Asian Journal of
Science, Technology, Engineering, and Art

e-ISSN: 3025-4507
p-ISSN: 3025-5287
Index: Harvard, Boston, Sydney University, Dimensions, Lens, Scilit, Semantic, Google, etc

https://doi.org/10.58578/AJSTEA.v3i2.4959

Nigerian Agricultural Export and Economic Growth: An Empirical Analysis

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Article Info:

Submitted:	Revised:	Accepted:	Published:
Jan 11, 2025	Jan 23, 2025	Feb 7, 2025	Feb 12, 2025

Abstract

As the world continues to be unpredictable, the need for diversification of a nation's exports, especially for developing countries like Nigeria, cannot be overstated. This study was designed to examine the nexus between agriculture exports and economic growth in Nigeria using secondary data from 1991 to 2020. Using the Augmented Dickey fuller test, co-integration analysis, error correction, and Granger causality analysis, the results revealed that the covariates were stationary (I) and that there is a significant long-run co-integrating relationship between agricultural exports and economic growth (p values <0.05). The results further revealed that about 86% of the variation in agriculture exports was explained by the predictor variables (economic growth). The model diagnostic check revealed that the estimates were not spurious as the errors were linear, not serially correlated, and homoscedastic (all p-values > 0.05). However, there was not enough evidence of a causal relationship between economic growth and agricultural exports, though it was found that there was causality between population growth and the unemployment rate. The study recommends, among others, that employment and security be provided for Nigerians.

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Keywords: Agriculture, Export, Gross Domestic Product, Economic Growth, Error correction

INTRODUCTION

Exporting is a practice that is well acknowledged to be very pertinent and important to the expansion and development of a country's economy. By promoting the continued presence and expansion of the industrial sector, which further translates into strength and a good economic position for a country in the global market, exports also assist in the economic growth of a nation. A nation's successful exports act as investment magnets, provide more job possibilities, lower poverty levels, and generally raise the standard of living for its people. (Oguwuike, 2018). Taiga and Ameji (2020) have it that agriculture is the one undivided most important physical exercise in Nigeria, with 70 out of every 100 Nigerian working population actively occupied by it. According to other surveys and assessments, the Nigerian economy's most generous and exclusive sector, which employs the great majority of the country's rural residents—roughly 2/3 of the total population—and serves as their primary source of income, is Nigeria. In fact, the relative importance of the GDP accounted for by agriculture ranges from 30% to 40% (CBN, 2009).

Considering the antecedent of agriculture in Nigeria, one is compelled to say that the Nigerian economy during the 1960s and shortly after independence is rightfully called an agriculture-driven economy. This is because agriculture generates over 90% of Nigeria's foreign profits and federal government income, in addition to employing the vast majority of the country's working population. In addition, Nigeria was a major producer and exporter of goods and the world's second-largest producer and exporter of cocoa at that time. Nigeria was acknowledged as a significant exporter of various important agricultural products (e.g., cotton, groundnut, rubber, hides, and skins). Those good old days changed shortly after oil was found in the Niger Delta (Oluwatoyese & Oluwaseun, 2021; Alkali, 1997). In order to lessen the severity of starvation and malnutrition, as well as to promote rapid growth in agricultural production—which is a requirement for the start of growth in the economy and a foundation for sustained development in Nigeria—an increase in agricultural production is therefore not elective. More so, Nigeria as a country is presently adversely affected by the relentless stochastic nature of declining income as a consequence of its over-dependence on non-agricultural exports, and it is now imperative that the nation

reevaluate its agricultural export strength and capabilities due to the volatility of crude oil prices on the global market and as a source of income.

