

A QUANTITATIVE ANALYSIS OF THE IMPACT OF AGRICULTURAL EXPORT ON ECONOMIC GROWTH IN NIGERIA

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Abstract

This paper analyzed the impact of agricultural export on economic growth in Nigeria. The study spanned from 1985 to 2022. The time series data used for the study were sourced from the Central Bank of Nigeria statistical bulletin various issues 2022 and Federal Bureau of Statistics. The study's analysis used ADF structural break unit root test. Therefore, the test indicated a structural break. The estimated break point represents the time at which the behavior of the time series changes significantly. More so, the ADF test revealed that the variables were integrated of different order $I(0)$ and $I(1)$, which gives credence to the adoption of ARDL bound cointegration estimate. Additionally, the presence of a significant error correction term indicates a long-run relationship between the variables. The ARDL long-run regression result provided presents the relationship between the dependent variable RGDP (Real Gross Domestic Product) and several independent variables over the long run. The long-run regression results suggest that variables such as COXP, RUXP, and CROP have significant long-run effects on RGDP, while the variable PMKX and the constant term do not appear to have significant long-run impacts. Additionally, the high R-squared and adjusted R-squared values indicate a very good fit of the regression model to the data. The $ecm(-1)$ coefficient, which captures the speed of adjustment process towards the long-run equilibrium relationship between the variables is significant. A significant coefficient suggests the presence of cointegration between the variables in the long run. The study concluded that agricultural export exerts influence on Nigeria economic growth for the period under study. The study recommended that, given the significant short-run and long-run effects of agricultural exports on RGDP, policymakers should prioritize investment in the agricultural sector.

Keywords: agricultural export, economic growth, cocoa export, palm kernel export, crop production.

Introduction

During Nigeria's early years of independence, more than 70% of all exports came from the country's agricultural sector. The main agricultural exports throughout the 1960s and 2010 were groundnuts, coffee, cocoa, and rubber. From 2010 to 2020, these goods—along with ginger, cotton, cocoa beans, cashew nuts, and sesame seeds—became the main exportable goods from Nigeria, bringing in almost ₦289.3 billion in income by March 2020 (Adesoji, 2020). Sesamum seeds and cocoa, for example, continue to be Nigeria's top agricultural exports, making for more than 60% of the nation's total agricultural export revenue, according to statistics from the National Bureau of Statistics (2020). Moreover, Nigeria's export earnings in 2020 were ₦112.8 billion for sesamum seeds and ₦109.6 billion for cocoa, representing 38.9% and 37.8% of the country's total top agricultural export earnings, respectively.

Nigeria's economy has grown significantly as a result of agricultural exports, which provide the foreign exchange profits required for other capital development projects. As a result, Ekpo and Egwaikhede (1994) noted a long-term correlation between Nigeria's economic expansion and agricultural exports. Due to the increasing domestic demand, Nigeria does not export any meat or livestock; nonetheless, frozen prawns and prawns made up 3.4% of Nigeria's total exports in 2020, which was projected to be worth ₦9.85 billion. The Netherlands, Belgium, France, Vietnam, and the United States are the leading export destinations for the items, according to Adesoji (2020). Nigeria's favourable temperature and lush vegetation allow it to produce cattle and crops for export. The cultivation of some cash crops is exclusive to a given location in comparison due to the unique climatic conditions found in different sections of the nation. Nigeria is now exporting more agricultural products as a result of this.

A country's economic growth cannot be disregarded due to the many benefits and foreign earnings that are expected to accompany an increase in agricultural exports. As an illustration, exports are a significant source of foreign exchange and create employment opportunities that help lower the social costs associated with unemployment (Ijirshar, 2015). Additionally, profitable international trade can transform an impoverished economy into a productive activity through its multiplier effects on the national income since the revenue earned from exporting agricultural produce will help to expand the level of demand within the economy (Ijirshar, 2015).

