0.0233	*I(0)*	Stationary
	First difference	-	-	-		

Table 4: Summary of ADF Unit Root Test Results at Trend and Intercept
Source: Author's computation (2024)

Therefore, to uphold the consistency of the ADF unit root test result, as shown in table 4. The study checks through the PP unit root test, and a mixed order of stationarity was obtained, as shown in table 5, similar to the ADF result. The essence was to avoid wrong specification of the model, and to overcome any structural break in any of the variable. Therefore, the ARDL model estimation technique was used to determine the existence of a short-run or long-run co-integration between the dependent and independent variables, which necessitated a co-integration test using the ARDL Bound test to avoid a misleading estimation technique.

Variables	Test Form	PP Test Statistics	Test Critical Value at 5%	Probability	Order of Integration	Remarks
RGDP	Level	-3.541832	-3.562882	0.0522	*I(0)*	Non-Stationary
	First difference	-	-	-		
TAR	Level	-6.281814	-3.562882	0.0001	*I(0)*	Stationary
	First difference	-	-	-		
TRO	Level	-5.017098	-3.562882	0.0017	*I(0)*	Stationary
	First difference	-	-	-		
LEXC	Level	-2.415920	-3.562882	0.3647	*I(1)*	Non-Stationary
	First difference	-4.913406	-3.568379	0.0023		Stationary
EXP	Level	-3.320131	-3.562882	0.0817	*I(1)*	Non-Stationary
	First difference	-5.446619	-3.574244	0.0007		Stationary
IMP	Level	-4.261640	-3.562882	0.0106	*I(0)*	Stationary
	First difference	-	-	-		
FDI	Level	-3.924414	-3.568379	0.0233	*I(0)*	Stationary
	First difference	-	-	-		

Table 5: Summary of PP Unit Root Test Results at Trend and Intercept
Source: Author's Computation Using E-View

4.5. Co-integration Test

To test for co-integration, the co-integration hypothesis is stated below as:

- H_0: There is no co-integration relationship between the independent and dependent variables.

The null hypothesis of the co-integration is specified as:

$H_0 = \beta_1 = \beta2 = \beta3 = \beta4 = \beta5 = \beta6 = \beta7 = 0$……4.1

However, it should be noted that equation 4.1, as specified, implies the non-existence of co-integration among the variables under the ARDL bound test.

H_1: There exists a co-integration relationship between the independent and dependent variables.

The alternate hypothesis of the co-integration is specified as:

$H_0 = \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta5 \neq \beta6 \neq \beta7 \neq 0$……4.2

However, it should be noted that equation 4.2, as specified, implies the existence of co-integration among the variables under the ARDL bound test.

Test Statistic	Value	k = (N-1)
F-statistic	4.234430	6

Table 6: ARDL Bound Test Results
Source: Author's Computation Via E-Views Output

Significance	I0 Bound (Lower Bound)	I1 Bound (Upper Bound)
10%	1.99	2.94
5%	2.27	3.28
2.5%	2.55	3.61
1%	2.88	3.99

Table 7: Critical Value Bounds Results
Source: Author's Computation Using E-views 10 (2024)

Table 6 revealed that the F-Statistic of the co-integration result was 4.234430, while table 7 shows that at a 5% significance level, the lower bound (I0) is 2.27, and the upper bound (I1) is 3.28. From the results, since the F-Statistic at 4.234430 is greater than the 5% upper bound at 3.28, it then shows that the co-integration null hypothesis is rejected at 5% significance. Hence, the implication is that there exists a co-integration and a long-run relationship between Tariff, Trade Openness, Exchange Rate, Export, Import, Foreign Direct Investment and Economic Productivity in Nigeria between 1990 and 2021.

Thus, it is necessary to correct this disequilibrium among the variables in the long-run by adjusting it to any shock in the short-run.