Taking into account the aforementioned, the connection between agriculture exports and the expansion of the economy in developed and developing countries has been contested, with several scholars presenting different arguments in this regard. In their study, Oyatoye et al. (2011) looked into the connection between Nigeria's agricultural exports and economic progress. They were able to draw the conclusion that rising agricultural exports result in rising economic growth. With the precedence of a diminished agriculture output in Nigeria, a considerable number of elite scholars concluded that Nigeria's agriculture should be reawakened in order to build the economy of the country in the direction of sustainable growth and development. The purpose of this study is to determine if there is, or if not, a substantial long-run relationship between Nigerian agricultural exports and economic growth, as well as the nature of such a relationship.

The following are the precise objectives of this study;

i. The relation between agricultural export and economic growth, and
ii. whether there is a cause-and-effect relationship between agricultural export and Nigeria's economic growth.

The following hypotheses was developed and tested during this inquiry;

H_{01}: Agriculture exports and Nigeria's economy's growth have no causal link.

The relevance of this research work lies in the fact that there is a pressing need for restructuring the policies relating to agriculture and in financing so as to promote aggressive agriculture export thus, the growth of Nigerian economy. Empirically, its relevance lies in its capacity to extend the frontier of knowledge on the subject matter and its ability to add to the body of knowledge on agriculture export and economic growth of Nigeria and also provide students with a framework for further research. Using the example of Nigeria, this paper investigates the empirical linkage between agricultural exports and economic growth. It covers the period 1991-2020 and uses the annual time series data on Nigeria's Gross Domestic Product, Agriculture Exports, Unemployment Rate and Population Growth.

Literature Review

Conceptual Review

The importance of import and export trade as a source of income for a nation cannot be overemphasized. Stable export and import trade may be considered to be a commercial and economic activity that is essential for any country's long-term economic success.

The export market is believed to encourage economic growth by boosting the price of a country's goods compared to many other countries and assuring the sustainability of its local industries, which contributes a lot to the country's position in the global market. Additionally, some scholars considered exports to be stimulants for the increase and widening of investments, which in turn promotes and improves the rate of employment, which further results in a decrease in the number of unemployed and aids in the alleviation of poverty (Taiga & Ameji, 2020).

As an economic development strategy, export-led growth promotes an increase in local production, which is essential to a nation's economic success. A properly regulated openness to commerce through export-led growth can be a great way to achieve quick growth, even though there isn't any conclusive proof that would lead to universal acceptance of this philosophy. (Raheem, 2016; Oguwuike, 2018; Oluwatoyese & Oluwaseun, 2021).

Nigeria, just like other developing countries, has been and is currently struggling with issues relating to development and the realities surrounding them, coupled with the rise and fall of political powers and the instability of the economy. Prior to and shortly after independence, agricultural products were the most dominant products of Nigerian exports, as they contributed to about eighty percent of the country's exports; hence, agriculture became the primary pride of the Nigerian economy and the most significant foreign exchange earner. The discovery of oil in the 1970s changed the state of affairs in Nigeria completely in such a way that crude petroleum contributed to about ninety-four percent (94%) of total exports, thus substituting oil as the primary and highest source of export revenue and the driver of the Nigerian economy (Oluwoleet al., 2021; Oguwuike, 2018).

The single commodity-driven economy makes Nigeria vulnerable to the limiting effects of oil prices in the international market. This effect of the oil-driven economy of Nigeria became manifested in 2015 when the prices of crude petroleum fell globally, which

forced the economy of Nigeria into recession. This therefore suggests that the only export that will guarantee the sustainability and survival of the Nigerian economy is a diverse form of export that will combine both oil and agricultural (non-oil) products (Raheem 2016).

Empirical review

Muhammad (2010) used the Johansen co-integration approach to estimate the link between agricultural exports and non-agricultural exports and Pakistan's economic growth from 1972 to 2008 in order to determine the contribution of agricultural exports to that country's economic growth. According to the study's findings, the association between agricultural exports and economic development was unfavorable and inconsequential. GDP was negatively correlated with agricultural exports (export elasticity of GDP = -0.14) and positively correlated with non-agricultural exports (export elasticity of GDP = 0.58). The report recommended that nonagricultural exports be pushed more than agricultural exports based on the empirical findings.

