GLOBAL RESEARCH NETWORK
ONLINE RESEARCH HUB

AMERICAN JOURNAL OF ECONOMICS AND BUSINESS MANAGEMENT

ISSN: 2576-5973
Vol. 7, No.1, January 2024

Examining the Dynamic Influence of Agricultural Exports on Economic Growth in Nigeria: An Empirical Analysis

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Abstract: This study delves into the multifaceted relationship between agricultural exports and economic growth in Nigeria, exploring the intricate dynamics that shape this crucial sector. By employing a comprehensive analytical framework using quantitative methodology like the econometric regression technique of the Ordinary least Square (OLS) which aims to shed light on the nuanced impact of agricultural exports on Nigeria's economic development trajectory. Through meticulous data analysis and rigorous statistical techniques, the study found that total agricultural exports, cocoa exports, rubber exports, exchange rate, inflation rate, trade openness significantly impact on real gross domestic product. The study recommends that policymakers should prioritize investments in infrastructure, research and development, and market access to unlock the full potential of agricultural exports. Additionally, implementing supportive policies that address challenges such as access to finance, technology adoption, and value chain development will be crucial in harnessing the transformative power of agriculture for sustainable economic growth and development in Nigeria. By leveraging its agricultural strengths and overcoming existing obstacles, Nigeria can pave the way for inclusive growth, poverty reduction, and food security, ultimately positioning itself as a key player in the global agricultural landscape.

Keywords: Agricultural Exports, Cocoa Exports, Rubber Exports, Exchange Rate, Inflation Rate, Trade Openness, Real Gross Domestic Product.

1. Introduction

Agricultural exports refer to the goods produced by the agricultural sector of a country and sold to other nations. These exports can include a wide range of products, such as crops, livestock, fishery products, and forestry goods (Udeorah & Oluwafemi, 2023). Agricultural exports are a significant component of many countries' economies, contributing to GDP growth, job creation, and foreign exchange earnings. Several factors contribute to a country's agricultural export potential, including: climate and geography, technological advancements, infrastructure, trade policies, quality standards and regulations, market demand, currency exchange rates and government support**.** Favourable climate conditions and suitable

geographical features can enable the production of a diverse range of agricultural products, enhancing export opportunities (Utuk, Akpan, Eduno & Udo, 2023). Adoption of modern agricultural practices, technologies, and techniques can improve productivity and quality, making agricultural exports more competitive in the global market. Adequate infrastructure, including transportation networks, storage facilities, and ports, is crucial for efficiently moving agricultural products from farms to international markets. Trade policies, tariffs, subsidies, and trade agreements can significantly impact a country's ability to export agricultural goods and compete in global markets. Compliance with international quality standards and regulations is essential for accessing foreign markets and ensuring the safety and quality of agricultural exports. Understanding global market demand and consumer preferences is crucial for identifying export opportunities and tailoring agricultural products to meet specific market requirements. Fluctuations in currency exchange rates can affect the competitiveness of agricultural exports by influencing prices in international markets. Government policies, incentives, and support programs aimed at promoting agricultural exports can play a vital role in boosting the sector's growth and competitiveness. Overall, agricultural exports play a significant role in the economic development of many countries, providing employment opportunities, income generation for farmers, and contributing to food security at both domestic and global levels (Udeorah & Oluwafemi, 2023; Odetola & Etumnu, 2013).

Economic growth refers to an increase in the production and consumption of goods and services within an economy over a certain period of time. It's often measured by the growth in Gross Domestic Product (GDP), which is the total value of all goods and services produced within a country's borders. When businesses invest in new equipment, technology, or infrastructure, it can lead to increased productivity and economic growth. Advances in technology can lead to new products and processes, making businesses more efficient and allowing them to produce more with the same amount of resources. A well-educated and skilled workforce is essential for economic growth. Education and training programs help improve productivity and innovation. Adequate infrastructure such as transportation, communication networks, and energy supply is crucial for facilitating economic activities and promoting growth. Sound macroeconomic policies, including stable prices, low inflation, and prudent fiscal management, provide a favourable environment for investment and growth (Sertoğlu, Ugural & Bekun, 2017). International trade allows countries to specialize in producing goods and services in which they have a comparative advantage, leading to increased efficiency and growth. Population growth and changes in demographics can influence economic growth. A growing population can lead to increased consumer demand and a larger labor force, while changes in the age structure can affect saving and investment patterns. The quality of institutions such as the legal system, property rights protection, and regulatory framework can significantly impact economic growth by fostering entrepreneurship, innovation, and investment. Sustainable economic growth is important for raising living standards, reducing poverty, and improving overall well-being. However, it's also essential to ensure that growth is inclusive, environmentally sustainable, and not at the expense of future generations. Governments, businesses, and civil society need to work together to promote policies and practices that support balanced and equitable growth (Nnoli, Enilolobo, Hassan & Bello, 2023; Sertoğlu, Ugural, Bekun, 2017).