4.6. Model Estimation Technique

Since the ADF and PP unit root test indicates mixed stationary results for the variables coupled with the observed existence of a long-run co-integration among the variables, the Error Correction Model (ECM) was adopted to adjust the long-run relationship to any short-run period in Nigeria. The short-run dynamic of the ARDL, ECM and ECT are estimated in equations 4.1, 4.2, 4.3, and 4.4, respectively, as:

$$\Delta Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 X_{1t-1} + \beta_3 X_{2t-1} + \beta_4 X_{3t-1} + \beta_5 X_{4t-1} + \beta_6 X_{5-1} + \beta_7 X_{6-1} \sum_{i=1}^{p} \gamma_1 \Delta Y_{t-1} + \sum_{i=0}^{q} \gamma_2 \Delta X_{1t-1} + \sum_{i=0}^{q} \gamma_3 \Delta X_{2t-1} + \sum_{i=0}^{q} \gamma_4 \Delta X_{3t-1} + \sum_{i=0}^{q} \Upsilon_5 \Delta X_{4t-1} + \sum_{i=0}^{q} \Upsilon_6 \Delta X_{5t-1} + \sum_{i=0}^{q} \gamma_7 \Delta X_{6t-1} \varepsilon_t \quad 4.1$$

$$\Delta RGDP_t = \beta_0 + \sum_{i=1}^{p} \gamma_1 \Delta RGDP_{t-1} + \sum_{i=1}^{q} \gamma_2 \Delta TAR_{t-1} + \sum_{i=1}^{q} \gamma_3 \Delta TRO_{t-1} + \sum_{i=1}^{q} \gamma_4 \Delta LEXC_{t-1} + \sum_{i=1}^{q} \Upsilon_5 \Delta EXP_{t-1} + \sum_{i=1}^{q} \Upsilon_6 \Delta IMP_{t-1} + \sum_{i=1}^{q} \Upsilon_7 \Delta FDI_{t-1} \varepsilon_t \quad 4.2$$

$$\Delta RGDP_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta RGDP_{t-1} + \sum_{i=1}^{q} \beta_2 \Delta TAR_{t-1} + \sum_{i=1}^{q} \beta_3 \Delta TRO_{t-1} + \sum_{i=1}^{q} \beta_4 \Delta LEXC_{t-1} + \sum_{i=1}^{p} \beta_5 \Delta EXP_{t-1} + \sum_{i=1}^{q} \beta_6 \Delta IMP_{t-1} + \sum_{i=1}^{q} \beta_7 \Delta FDI_{t-1} \lambda ECT_{t-1} + \varepsilon_t \quad 4.3$$

$$ECT_t = RGDP_t - (\beta_1 TAR_t - \beta_2 TRO_t - \beta_3 LEXC_t - \beta_4 EXP_t - \beta_5 IMP_t - \beta_6 FDI_t) \quad 4.4$$

The Error Correction Term (ECT) depicts the speed of adjustment of the dynamic short-run to the long-run equation. Capturing the potential short-run variation in the estimation of the long-run co-integrating equation is the aim of the ECM.

ARDL Error Correction Regression Selected Model: ARDL (2, 1, 1, 2, 2, 0, 2) Sample: 1990–2021 Included Observations: 30				
ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(RGDP(-1))	-0.652439	0.109926	-5.935270	0.0000
D(TARIFF)	0.038553	0.033874	1.138140	0.2756
D(TRADE_OPENNESS)	-0.052412	0.034225	-1.531374	0.1496
D(LEXCEATE)	-20.30667	5.144692	-3.947112	0.0017
D(LEXCEATE(-1))	-10.35995	5.367118	-1.930262	0.0757
D(EXPORT)	-0.031433	0.065729	-0.478222	0.6404
D(EXPORT(-1))	-0.419501	0.090879	-4.616059	0.0005
D(IMPORT)	0.353473	0.104587	3.379694	0.0049
D(IMPORT(-1))	0.168292	0.083629	2.012360	0.0654
CointEq(-1)*	-0.688296	0.095343	-7.219146	0.0000
R-squared	0.806698	Mean dependent var		0.109628
Adjusted R-squared	0.719713	S.D. dependent var		3.594306
S.E. of regression	1.902904	Akaike info criterion		4.385841
Sum squared resid	72.42087	Schwarz criterion		4.852907
Log-likelihood	-55.78761	Hannan-Quinn criter.		4.535259
Durbin-Watson stat	1.673915			