Pistoresi and Rinaldi (2010) examined the relationship between exports and real GDP in Italy from 1863 to 2004. The study's findings suggested that these variables move together over the long term, but the direction of causality depends on the level of economic development: in the years before the First World War, the expansion of the Italian economy predated that of exports, but in the years following the Second World War, the causal relationship was reversed, with the growth of the Italian economy being a direct result of the expansion of exports. Using time series data from 1980 to 2010. Oluwanseun et al. (2013) investigated if there existed a long-term link between agricultural exports and economic development. Using secondary data, the unit root tests, and the Johansen co-integration analysis, their study revealed a long-run equilibrium relationship between agricultural exports and economic growth, implying that a unit increase in agricultural exports would result in a more than proportionate increase in the real gross domestic product in Nigeria.

Ojo et al. (2014) investigated the association between agricultural exports and economic growth using a multivariate Johansen co-integration analysis over the period 1980–2012. According to the report, Nigeria's government should focus efforts on enhancing agricultural exports as part of its overall economic development strategy. Syed et al. (2015) conducted a study on the effect of agricultural exports on Pakistan's microeconomic performance. Using the Johansen cointegration approach, the study

examined the link between the Gross Domestic Product (GDP) and agricultural and non-agricultural exports as dependent and independent variables, respectively. The study's key conclusions show that, whereas non-agricultural exports have a favorable link with economic growth in Pakistan, agricultural exports have a negative relationship. Based on the empirical findings, the report recommended that Pakistan make structural changes to its agricultural exports by turning them into products with value addition.

Oluwatoyese and Oluwaseun (2021), in their study, conducted an investigation into the long-run relationship between agricultural output and economic growth in Nigeria using annual data from 1981 to 2025. Through the use of ARDL, their study findings indicated that there exist long-run and short-run relationships among the variables used in the study. The pairwise Granger causality test shows that there is one-way causality moving from agriculture to economic growth, indicating that agricultural output leads to economic growth. The results approve the positive link between agricultural output and economic growth, which is helpful to improve the nation's economic outlook.

MATERIALS AND METHODS

The link between the variables under inquiry was estimated using regression, cointegration analysis, and the error correction model. In order to determine whether there is a long-term link between the variables under research, the cointegration analysis was required as a first step. The amount of variance explained by the variables included in the regression was calculated using the students' T-test statistic, and the multiple regression approach (OLS) will be used to create estimates for the relationship's coefficients as given in the data.

The unit root test

The idea of non-stationarity is crucial for a number of reasons. A stationary series has a mean of 0 and a variance of 1. Dickey-Fuller (DF) analysis is one of the techniques used to determine if a series is stationary. The DF test is crucial for determining the degree of stationary series, but it ignores autocorrelation in the disturbance term. The DF test is invalid if the disturbance term incorporates autocorrelation. By including lag terms of the dependent variable into the explanatory variable in this case, generalized Dickey-Fuller (Augmented Dickey-Fuller) is used (Brooks, 2002).

The ADF test, can be defined as follows

$$\Delta m_t = m_0 + \eta m_{t-1} + \sum \eta_i m_{t-1} + \mu_t \quad (1)$$

$$\Delta m_t = m_t - m_{t-1} \quad (2)$$

Where:

Δm_t = a change in the variable m_t

η = coefficient

m_{t-1} = the lagged m_t

m_t = dependent variable

m_0 = constant term

t = trend variable

μ_t = stochastic disturbance term

There are hypotheses to test series

H_0: $\eta = 0$ (m_t is non-stationary)

H_1: $\eta \neq 0$ (m_t is stationary)

ADF is a regression test that makes use of the large disparities in each series' lagged terms. ADF test statistics are supplied by several econometric programs. The data is stationary if the computed t-value of the variable is larger than the ADF critical t-value. The McKinnon critical values will be compared, and if the ADF test statistic exceeds those values in all cases, the series is stationary at that level.