The dynamic influence of agricultural exports on economic growth in Nigeria is a multifaceted subject that requires analysis from various angles. Agriculture has long been a significant sector in Nigeria, contributing to employment, GDP, and export earnings. Agricultural exports can significantly contribute to Nigeria's foreign exchange earnings. By exporting crops such as cocoa, palm oil, rubber, and cashew nuts, Nigeria can earn revenue in international markets. These earnings can then be used to finance imports, infrastructure development, and other sectors of the economy, thereby stimulating economic growth (Adamgbe, Belonwu, Ochu & Okafor, 2020). Agriculture is a labor-intensive sector. Increased

agricultural exports can lead to the creation of more jobs, particularly in rural areas where the majority of Nigeria's agricultural activities take place. The expansion of agricultural exports can absorb surplus labor from other sectors, reducing unemployment and poverty, which are crucial for sustained economic growth. To support increased agricultural exports, there needs to be investment in infrastructure such as transportation networks, storage facilities, and processing plants. These investments not only facilitate the efficient movement of goods but also create multiplier effects by stimulating related industries and services (Nnoli, Enilolobo, Hassan & Bello, 2023; Jabuya, Sule & Ndwiga, 2023). Improved infrastructure can reduce post-harvest losses, enhance product quality, and increase the competitiveness of Nigerian agricultural exports in global markets. To boost agricultural productivity and the quality of exports, Nigeria needs to invest in research and development, technology transfer, and innovation in the agricultural sector. By adopting modern farming techniques, improved seeds, irrigation systems, and mechanization, Nigerian farmers can increase yields and produce higher-quality crops for export. This technological advancement can drive economic growth by enhancing efficiency and competitiveness in the global market. Over-reliance on oil exports has made Nigeria vulnerable to external shocks, as seen during oil price fluctuations. Promoting agricultural exports can diversify the economy and reduce dependence on oil revenues. Diversification enhances economic stability and resilience by spreading risks across different sectors. Moreover, a vibrant agricultural sector can stimulate the growth of agro-allied industries, further diversifying the economy and creating additional sources of income and employment (Osabohien, Akinpelumi, Matthew, Okafor, Iku, Olawande & Okorie, 2019). Emphasizing agricultural exports can promote sustainable development by fostering environmental conservation and social inclusiveness. Sustainable agricultural practices, such as organic farming and agroforestry, can preserve natural resources, mitigate climate change impacts, and protect biodiversity. Additionally, empowering smallholder farmers, particularly women and youth, can promote inclusive growth and poverty reduction, thereby contributing to overall economic development. Government policies play a crucial role in promoting agricultural exports and fostering economic growth. Policy measures such as trade facilitation, export promotion schemes, access to credit, market information systems, and institutional support are essential for creating an enabling environment for agricultural exporters. Moreover, regulatory reforms and investment incentives can attract private sector participation and foreign direct investment in the agricultural sector, driving its growth and contribution to the economy. The dynamic influence of agricultural exports on economic growth in Nigeria hinges on various factors, including export earnings, employment generation, investment in infrastructure, technology adoption, diversification of the economy, sustainable development, and supportive policies. By harnessing the potential of its agricultural sector and addressing challenges such as infrastructure deficits, low productivity, and market access barriers, Nigeria can leverage agricultural exports as a catalyst for sustainable and inclusive economic growth (Oluwafemi & Udeorah, 2023; Gilbert, Linyong & Gwah, 2013).