Nonetheless, the agriculture sector's export-based contribution to Nigeria's GDP has not been particularly positive in terms of economic development (CBN, 2016; NBS, 2017). The agricultural sector's share of Nigeria's GDP decreased from 48% in 1960 to 49% in 1970, 20% in 1980, and 19% in 1985 (Ukeje, 2003). The 1980s oil glut was cited as the reason for the decline in agricultural exports. Less than 5% of Nigeria's GDP in 2012 came from agricultural exports, according to Onunze (2012). The contribution of agricultural exports to Nigeria's GDP varied from 2.95 percent in the 1990s to 3.88 percent in 2001, 4.25 percent in 2002, and 7.40 percent in 2006 (CBN, 2015). By 2007, the contribution of agriculture exports to GDP had slightly decreased to 7.20 percent, which then declined to 6.30 percent in 2008 and 5.90 percent in 2009; from 2010 to 2012, it had decreased to 4 percent and 2.61 percent in 2013 (CBN, 2016). In 2017,

the output of the agricultural sector stood at 4.23 percent, down from 3.06 percent in 2016 (NBS, 2017).

Through the above trend, it displays those agricultural exports have not trickled down to the growth of the Nigerian economy. Therefore, there has been a diminishing influence of the agricultural exports to economic growth in Nigeria. Against this backdrop, this study will examine the effect of agricultural export on economic growth in Nigeria.

Literature Review

Concept of Agricultural Export

Agricultural export, according to Yifru (2015), is the export of agricultural products—whether processed or raw—from a nation's port or the sale of domestically produced agricultural commodities to foreign markets. Because the nation producing them may have a competitive advantage over other nations where they are imported, certain commodities are produced in excess.

According to Ijirsha (2015), agricultural exports have the potential to yield returns on investment comparable to those of any other economic sector. Due to the industry's great potential for employment, food security, and exports, prejudice against and unfavourable perceptions of agriculture should be changed in order for the sector to contribute as much to GDP as possible when investments are directed towards it.

According to Faridi (2012), exporting agricultural products is all that constitutes agricultural exports. In developing nations, agriculture often accounts for a sizable portion of overall exports. The striking finding was that, while agricultural exports' long-standing importance in the development process, empirical research on their impact to economic growth has received very little attention in the literature. However, some economists have maintained that increasing exports of agricultural products are essential to economic expansion.

Concept of Economic Growth

According to the National Bureau of Statistics (NBS) (2013), economic growth is the term used to characterise the steady rise in real per capita income over time. It calculates the quantity of commodities and services generated in a nation and the impact those items have over a given time period on the welfare of that nation's citizens. The traditional way to quantify it is as the real GDP (real gross domestic product) growth percentage. Economic development is defined as the process by which individuals take resources and reorganise them to create more value products or services.

According to Dwivedi (2004), economic growth is the result of a long-term, steady rise in net national product or per capita national production. It suggests that the rate of rise in overall production needs to outpace the rate of increase in the population. The idea that national production should be made up of products and services that meet the needs of the greatest number of people is another way to measure economic growth. Four key factors—human resources, natural resources, capital formation, and technical advancement—can be used to predict economic growth.

Theoretical Review

The study's theoretical foundation is the export-led growth theory. According to the notion of export-led growth, one of the primary drivers of growth is export expansion. It contends that raising exports may contribute to a nation's overall growth in addition to adding more capital and manpower to the economy. Advocates of the idea contend that exports might act as a "engine of economic growth" (Emilio, 2001). The idea of export-led growth elucidates the correlation between the increase of exports and the economy, wherein export growth emerges as a primary driver of economic growth. According to this theory, boosting exports rather than only labour and capital inputs might lead to overall economic growth in various countries. This hypothesis' theoretical foundation rests on several reasons, some of which are as follows:

The export industry has the potential to provide positive externalities on non-export industries by means of enhanced manufacturing processes and more efficient management styles. Feder (1983). Second, growing exports will boost output by providing opportunities for scale economies. Helpman (1985), as well as Krugman (1994). Thirdly, Esfahani (1991) states that exports have the potential to ease restrictions on foreign exchange and so increase access to global markets. The literature on endogenous growth theory, which highlights the impact of exports on long-run growth through a high rate of technological innovation and dynamic learning from abroad, has recently expanded on these arguments. Notable authors include Lucas (1998), Romer (1986, 1989), Grossman and Helpman (1991, 1995), Edwards (1992), Alisna and Rodrick (1999). We shall use the export-led growth (ELG) hypothesis in this study. As a result, in contrast to other theories, the ELG effectively summarizes the findings of this study. It clarified, for instance, the dynamics of global competitiveness for goods that are exportable and importable on the global market.