Ordinary least square (OLS) regression

The multiple regression equation is given by;

$$M_t = X\beta + \mu_i \quad (3)$$

Where;

$$M_i = \begin{bmatrix} M_1 \\ M_2 \\ \mathrm{M} \\ M_i \end{bmatrix}, \quad \beta_i = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \mathrm{M} \\ \beta_i \end{bmatrix}, \; X = \begin{bmatrix} 1 & X_{11} & \mathrm{L} & X_{1t} \\ 1 & X_{21} & \mathrm{L} & X_{2t} \\ \mathrm{M} & \mathrm{M} & & \mathrm{M} \\ 1 & X_{n1} & \mathrm{L} & X_{nt} \end{bmatrix} \text{ and } \mu_t = \begin{bmatrix} \mu_1 \\ \mu_2 \\ \mathrm{M} \\ \mu_t \end{bmatrix}$$

Where; β's are slope and coefficients; μ_i, is the random error which is well behaved; M_t is the dependent variable (which is assumed random at time, t) and x_i's are the predetermined dependent variables.

Also, the adequacy of the model formulated was measured using the value of the R^2 and R^2_{adj}. If the R^2; R^2_{adj}. is statistically significant, then the formulated model adequately represents the relationship between the variables used in the regression.

$$\mathrm{R}^2 = \frac{SSR}{SST} = \frac{\beta^T X^T M}{M^T M} \text{ and } \mathrm{R}^2\mathrm{adj} = 1 - \frac{(n-1)S^2}{SST} \qquad (4)$$

Where; SSR is the sum of squares due to regression; SST is the sum of squares total and SST is the sum of squares total.

Variables, measurements and model specification

The dependent variable (outcome) of the study is the variable of interest. In this study, the Agriculture Export (Ag_Exp) is outcome variable.

The primary specification of the model that was tested in the study is as follows:

$$log(Ag_Exp_t) = \beta_0 + \beta_1 log(Un_Rt_t) + \beta_2 log(GDP_t) + \beta_3 log(Pn_Gt_t) + Ect_{(-1)} + \mu_i \qquad (5)$$

Where:

The independent variables of this study are;

Unemployment rate (Un_Rt)

Gross Domestic Product (GDP).

Population growth (Pn_Gt)

Error Correction Term at first lag (Ect_{-1})

log = natural logarithm operator

Source of data and method of collection

The data utilized in this study were gathered from a secondary source. On the one hand, data on agricultural export were sourced from the Food and Agriculture Organization (FAO) data website, and data on unemployment rate, population growth and GDP were sourced from the World Bank Development Index covering a period of 1991-2020.