Table 8: ECM Results
Source: Author's Computation

The absolute value of the ECM depicts how equilibrium is restored in the system in the event of a temporary shock. The size of the error term indicates the speed of adjustment to any disequilibrium towards a long-run equilibrium since the deviation of long-run equilibrium is corrected through a short-run partial dynamic. The coefficient of the ECT represented as CointEq(-1) carries the negative sign (-0.688296). The coefficient indicates that 68.82% of the disequilibrium in the model is offset by the short-run annually to restore the long-run equilibrium. This implies that the model corrects to equilibrium in the following year, 2022, after the sampled period at a speed of 68.82%.

Thus, by estimating the results of the ECM, gives,

$$\Delta \mathrm{R}GDP_t = -0.652439 + 0.038553\Delta TAR_t - 0.052412\ \Delta TRO_t - 10.35995\ \Delta \mathrm{L}EXC_t - 0.419501\Delta EXP + 0.168292\Delta IMP - 0.688296\ ECT_t + \varepsilon_t \quad \ldots\ldots 4.5$$

As such, this shows that in the short run, TAR and IMP positively affect economic productivity, while TRO, LEXC and EXP negatively affect economic productivity between 1990-2021. FDI has no positive or negative effect on economic productivity in the short run. Thus, the result shows that at any 1% change in tariff and import, economic productivity will increase by 3.86% and 16.83%, respectively, in the short run. Moreover, at any 1% increase in trade openness, exchange rate, and export, economic productivity in Nigeria will decrease by 5.24%, 1035.99%, and 41.95%, respectively, in the short run.

Moreover, in the short run, all the independent variables except Export are not statistically significant at a 5% percent level of significance. As such, the R-squared shows that in the short run, the variation of the independent variables affects the dependent variable by 80.67%. This shows that the remaining 19.33% is explained by other variables not specified in the short-run ECM.

In order to check the long-run relationship, the ARDL model using AIC automatic selection of 2 maximum dependent lags and 2 automatic dynamic regressors was adopted. Hence, the selected model for the RGDP, LEXC, EXP and FDI lagged by two periods, while the TAR and TRO lagged by one period (that is, ARDL: 2, 1,1, 2, 2, 0, 2). Therefore, the AIC of the top 20 ARDL models adopted for the study reveals that the best or appropriate model to be used for the study in figure 1 is the 2, 1, 1, 2, 2, 0 and 2 model, which tends to be the lowest model on the graph. Table 9 offers an instance of this.

4.6.1. ARDL Criteria Graph

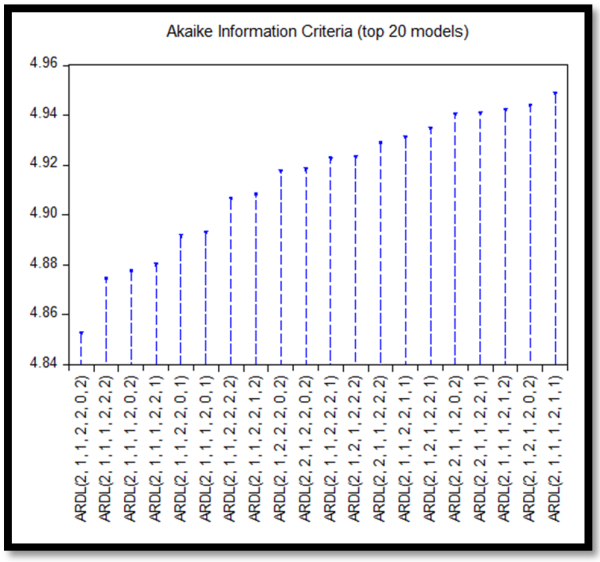

Figure 1: Akaike Information Criteria (Top 20 Models)
Source: Author's Computation