Empirical Review

Okuduwor, Amadi and Udi (2023) examined the impact of agriculture export on economic growth in Nigeria from 1999 to 2020. The study used econometric techniques of Augmented Dickey-Fuller (ADF), bound test and autoregressive distributed lag (ARDL) for empirical analysis. The results of unit root suggested that GDP growth rate and agriculture export were stationary while exchange rate and trade openness were non-stationary of order one. The findings from the autoregressive distributed lag (ARDL) method show that agriculture export contribute positive to economic growth. Exchange rate has a positive and significant impact on the Nigerian economy. Furthermore, the ARDL result show that trade openness has a positive and insignificant impact on economic growth. It was recommended that the Federal Government should formulate policies that will increase investment in the agriculture sector in order to optimize its positive contribution to the Nigerian economy.

Oyetoun, Michael, Oluwaseun, Timothy and Theresa (2021) explore the performance of agricultural export products on economic growth in Nigeria from 1960 to 2016. The Generalized Method of Moments (GMM) model was explored in this study. The findings of the study show that food and live animals, beverages, and tobacco were found to be negative but significant to agricultural exports, while agricultural exports (total) and crude materials, inedible except fats, were found to be negative and insignificant to economic growth. Animal and vegetable oils and fats were found to be positive but insignificant to economic growth. Based on the following findings, it is recommended that policies aimed at increasing the

productivity and quality of agricultural products, especially those from crops, should be implemented. There is also a need to devote more resources to the production of non-export goods to increase exports. Above all, more credit should be extended to the agricultural sector with a low or zero interest rate, which may lead to a higher rate of economic growth in Nigeria. Verter (2016) looked at how Nigerian agricultural exports were affected by economic expansion. Granger Causality and Johansen Cointegration were used in the secondary data analysis. The study found a negative correlation between economic growth and agricultural openness. It was decided that in order for Nigeria to have a positive trade balance in its agricultural sector, indigenous industries should be supported. Additionally, domestic processing companies should be promoted, and imports of items that Nigeria can make at a low cost should be avoided. But the study was unable to distinguish between the many agricultural export components in order to determine which ones will, in particular, have a long-term impact on economic growth.

Dawson (2015) examined how exports of agricultural products have boosted economic development in a few developed nations. For its examination, the theory took into account two theoretical models. The dual economy models, which included the agricultural and non-agricultural models, were the second type of model. The first model was an aggregate production function using both agricultural and non-agricultural exports as inputs. There are two subsectors in each model: one that produces exports and the other that produces non-exports. Using panel data from 62 LDCs covering the years 1974–2005, the study used fixed and random effects models. The study's findings clarified how agricultural exports contribute to economic expansion. It is noteworthy, although, that this study did not clearly list the agricultural goods exported by the nations under investigation, making it impossible to determine which items provided a clearer picture of their impact on the economy.

Methodology

Data for this study is an annual time series secondary data and was collected from the Central Bank of Nigeria (CBN) and Federal Bureau of statistics (NBS). The data covered a period of thirty-seven years from 1985 to 2022. The variables on which data were collected are the gross domestic product (RGDP), crop production (CROP), amount of cocoa export (COXP), amount of palm kernel export (PMKX) and amount of rubber export (RUXP). Autoregressive distributed lag, or ARDL, model econometric analysis was used to examine the data. The test for the presence of relationships between variables may be used regardless of whether the underlying regressors are purely I(0), purely I(1), or a combination of the two because this method does not need pretesting of variables. To establish the presence of long-run and short-run correlations, the study applied the ARDL technique, which yields strong findings.