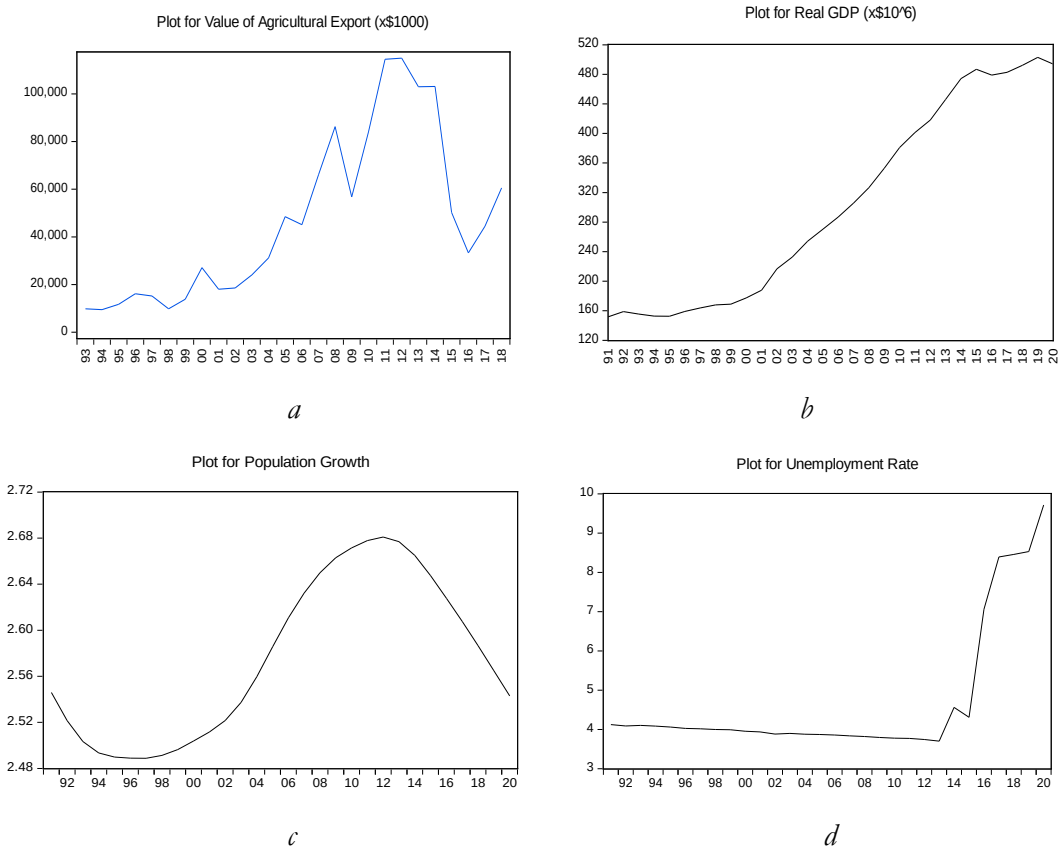
RESULTS AND DISCUSSION

Descriptive analysis

The variables under examination, including the gross domestic product, agricultural exports, population growth rate, and unemployment rate, are shown in Table 1 with descriptive statistics (where GDP, unemployment rate, and population growth are used as proxies for economic growth). The study encompassed a period of 30 years in total, as can be seen from the data. The table for the variable of interest, agricultural export, demonstrates that there are significant variations in the series, as seen by the disparity between the highest and minimum values. According to the stated standard deviation, the GDP exhibits more swings than the other studied variables. The series is far from being normal, as indicated by the values for skewness and kurtosis. The Jarque-Bera probability values for all the variables reveal that all the variables under study except for unemployment rate (Un_Rt) were normally distributed.

Table 1. Descriptive statistics

	Ag_Exp($)	GDP($)	Pn_Gt	Un_Rt
Mean	44647.93	303.3568	2.574809	4.707500
Median	34467.77	278.7116	2.562265	3.994500
Maximum	115000.0	502.9420	2.680930	9.714000
Minimum	9478.720	151.7872	2.488792	3.700000
Std. Dev.	33771.93	134.3000	0.070050	1.737452
Skewness	0.801461	0.260563	0.206632	1.905327
Kurtosis	2.432173	1.462118	1.513825	4.947089
Jarque-Bera	3.614730	3.295816	2.974381	22.89031
Probability	0.164086	0.192452	0.226007	0.000011
Sum	1339438.	9100.704	77.24428	141.2250
Sum Sq. Dev.	3.31E+10	523058.6	0.142301	87.54347
Observations	30	30	30	30



a *b*

c *d*

Figure I: Individual Series Plot for Study Variables

Figure I (a–d) is a graphical presentation of the individual series under consideration in this research. We observed from the graphs that there is evidence among all the series of the presence of non-stattionarity, implying that the series is not time-invariant. This is due to the existence of an upward trend that appears to increase with an increase in time. A formal test for non-stationarity is displayed in Table 2. We observed from the results that, at level 1, all the variables were non-stationary. The results would not be good for a regression, as it is prone to spurious relationships. To correct for this, however, the series were different, and at the first difference, a stationary series was achieved. It is imperative to also suspect the presence of a cointegrating relationship of order I(1), although a formal test would be required to be certain of it.