4.6.2. Auto Regressive Distributed Lag (Long-Run)

Dependent Variable: GDP **Method: ARDL** **Sample (adjusted): 1992–2021** **Included observations: 30 after adjustments** **Maximum dependent lags: 2 (Automatic selection)** **Model selection method: Akaike info criterion (AIC)** **Dynamic regressors (2 lags, automatic): TARIFF TRADE_OPENNESS LEXCEATE EXPORT FDI IMPORT** **Fixed regressors: C** **Number of models evaluated: 1458** **Selected Model: ARDL(2, 1, 1, 2, 2, 0, 2)**				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
RGDP(-1)	-0.340734	0.234764	-1.451392	0.1704
RGDP(-2)	0.652439	0.188593	3.459506	0.0042
TARIFF	0.038553	0.064170	0.600801	0.5583
TARIFF(-1)	0.210222	0.072661	2.893180	0.0126
TRADE_OPENNESS	-0.052412	0.059016	-0.888096	0.3906
TRADE_OPENNESS(-1)	0.111691	0.055624	2.007966	0.0659
LEXCEATE	-20.30667	10.41957	-1.948897	0.0732
LEXCEATE(-1)	17.91840	11.93749	1.501019	0.1572
LEXCEATE(-2)	10.35995	9.274702	1.117011	0.2842
EXPORT	-0.031433	0.112959	-0.278270	0.7852
EXPORT(-1)	-0.095438	0.127524	-0.748391	0.4675
EXPORT(-2)	0.419501	0.121456	3.453930	0.0043
FDI	1.467018	0.800807	1.831924	0.0900
IMPORT	0.353473	0.192867	1.832732	0.0898
IMPORT(-1)	-0.340079	0.149338	-2.277242	0.0403
IMPORT(-2)	-0.168292	0.139633	-1.205242	0.2496
C	-23.75956	8.743510	-2.717394	0.0176
R-squared	0.831016	Mean dependent var		4.203614
Adjusted R-squared	0.623037	S.D. dependent var		3.844241
S.E. of regression	2.360262	Akaike info criterion		4.852507
Sum squared resid	72.42087	Schwarz criterion		5.646519
Log-likelihood	-55.78761	Hannan-Quinn criter.		5.106519
F-statistic	3.995660	Durbin-Watson stat		1.673915
Prob(F-statistic)	0.007827			

Table 9: Long-Run Relationship Results
Source: Author's Computation

$$\mathrm{RGDP}_t = \beta_0 + \sum_{i=1}^{p}\beta_1 \mathrm{RGDP}_{t-1} + \sum_{i=1}^{p}\beta_2 RGDP_{t-2} + \sum_{i=1}^{p}\beta_3 TAR_{t-1} + \sum_{i=1}^{p}\beta_4 \mathrm{TRO}_{t-1} + \sum_{i=1}^{q}\beta_5 \mathrm{LEXC}_{t-1} + \sum_{i=1}^{q}\beta_6 \mathrm{LEXC}_{t-2} + \sum_{i=1}^{q}\beta_7 EXP_{t-1} + \sum_{i=1}^{q}\beta_8 \mathrm{EXP}_{t-2} + \sum_{i=1}^{q}\beta_9 \mathrm{IMP}_{t-1} + \sum_{i=1}^{q}\beta_{10} \mathrm{IMP}_{t-2} \quad 4.6$$

Since the model adopts the selected model of the 2, 1, 1, 2, 2, 0, and 2 models, it is estimated below as:

$$\mathrm{RGDP}_t = \beta_0 + \sum_{i=1}^{p}\beta_2 \mathrm{RGDP}_{t-2} + \sum_{i=1}^{q}\beta_3 \mathrm{TAR}_{t-1} + \sum_{i=1}^{q}\beta_4 \mathrm{TRO}_{t-1} + \sum_{i=1}^{q}\beta_5 \mathrm{LEXC}_{t-2} + \sum_{i=1}^{q}\beta_8 \mathrm{EXP}_{t-2} + \sum_{i=1}^{q}\beta_{10} \mathrm{IMP}_{t-2} + \varepsilon_t \quad 4.7$$

$$RGDP_t = -23.75956 + 0.652439\mathrm{RGDP}_{t-2} + 0.210222\mathrm{TAR}_{t-1} + 0.111691\mathrm{TRO}_{t-1} + 10.35995 LEXC_{t-2} + 0.419501 EXP_{t-2} + 1.467018 FDI_{t-0} - 0.340079\mathrm{IMP}_{t-2} + \varepsilon_t \quad 4.8$$