The ARDL (p,q1,q2.....qk) model specification is given as follows;

$$\Phi(L,p)y_t = \sum_{i=1}^k \alpha_i(L, q_i)x_{it} + \delta w_t + u_t \quad (1)$$

Where;

$$\begin{aligned} \phi(L,p) &= 1 - \phi_1 L - \phi_2 L^2 - \dots - \phi_p L^p \quad (2) \\ \alpha(L,q) &= 1 - \alpha_1 L - \alpha_2 L^2 - \dots - \alpha_q L^q, \quad \text{for } i=1,2,3,\dots,k, \quad u_t \sim \text{iid}(0; \delta^2) \dots \dots \dots (3) \end{aligned}$$

L is a lag operator such that $L^0 y_t = x_t$, $L^1 y_t = y_{t-1}$, and w_t is a vector of deterministic variables such as the intercept term, time trends, seasonal dummies, or exogenous variables with the fixed lags $P=0,1,2,\dots,m$, $q=0,1,2,\dots,m$, $i=1,2,\dots,k$: namely a total of $(m+1)^{k+1}$ different ARDL models. The maximum lag order, m , is chosen for the study. Sample period, $t = m+1, m+2, \dots, n$.

The corresponding specification is given as:

$$\Phi(L)y_t = \Theta + \Theta(L)x_t + u_t \quad (4)$$

with

$$\Phi(L) = 1 - \phi_1 L - \dots - \phi_p L^p,$$

$$\Theta(L) = \alpha_0 - \alpha_1 L - \dots - \alpha_q L^q.$$

Hence, the general ARDL($p, q_1, q_2, \dots, q_k$) model for the educational demand and expenditure on economic growth;

$$\Phi(L)y_t = \Theta + \theta_1(L)x_{1t} + \theta_2(L)x_{2t} + \theta_k(L)x_{kt} + \mu_t \quad (5)$$

Where:

$\theta_1, \theta_2, \theta_k$ are the unknown parameters of interest, while μ_t is the structural disturbances or errors term.

Using the lag operator L applied to each component of a vector, $L^k y_t = y_{t-k}$, is convenient to define the lag polynomial $\Phi(L, p)$ and the vector polynomial $\alpha(L, q)$. As long as it can be assumed that the error term u_t is a white noise process, or more generally, is stationary and independent of $x_t, x_{t-1}, \dots$ and $y_t, y_{t-1}, \dots$, the ARDL models can be estimated consistently by ordinary least squares.

The analytical method started with a limits test to rule out the null hypothesis that there is no cointegration. The critical value provided by Pesaran (1997) and Pesaran et al. (2001) is compared with the computed F-statistic. Regardless of whether the underlying order of integration of the variables is 0 or 1, the null hypothesis of no long-run association can be rejected if the test statistics surpass the upper critical value. Similarly, the null hypothesis is not rejected if the test statistic is less than a lower critical value. Nonetheless, the outcome is ambiguous if the test statistic is in the range of these two boundaries. An upper limit is used to make a choice when all variables are $I(1)$ and the sequence of variable integration is known. In a similar vein, the lower limit is used to make the choice if every variable is $I(0)$.

Presentation and Discussion of Result

Table 1: Break-Point Augmented Dickey Fuller Unit Root test

Variable	Level I(0)	1 st Difference I(1)	Test critical values	Prob.*	Order of Integration
RGDP		-5.033893**	-4.859812	0.0298	I(1)
CROP		-4.455283	-4.443649	0.0486	I(1)
COXP	-4.699429**		-4.443649	0.0246	I(0)
PMKX		-5.534871**	-4.859812	0.01	I(1)
RUXP		-10.27842	-4.443649	0.01	I(1)