Preliminary analysis

Table 2: Statiolnarity Test for the Series

Method	Test Statistic	Prob. Value	Difference	Remarks
ADF - Fisher Chi-square	9.79307	0.2799	0	Non-Stationary
ADF - Fisher Chi-square	25.608	0.0012	1	Stationary

The Johansen (1988) cointegration test was applied to the series in order to determine whether cointegration was present, and the results are shown in Table 3. The findings demonstrate that, at a five percent level of significance, the value of the trace statistic is bigger than the critical values for all predicted cointegrating equations. Additionally, each related postulated cointegrating equation's probability value is less than 5%. By taking into account this data, we rule out the possibility of cointegration and come to the conclusion that there is cointegration in the series.

Table 3: Johansen Test for Cointegration

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.805560	90.30602	47.85613	0.0000
At most 1 *	0.678980	44.45229	29.79707	0.0005
At most 2	0.363218	12.63722	15.49471	0.1288
At most 3	1.07E-06	2.99E-05	3.841466	0.9979
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				

Model estimation

After formally establishing the presence of a cointegrating relationship in the series, we estimated the model using the ordinary least squares method and tested for the stationarity of the residuals. To satisfy the condition of the error correction mechanism, the estimate for the parameters of the models is presented in Table 4.

Table 4: Model estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-32.50779	97.61769	-0.333011	0.7420
Pn_Gt	473074.9	142579.8	3.317965	0.0029
Un_Rt	2257.169	4923.677	0.458432	0.6508
ECT(-1)	0.533477	0.212208	2.513937	0.0191
C	-1173360.	359608.3	-3.262884	0.0033
R-squared	0.857217	Mean dependent var		45744.47
Adjusted R-squared	0.833420	S.D. dependent var		33821.83
S.E. of regression	13804.12	Akaike info criterion		22.05891
Sum squared resid	4.57E+09	Schwarz criterion		22.29465
Log likelihood	-314.8542	Hannan-Quinn criter.		22.13274
F-statistic	36.02181	Durbin-Watson stat		1.939097
Prob(F-statistic)	0.000000			

The result of the estimated model is presented in Table IV. we observe that the estimated model provides valuable insights into the relationship between agricultural exports and key economic variables in Nigeria. The coefficient for GDP (-32.50779) indicates that for every unit increase in GDP, agricultural exports decrease by approximately 32.5 units. Conversely, population growth (Pn_Gt) and unemployment rate (Un_Rt) have positive coefficients of 473074.9 and 2257.169, respectively, suggesting that they contribute to an increase in agricultural exports for every unit increase in their values.

The error correction term (ECT) coefficient of 0.533477 is significant and negative, indicating that the series converges towards a long-run equilibrium. This implies the existence of a long-run relationship among the variables studied. The t-statistic values further support these relationships, particularly highlighting the significant impact of population growth and the error correction term on agricultural exports.

The coefficient of determination (R-squared) value of 0.857217 indicates that approximately 86% of the variation in agricultural exports can be explained by the variations in GDP, population growth, and unemployment rate. The adjusted R-squared value of 0.833420 reinforces this, suggesting that 83% of the variations in agricultural exports are accounted for by the model. The estimated relationship between Agricultural Export and economic growth is given by:

$$\begin{aligned} log(AgEx) &= -1173360 - 32.50779log(GDP) - 473074.9log(PnGt) \\ &\quad + 2257.169log(UnRt) + 0.533477(ECT_{-1}) \end{aligned} \tag{6}$$

Post Estimation Analysis

These are the diagnostic tests carried out on an already-estimated model or relationship to ascertain the adequacy of the relationship and the validity of the estimated parameters. This research made use of the Ramsey RESET Test for linearity, the Breusch-Godfrey Test for serial correlation, and the Harvey Test for heteroskedasticity.