Results from table 9 show the long-run relationship between Tariff, Trade Openness, Exchange Rate, Export, Foreign Direct Investment, Import and economic productivity in Nigeria from 1990-2021. The result shows that TAR, TRO, LEXC, EXP, and FDI positively affect economic productivity in the long run and that at any 1% change in these variables, economic productivity will be increased by 21.02%, 11.17%, 1035.99%, 41.95% and 146.71% in the long-run. Likewise, TAR and EXP are significant at a 5% significance level.

IMP negatively affects economic productivity in the long-run, which also depicts that any 1% increase in IMP, economic productivity will be decreased by 34.01% in the long-run and the result also reveals to be significant at 5% level of significance in the long-run.

Consequently, the R-squared shows that in the long run, the variation of the independent variables affects the dependent variable by 83.10%, which means that the remaining 16.9% is explained by other variables not specified in the ARDL long-run model. Moreover, the results show that the long-run model is fit.

Also, the F-statistic at 3.995660 and a p-value (ρ) of 0.007827 shows that there is a strong linear dependency existing between the values of Tariff, Trade Openness, Exchange Rate, Export, Foreign Direct Investment, Import and economic productivity in Nigeria from 1990-2021 in Nigeria. Moreover, the Durbin Watson (DW) statistic at 1.673915 indicates no first-order autocorrelation among the variables in the long run since the DW statistic is within the range of 1.50-2.50. Therefore, this means that the parameter estimate is efficient and can be relied upon to forecast economic productivity in Nigeria.

4.7. Diagnostic Test

4.7.1. Normality Test

The study conducted a normality test using the Jarque-Bera Statistic at a 5% level of significance. The purpose of the normality test is to determine if the distribution of data within a group of data or variables is regularly distributed or not. Data that have been collected in a normal distribution or taken from a normal population can be identified using the normality test.

Thus, the probability of the Jarque-Bera normality test (χ^2_N) is 0.935205 is greater than 0.05. This shows that the residuals are normally distributed and that the result is desirable for economic interpretation and implications. Figure 2 shows the outcome.

4.7.1.1. Histogram-Normality Test

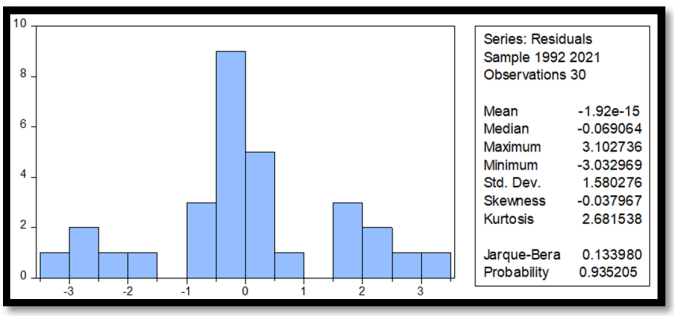

Figure 2: Jarque-Bera Normality Test Result
Source: Author's Computation

4.7.2. Test for Serial Correlation

To uphold the avoidance of serial correlation and the stability of the model specification, the serial correlation (χ^2_{SC}) through the LM test of the Breusch-Godfrey is 0.1835, which shows to be greater than the 5% probability level.