Source: Authors computation, reviews 10, 2024

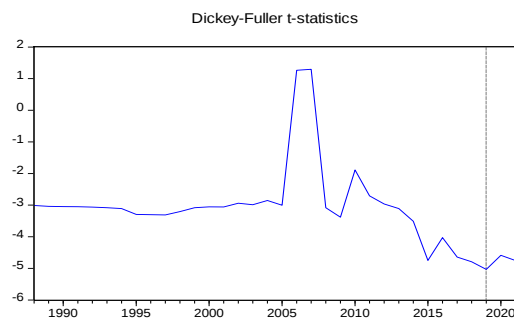


Fig 1: RGDP structural Break-point

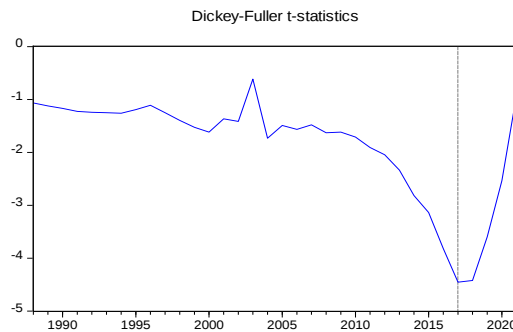


Fig 2: CROP structural Break-point

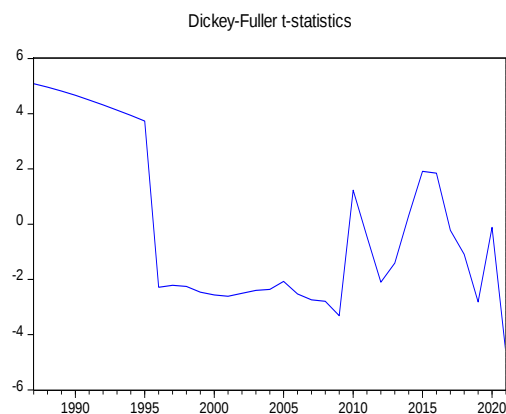


Fig 3: COXP structural Break-point

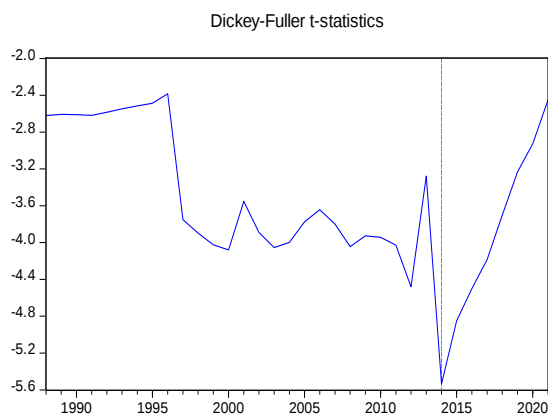


Fig 4: PMKX structural Break-point

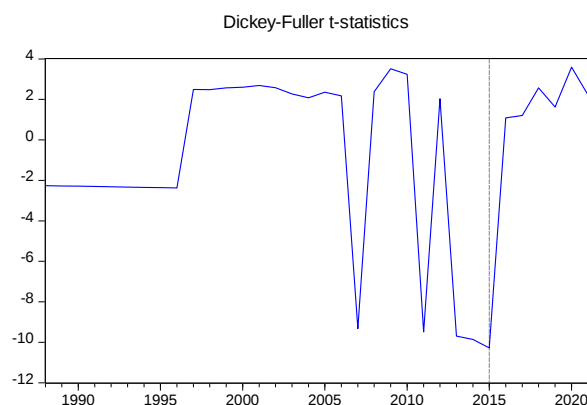


Fig 5: RUXP structural Break-point

The break-point unit root result presented in table one above showed the result of all the variables. The ADF test revealed that at 5 percent level of significance only the COXP was found stationary at levels. Since other variables were not stationary at levels, they were differenced at their first difference $I(1)$. At this point of first difference, all the variables become stationary at 5% critical value. Therefore, given that the variables are integrated of order $I(0)$ and $I(1)$, the condition to employ ARDL model to test for long run relationship is satisfied. Consequently, the stationarity results paved way for bound test cointegration, which measures the long run relationship among the variables.

Table 2: ARDL Bounds Test Cointegration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.275311	10%	2.45	3.52
k	4	5%	2.86	4.01
		2.5%	3.25	4.49
		1%	3.74	5.06

Source: Authors computation, eviews 10, 2024

Given that the variables were integrated of order 1(1), the ARDL bounds test result, revealed the existence of long run relationship amongst the variables. The F-statistic of about 5.27 from the result is higher than the upper critical bounds at 10%, 5%, 2.5% and 1% critical values. This provided credence to reject the null hypothesis of no cointegration in the model. As such, it can be inferred from the ARDL bounds test result that a long-run relationship exists among the variables in the model. Owing to the establishment of long-run co-integration association among the variables, the short-run and Long-run dynamic limits for the variables were acquired.