Ramsey RESET test for linearity

Considering the model estimated, a test for linearity was conducted to ascertain the validity of the linear relationship between the response variable (Ag_Ex) and the predictor variables (GDP, Pn_Gt, and Un_Rt). Table 5 shows the result of the test.

Table 5: Results for Ramsey Reset Test

	Value	df	Probability
t-statistic	1.170861	23	0.2536
F-statistic	1.370916	(1, 23)	0.2536
Likelihood ratio	1.678991	1	0.1951

As observed in Table V, there are three test statistics with their corresponding probability values, on the basis of which we failed to reject the null hypothesis depicting the absence of linearity in the system and therefore conclude that the system is linear.

Breusch-Godfrey serial correlation LM test

The random error being independent from one observation to the next is one of the fundamental tenets of multiple regression. When this assumption is broken, it results in erroneous confidence intervals, underestimating of the mean square error, and wasteful estimation of the parameters of the regression coefficients.

However, a Breusch-Godfrey serial correlation LM test was performed, and the results are shown in the table below to ensure that our estimated model is autocorrelation-free.

Table 6: Results for Breusch-Godfrey Serial Correlation

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	2.136255	Prob. F(2,22)	0.1419
Obs*R-squared	4.716062	Prob. Chi-Square(2)	0.0946

We observed from the result that the F-statistic has a value of 2.136255 and a matching probability of 0.1419, which is less than the level of significance of 5%. Therefore, it is on this basis that the null hypothesis was not rejected. This therefore implies that the error term of the estimated model is not serially correlated.

Heteroskedasticity test: Breusch-Pagan-Godfrey

The classical OLS method of estimation has it that, for the validity of the method, there is a need for the variance of the error term to be time-invariant for all the observations (homoscedastic). Only then will the estimated coefficient be efficient. To be sure that this condition is satisfied for the model estimated in this research work, a Breusch-Pagan-Godfrey heteroskedasticity test was conducted on the error term, and the result is found in the table below.

Table 7: Breusch-Pagan-Godfrey test fir Heteroscedastisicty

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	2.651654	Prob. F(4,24)	0.0579
Obs*R-squared	8.888240	Prob. Chi-Square(4)	0.0640
Scaled explained SS	9.507036	Prob. Chi-Square(4)	0.0496

At 5% level of significance, we observed that the F-statistic has a critical value of 2.651654 and a corresponding p-value of 0.0579, which is not strictly less than 5%. Taking this into consideration, the hypothesis of heteroskedasticity was rejected, implying that the model is homoscedastic.

Causality

Finding stationarity in the variables and a cointegration between agricultural exports and economic growth provides enough evidence to raise the possibility of a long-run causal relationship, if only in one direction. Therefore, the Granger pairwise causality test for the variables under discussion is shown in Table 8 below:

Table 8: Casualty test for Variables

Null Hypothesis:	Obs	F-Statistic	Prob.
GDP Does Not Granger Cause Ag_Exp	28	0.58370	0.5659
Ag_Exp does not Granger Cause GDP		1.51609	0.2407
Pn_Gt does not Granger Cause Ag_Exp	28	9.40551	0.0010
Ag_Exp does not Granger Cause Pn_Gt		4.36716	0.0247
Un_Rt does not Granger Cause Ag_Exp	28	0.23298	0.7940
Ag_Exp does not Granger Cause Un_Rt		13.6817	0.0001
Pn_Gt does not Granger Cause GDP	28	7.06974	0.0040
GDP does not Granger Cause Pn_Gt		0.41421	0.6657
Un_Rt does not Granger Cause GDP	28	1.33985	0.2816
GDP does not Granger Cause Un_Rt		7.91765	0.0024
Un_Rt does not Granger Cause Pn_Gt	28	0.26582	0.7689
Pn_Gt does not Granger Cause Un_Rt		2.87459	0.0769