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	1.985815	Prob. F(2,11)	0.1835
Obs*R-squared	7.958311	Prob. Chi-Square(2)	0.0187

Table 10: Breusch-Godfrey Serial Correlation LM Test
Source: Author's Computation

4.7.3. Test of Multicollinearity

The correlation of independent variables with other independent variables is known as multicollinearity. Therefore, multicollinearity might result in a bigger standard error, the coefficient of determination (R^2) remains high, and the F-statistics test is significant even when there are many inconsequential variables, even if the Best Linear Unlimited Estimator (BLUE) estimate findings remain. The multicollinearity depicts some of the basic assumptions underlying the mathematical estimation of the model. Thus, using the Centered Variance inflation factors (VIFs), if the value is greater than 10, then there is a sign of multicollinearity. The higher the VIFs, the more severe the problem exists in the model, and vice versa. The result of the multicollinearity test is presented in table 11.

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.000102	1.244948	NA
D(TAR)	0.001360	1.754084	1.602442
D(TRO)	1.10E-06	1.164819	1.164624
D(LEXC)	4.67E-06	1.093374	1.018107
D(EXP)	1.026370	1.351463	1.236742
D(FDI)	0.053689	1.064782	1.192053
D(IMP)	3.782450	1.267153	1.476211
ECT(-1)	0.007073	1.708237	1.707944

Table 11: Variance Inflation Factors Test Result Sample: 1990-2021
Included Observations: 31
Source: Author's Compilation

The result shows that all Centered VIF values are less than 10; then, it was revealed that the ECM model does not contain Multicollinearity.

4.7.4. Test for Heteroskedasticity

Also, to support the foregoing diagnostic results, the heteroskedasticity (χ^2_H) through the Breusch-Pagan-Godfrey is 0.5150, which is greater than the 5% probability level, as shown in table 12.

F-statistic	0.784932	Prob. F	0.6816
Obs*R-squared	16.12452	Prob. Chi-Square	0.5150
Scaled explained SS	2.147776	Prob. Chi-Square	1.0000

Table 12: Breusch-Pagan-Godfrey Heteroskedasticity Test
Source: Author's Computation

4.7.5. Test for Ramsey RESET

Consecutively, to upkeep the foregoing normality, serial correlation, multicollinearity, and heteroscedasticity test, the Ramsey RESET test, which tells how stable the model is, also supports the previous diagnostic result where the probability of the F-statistic is greater than 0.05 at 0.3942. This is further shown in table 13.

Statistics	Value	Df	Probability
t-statistic	0.883657	12	0.3942
F-statistic	0.780849	(1, 12)	0.3942

Table 13: Omitted Variables: Squares of Fitted Values
Source: Author's Computation

	Sum of Sq.	df	Mean Squares
Test SSR	4.424573	1	4.424573
Restricted SSR	72.42087	13	5.570836
Unrestricted SSR	67.99629	12	5.666358

Table 14: F-Test Summary
Source: Author's Computation

4.7.6. Test for Model Stability

The test for stability shows a boundary lying inside the 5% significance level of significance using the CUSUM, and the CUSUM of Squares of the Recursive Estimates shows that the model is stable and, therefore, good and desirable for

economic interpretation and policy implementation. Thus, to check for the model stability, the result is shown in figures 3 and 4, respectively.