Table 3: ARDL Regression Result

Dependent Variable: RGDP

Short-Run Estimate				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.078700	0.597228	-0.131775	0.8961
D(COXP))	0.358565	0.129778	2.762904	0.0102
D(PMKX)	0.569535	0.064871	8.779565	0.6100
D(RUXP)	0.040743	0.005011	8.131144	0.0000
D(CROP)	0.393355	0.087342	4.503616	0.0001
CointEq(-1)*	-0.859888	0.156255	-5.503108	0.0000
Long-Run Estimate				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
COXP	0.695535	0.154984	3.674811	0.0010
PMKX	0.069961	0.111483	0.627548	0.5356
RUXP	0.051743	0.011368	3.584172	0.0013
CROP	0.338241	0.088429	3.825010	0.0007
C	-0.078700	0.943173	-0.083442	0.9341
R-squared	0.999245	Adjusted R-squared		0.999021

Source: Authors computation, eviews 10, 2024

The ARDL (Autoregressive Distributed Lag) short-run regression result provided indicates the relationship between the dependent variable RGDP (Real Gross Domestic Product) and several independent variables, presumably economic indicators or factors that may influence RGDP. The constant term represents the intercept of the regression equation. In this case, the

constant is not statistically significant (as indicated by the high p-value), suggesting that there is no significant impact of the constant term on RGDP in the short run.

The coefficient COXP indicates the short-run effect of the variable COXP on RGDP. In this case, the coefficient is statistically significant at the 5% level (p-value < 0.05), suggesting that changes in COXP have a significant positive impact on RGDP in the short run. The coefficient of PMKX indicates the short-run effect of the variable PMKX on RGDP. However, the high p-value suggests that this coefficient is not statistically significant at 5 percent significance levels. The coefficient of RUXP indicates the short-run effect of the variable RUXP on RGDP. The coefficient is statistically significant at a very high level of confidence (p-value close to 0), suggesting that changes in RUXP have a significant positive impact on RGDP in the short run. Additionally, the coefficient CROP indicates the short-run effect of the variable CROP on RGDP. The coefficient is statistically significant at the 1% level (p-value < 0.01), suggesting that changes in CROP have a significant positive impact on RGDP in the short run. However, The $ecm(-1)$ coefficient represents the error correction term, which captures the adjustment process towards the long-run equilibrium relationship between the variables. A significant coefficient suggests the presence of cointegration between the variables in the long run. In this case, the coefficient is statistically significant (p-value < 0.05), indicating a significant adjustment process towards the long-run equilibrium.

Overall, the short-run regression results suggest that variables such as COXP, RUXP, and CROP have significant short-run effects on RGDP, while the constant term and the variable PMKX do not appear to have significant short-run impacts. Additionally, the presence of a significant error correction term indicates a long-run relationship between the variables. The ARDL long-run regression result provided presents the relationship between the dependent variable RGDP (Real Gross Domestic Product) and several independent variables over the long run.

The coefficient COXP indicates the long-run effect of the variable COXP on RGDP. This coefficient is statistically significant at the 1% level (p-value < 0.01), suggesting that changes in COXP have a significant positive impact on RGDP over the long run. More so, the coefficient of PMKX indicates the long-run effect of the variable PMKX on RGDP. However, the high p-value suggests that this coefficient is not statistically significant at 5% significance levels, indicating that PMKX may not have a significant long-run impact on RGDP. The coefficient RUXP indicates the long-run effect of the variable RUXP on RGDP. Similar to COXP, this coefficient is statistically significant at the 1% level (p-value < 0.01), suggesting that changes in RUXP have a significant positive impact on RGDP over the long run. Additionally, the coefficient CROP indicates the long-run effect of the variable CROP on RGDP. Like COXP and RUXP, this coefficient is statistically significant at the 1% level (p-value < 0.01), suggesting that changes in CROP have a significant positive impact on RGDP over the long run.

The constant term represents the intercept of the regression equation in the long run. In this case, the constant is not statistically significant (as indicated by the high p-value), suggesting that there is no significant impact of the constant term on RGDP in the long run. The R-squared and adjusted R-squared values indicate the goodness of fit of the regression model. In this case, the high values of both R-squared and adjusted R-squared (close to 1) suggest that the

independent variables included in the model explain a very high percentage of the variation in the dependent variable RGDP.

Overall, the long-run regression results suggest that variables such as COXP, RUXP, and CROP have significant long-run effects on RGDP, while the variable PMKX and the constant term do not appear to have significant long-run impacts. Additionally, the high R-squared and adjusted R-squared values indicate a very good fit of the regression model to the data.