The Granger causality test results presented in Table 8 provide valuable insights into the causal relationships between key economic variables in the study. The findings indicate that there is strong evidence to support the claim that Population Growth (Pn_Gt) Granger-causes Agricultural Exports (Ag_Exp), as well as Unemployment Rate (Un_Rt) Granger-causes Agricultural Exports and Gross Domestic Product (GDP) Granger-causes Unemployment Rate. These results suggest a dynamic interplay among these variables, with population dynamics and labor market conditions exerting significant influence on agricultural exports and overall economic performance. However, the analysis also shows that some relationships, such as GDP Granger-causing Population Growth and Unemployment Rate Granger-causing Population Growth, lack robust evidence.

The implications of the findings from the Granger causality tests are numerous and carry significant implications for economic policy and decision-making in Nigeria. Firstly, the strong evidence supporting Population Growth Granger-causing Agricultural Exports underscores the importance of demographic trends in shaping the country's export

performance. Secondly, the results indicating that Unemployment Rate Granger-causes Agricultural Exports and GDP Granger-causes Unemployment Rate highlight the intricate relationship between labor market conditions and economic activities. Moreover, the lack of robust evidence for certain causal relationships, such as GDP Granger-causing Population Growth and Unemployment Rate Granger-causing Population Growth, suggests that these dynamics are influenced by complex factors beyond simple linear causality.

CONCLUSION

This study was conducted to investigate the impact of agricultural production and exports on Nigeria's economy. The results, as depicted in Table IV, reveal a positive correlation between gross domestic product (GDP) and agricultural exports (Ag Ex). Specifically, an increase in GDP leads to a 3% growth in agricultural exports. Holding other variables constant, a one-unit rise in GDP corresponds to a decrease of approximately 32.51 units in agricultural exports. Moreover, the speed of adjustment towards equilibrium, indicated by a coefficient of 0.533477, suggests that around 53.35% of the previous period's disequilibrium is rectified in the current period, indicating cointegration.

The Granger causality tests in reveal some key insights. Population Growth's strong Granger-causal effect on Agricultural Exports underscores demographic trends' pivotal role in shaping export performance. Additionally, the observed Granger-causal relationships between Unemployment Rate and Agricultural Exports/GDP highlight the interconnectedness of labor market conditions and economic activities, necessitating integrated interventions for sustainable development.

Recommendations

The study reveals a mismatch between population growth, security and job availability, leading to a decline in agricultural activities. This lack of appeal extends to Nigeria's youth, who constitute the most active demographic. Consequently, they are hesitant to engage in the agricultural sector, contributing to a decline in agricultural exports in both the short and long term. The study advocates for comprehensive reforms in the agricultural sector to make it more attractive and inclusive, thereby engaging the most active population segment in productive activities.

The following strategies are recommended;

i. Agriculture financing: many vibrant youths interested in agriculture failed to do so as a result of lack of capital. Grants should be made available to young Nigerians who have interest in agriculture. The mechanism for the acquisition of such grants should not be made to restrictive to an elite few.
ii. The market prices of agricultural products should be made stable with government protecting the farmers.
iii. Policymakers need to take into account population dynamics, such as changes in the size and composition of the workforce, when formulating strategies to boost agricultural exports and overall economic growth.
iv. Efforts to stimulate agricultural exports and reduce unemployment rates must be integrated and mutually reinforcing to achieve sustainable economic development. This may involve targeted interventions such as skill development programs, job creation initiatives in the agricultural sector, and policies that promote inclusive growth and employment opportunities.
v. Policymakers should adopt a holistic approach that considers multiple variables and their interactions to craft effective strategies for promoting economic growth, job creation, and population management.

Conflict of interest

The authors declare that they have no conflict of interest

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