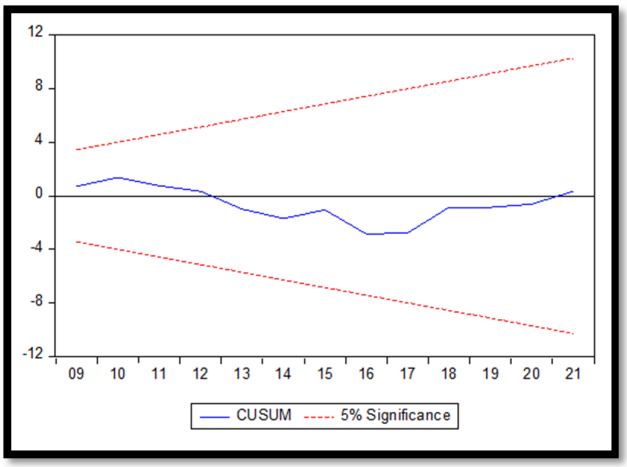

Figure 3: CUSUM at a 5% Significance Level
Source: Author's Computation

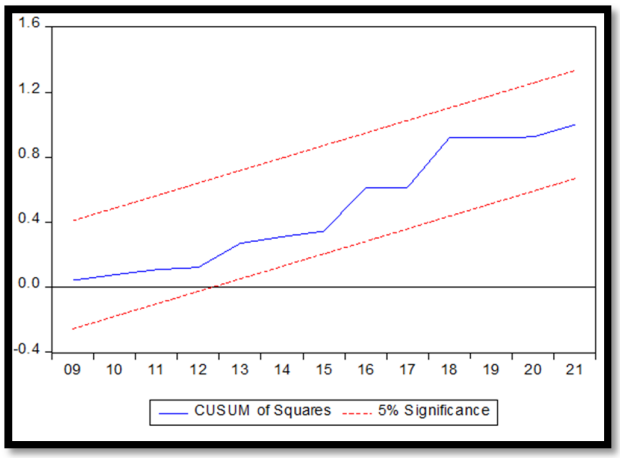

Figure 4: CUSUM of Squares at a 5% Significance Level
Source: Author's Computation

Figures 3 and 4 show the lies between the 5% significance boundaries, which shows that the model is stable.

4.8. Discussion of Findings

After all the considerable necessary analysis and interpretation of the result, it can be observed from the short-run result that Tariffs and Imports have positive but insignificant effects on economic productivity. The implication in the short-run is that there is a positive but negligible relationship between Tariff, Import and economic productivity in Nigeria. In the long-run, the result shows that Tariff and Export positively and significantly affect economic productivity while import have a negative but significant effect on economic productivity at 5% significance level. This means that in the long run, there is a statistically significant relationship between Tariff, Export, Import and economic productivity in Nigeria.

The result also revealed that Trade Openness (TRO), Exchange Rate (LEXC) and Export (EXP) negatively affected economic growth and productivity in Nigeria from 1990-2021. In the short run, all the variables except export are not significant. Thus, there is no statistically significant relationship between trade openness, exchange rate and economic productivity in Nigeria in the short run. Also, in the long run, the result shows that there is a positive relationship between trade openness, exchange rate, export, foreign direct investment economic growth and productivity in Nigeria, while tariff and export are not significant at a 5% significance level.

5. Conclusion and Recommendations

5.1. Summary of Findings

The study examined the relationship between Tariff Policy, in particular, and other trade variables on economic productivity in Nigeria between the periods of 1990 to 2021, where the TAR, TRO, LEXC, EXP, FDI and IMP are the independent variables and RGDP is the dependent variable. Two research objectives guided the study, and two research

questions were also asked. Likewise, three research hypotheses were formulated, and for the sake of validity and reliability of the data used, the study used secondary time series data obtained from the CBN Annual Statistical Bulletin.
The study reviewed literature revolving around the study. Furthermore, the study adopted the explanatory research design because it establishes the basis for explaining the relationships between tariff, trade openness, exchange rate, export foreign direct investment and import on economic productivity in Nigeria. The study adopted the model put forth by Orji (2017) by justifying the inclusion of Import and Foreign Direct Investment to keep the study's main points at the forefront.

The results of the descriptive statistics showed that the mean values for RGDP, TAR, TRO, LEXC, EXP, FDI, and IMP are 4.320114, 17.13844, 18.76047, 2.005847, 21.11458, 1.657719 and 15.04558 respectively from 1990 to 2021. The result revealed that RGDP, TAR, IMP and FDI were symmetric around the mean, while TRO, LEXC and EXP were shown to be negatively skewed. The Kurtosis result showed that GDP, TAR, TRO, LEXC and FDI were leptokurtic, while EXP and IMP were platykurtic. Significantly, the Jarque-Bera statistics results show that all the variables were not normally distributed except RGDP, EXP and IMP. The inferential statistics conducted in the study were divided into pre-estimation and post-diagnostic tests. The pre-estimation tests conducted were optimal lag length selection, ADF and PP unit root test, the ARDL bound co-integration test, and the model estimation technique.