Table 4: Diagnostic Tests for ARDL
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.106267	Prob. F(2,25)	0.8996
Obs*R-squared	0.303468	Prob. Chi-Square(2)	0.8592

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.094948	Prob. F(8,27)	0.0722
Obs*R-squared	13.78772	Prob. Chi-Square(8)	0.0875
Scaled explained SS	10.94366	Prob. Chi-Square(8)	0.2049

Source: Authors computation, eviews 10, 2024

The null hypothesis of the Breusch-Godfrey LMtest is that there is no serial correlation in the residuals up to the specified lag order. Consequently, the result showed that both statistics for the LM test accept the hypothesis of no serial correlation up to lag order two. This means that the series are not serially correlated. Additionally, to further validate the robustness of this result, we explored Breusch-Pagan-Godfrey heteroscedasticity tests. The result showed that the residual is free from heteroscedasticity.

Table 5: Correlograms-Q-Statistics
Q-statistic probabilities adjusted for 2 dynamic regressors

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. .	. .	1	-0.037	-0.037	0.0540	0.816
. .	. .	2	-0.052	-0.053	0.1613	0.923

Source: Authors computation, eviews 10, 2024

Again, in Table 6 above, if there is no serial correlation, then, all the Q-statistics should be insignificant. Therefore, since the p-values of the Q-statistics are greater than 0.10, we conclude that there is no serial correlation.

Table 6: RESET Test

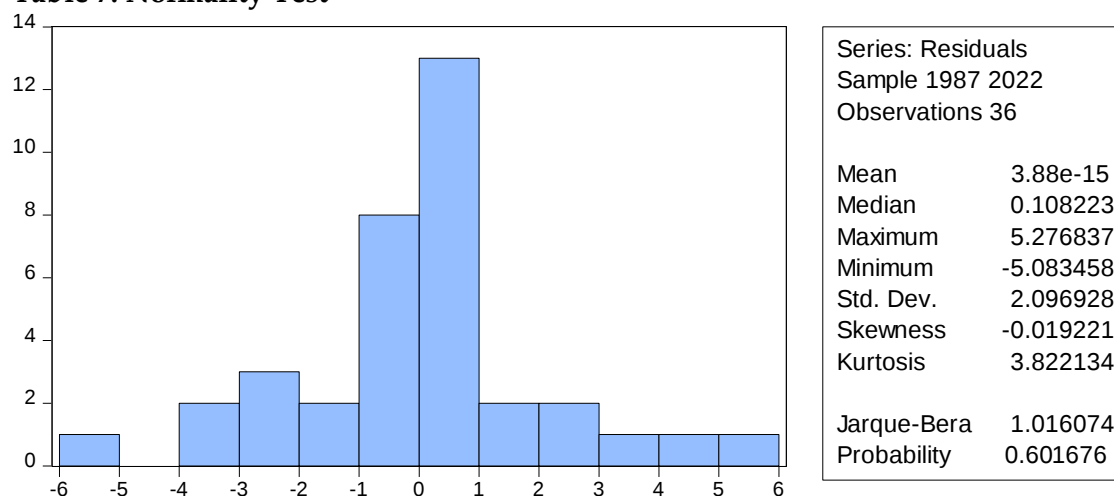
Omitted Variables: Powers of fitted values from 2 to 3

	Value	df	Probability
F-statistic	0.906448	(2, 25)	0.4168

Source: Authors computation, eviews 10, 2024

Output from the Ramsey reset test reports the test regression, the F-statistic and t-statistic for testing the hypothesis that the coefficients on the powers of fitted values from the regression are jointly zero, that is, the model is correctly specified. The null cannot be rejected since the p-value is more than 0.1.

Table 7: Normality Test



The normality result showed that the regression residual is normally distributed since the P-value is greater than 0.10.

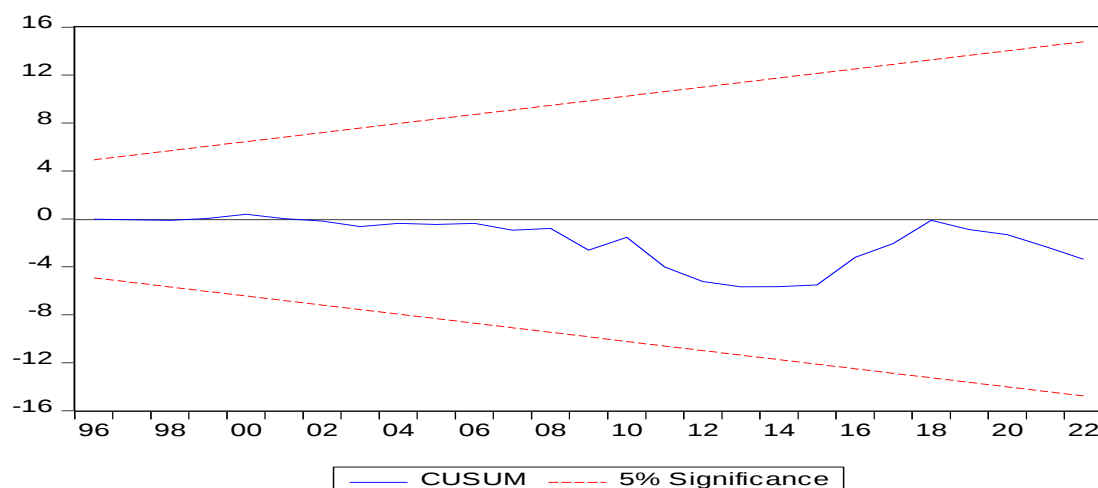


Fig 6:CUSUM

Conclusion and Recommendations

The research conducted on the effect of agricultural exports on Nigeria economic growth proxied by the Real Gross Domestic Product (RGDP) provides valuable insights into the relationship between these variables. The study covered a period of thirty-seven (37) years.

The study's analysis began by estimating the unit root test using the ADF structural break point. Therefore, the test indicated a structural break. Hence, the estimated break point represents the time at which the behavior of the time series changes significantly. This break point can provide insights into changes in underlying processes, policy interventions, or other factors affecting the data. More so, the ADF test revealed that the variables were integrated of different order $I(0)$ and $I(1)$, which gives credence to the adoption of ARDL bound cointegration estimate. The bound test showed the existence of a long run relationship among the variables.

Consequently, the short-run regression results reveal that agricultural exports, specifically COXP (coco export), RUXP (rubber export), and CROP (crop production), exert significant effects on RGDP. However, the constant term and the variable PMKX (palm kernel export) do not display significant impacts on RGDP in the short run. Furthermore, the identification of a significant error correction term suggests the presence of a long-run relationship between the variables, indicating the adjustment process towards equilibrium.

In the long run, the analysis demonstrates consistent findings, indicating that COXP, RUXP, and CROP maintain their significant impacts on RGDP. These results underscore the enduring importance of agricultural exports in driving overall economic output over an extended period. Conversely, the variable PMKX and the constant term do not exhibit significant long-run impacts on RGDP. Moreover, the high values of R-squared and adjusted R-squared indicate a strong fit of the regression model to the data, enhancing the reliability of the findings.

Based on the findings, the study made the following policy recommendations:

- a) Given the significant short-run and long-run effects of agricultural exports on RGDP, policymakers should prioritize investment in the agricultural sector. This could involve initiatives aimed at improving agricultural productivity, enhancing infrastructure for transportation and storage, and providing access to modern technology and training for farmers.
- b) Policymakers should focus on promoting export opportunities for agricultural products such as coco, rubber, and crops production. This could include trade agreements, market access initiatives, and export promotion programs aimed at expanding market reach and increasing export volumes.
- c) While coco, rubber, and crop production demonstrate significant impacts on RGDP, policymakers should also encourage diversification of agricultural exports to mitigate risks associated with reliance on specific commodities. This could involve supporting the development of new export markets and value-added products within the agricultural sector.
- d) To support the growth of agricultural exports and enhance their contribution to RGDP, policymakers should prioritize infrastructure development in rural areas. This includes investments in roads, ports, and irrigation systems to facilitate transportation, logistics, and production processes in the agricultural sector.
- e) Policymakers should promote sustainable agriculture practices to ensure the long-term viability of agricultural exports and minimize negative environmental impacts. This includes initiatives to promote sustainable land use, water management, and biodiversity conservation within the agricultural sector.

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