Results of the optimal lag length selection show that the AIC had the least value of 28.05794 at the lag lengths of one (1) period as the optimal lag, as jointly suggested by SIC, LR, HQIC, and FPE criteria. Therefore, in the ADF unit root test, there was mixed stationarity between the variables where the RGDP, TAR, TRO, IMP, and FDI were all stationary at levels, that is, *I(0)*, while LEXC and EXP were stationary at the first difference, that is, *I(1)*. Also, the ARDL bound co-integration test results show that there exists a co-integration and a long-run relationship between Tariff, Trade Openness, Exchange Rate, Export, Foreign Direct Investment, Import and economic productivity in Nigeria between 1990 and 2021.

However, since the F-Statistic at 4.234430 is greater than the 5% upper bound at 3.28, there is a need to correct this disequilibrium among the variables in the long run by adjusting it to any shock in the short run using the ECM. The ECM coefficient indicates that 68.83% of the disequilibrium in the model is offset by the short-run annually to restore the long-run equilibrium, which implies that the model corrects to equilibrium in the following year, 2022, after the sampled period at a speed of 68.83%. Therefore, the ECM showed that in the short run, all variables except Export had no significant effect on economic productivity in Nigeria. Consequently, since there was mixed stationarity between the variables, it was revealed that the study employed the 2, 1, 1, 2, 2, 0, and 2 selected ARDL model to empirically investigate the long-run relationship between the dependent and independent variables. As such, the long-run results showed that all independent variables except imports had a significant positive effect on economic productivity in Nigeria. This further revealed that the research hypotheses were accepted in the short run but rejected in the long run.

Furthermore, the diagnostic test conducted includes the normality test, LM serial correlation test, heteroscedasticity test, test for multicollinearity, Ramsey RESET test, and test for model stability. The Jarque-Bera normality test revealed that the residuals are normally distributed and that the result is desirable for economic interpretation and implications. Also, using VIF results, the study showed that all the ECM models do not contain multicollinearity. Conclusively, using the CUSUM and CUSUM of Squares of the recursive estimates, the results showed that the ECM model was stable and, therefore, good and desirable for economic interpretation and policy implementation.

5.2. Conclusion

The study concluded that there exists a co-integration and a long-run relationship between Tariff (TAR), Trade Openness (TRO), Exchange Rate (LEXCH), Export (EXP), Foreign Direct Investment (FDI), Import (IMP) and economic productivity (RGDP) in Nigeria between 1990 and 2021. The study also concludes that at any 1% change in tariff and import, economic productivity will increase by 3.86% and 16.83%, respectively, in the short run. Moreover, at any 1% increase in trade openness, exchange rate, and export, economic productivity in Nigeria will decrease by 5.24%, 1035.99%, and 41.95%, respectively, in the short run. Moreover, the study concludes that all the independent variables except Exports do not statistically affect economic productivity in the short run. This then means that in the short run, the government should invest in exportation by encouraging industrialization and increasing its allocation to the manufacturing sector because exports are perceived as a key factor in economic productivity.

Similarly, the study further concludes that at a 1% change in TAR, TRO, LEXC, EXP, and FDI, economic productivity will increase by 21.02%, 11.17%, 1035.99%, 41.95%, and 146.71% in the long run and that any 1% increase in IMP will decrease economic productivity by 34.01% in the long run. Therefore, the result concludes that TAR, EXP, and IMP are all statistically significant and have an effect on economic productivity in the long run.

5.3. Recommendations

The major findings of the study revealed that Tariff, Trade Openness, Exchange Rate, Export, Foreign Direct Investment, and Import do not have a statistically significant effect on economic productivity in the short run. However, they are statistically significant and influence economic productivity in the long run. The following are the recommendations made by the study:

The government and policy stakeholders should pay close attention to exports in the short run. The study recommends that the government invest in industries, promote local production, and provide improved infrastructure to encourage economic growth and productivity, given that other factors do not have a statistically significant impact on economic productivity in the short run.

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