2. Statement of the Problem

Despite Nigeria's rich agricultural potential, characterized by diverse climatic conditions and fertile land, the country's economic growth has been hindered by various challenges, including over-reliance on oil revenue, inadequate infrastructure, and inconsistent agricultural policies. In recent years, there has been a growing interest in exploring the potential of agricultural exports as a catalyst for economic growth and development. However, the extent to which agricultural exports contribute to Nigeria's economic growth remains uncertain and inadequately understood. There is a dearth of comprehensive empirical studies that examine the direct and indirect influence of agricultural exports on economic growth in Nigeria. Existing literature often lacks depth in analyzing the specific mechanisms through which agricultural exports impact economic growth indicators such as GDP, employment, and poverty reduction. Nigeria's agricultural sector faces numerous structural challenges, including inadequate

infrastructure, limited access to finance and technology, poor market linkages, and inconsistent government policies (Ibrahim, 2020; Daniel Otieno Jabuya, Fredrick Odhiambo Sule & Michael Jairo Ndwiga, 2023). These challenges hinder the competitiveness of Nigerian agricultural exports in the global market and limit their potential contribution to economic growth. While agricultural exports have the potential to generate foreign exchange earnings and enhance economic growth, there are concerns regarding the sustainability of current agricultural practices. Issues such as land degradation, deforestation, water scarcity, and climate change pose significant threats to the long-term viability of agricultural production and exports in Nigeria. Nigeria has experienced inconsistencies in agricultural policies and initiatives, which have undermined the development of the sector and its contribution to economic growth. The lack of coherent and long-term policy frameworks hampers investment in agriculture and impedes the growth of agricultural exports (Oluwafemi & Udeorah, 2023; Gilbert, Linyong & Gwah, 2013). Addressing these problems is essential for formulating evidence-based policies and strategies that can leverage Nigeria's agricultural exports to promote sustainable economic growth, alleviate poverty, and enhance food security. By gaining a deeper understanding of the dynamics between agricultural exports and economic growth, policymakers can design interventions that harness the full potential of the agricultural sector to drive inclusive and resilient economic development in Nigeria.

3. Objectives of the Study

The main objective of the study is to examine the dynamic influence of agricultural exports on economic growth in Nigeria. The specific objectives are to:

1. Ascertain the effect of total agricultural exports on real gross domestic product
2. Determine the effect of cocoa exports on real gross domestic product
3. Examine the effect of rubber exports on real gross domestic product
4. Evaluate the effect of exchange rate on real gross domestic product
5. Ascertain the effect of inflation rate on real gross domestic product
6. Determine the effect of trade openness on real gross domestic product

4. Hypotheses of Study

Ho_1: Total agricultural exports has no significant effect on real gross domestic product

Ho_2: Cocoa exports has no significant effect on real gross domestic product

Ho_3: Rubber exports has no significant effect on real gross domestic product

Ho_4: Exchange rate has no significant effect on real gross domestic product

Ho_5: Inflation rate has no significant effect on real gross domestic product

Ho_6: Trade openness has no significant effect on real gross domestic product

5. Theoretical Framework

The underlying theory adopted in this research work is the neo classical growth model developed by Robert Solow and Trevor Swan (1956), popularly known as Solow Swan model. The Solow-Swan model, named after Robert Solow and Trevor Swan who independently developed it in 1956, is a cornerstone in the field of macroeconomics and growth theory. It provides insights into the long-term growth of economies by emphasizing the roles of capital accumulation, technological progress, and labour force growth. The model is a neoclassical approach to economic growth, meaning it draws

heavily on classical economic principles such as diminishing returns to factors of production. It considers a simplified economy where output (Y) is produced using capital (K), labor (L), and technology (A). The production function is assumed to have constant returns to scale, implying that doubling the inputs will double the output. The model assumes perfect competition and flexible prices. The key variables here are: Output (Y): The total amount of goods and services produced in the economy. Capital (K): The stock of physical capital available in the economy, including machinery, buildings, and infrastructure. Labor (L): The size of the workforce actively engaged in production. Technology (A): Represents the level of knowledge and efficiency in transforming inputs into outputs. The Solow-Swan model has its production function expressed as: Y = A * F(K, L). Here, F() represents the production function, which assumes diminishing returns to capital and labour. The production function exhibits diminishing marginal product of capital and labour, meaning each additional unit of capital or labor contributes less to output as the amount of capital or labour increases.

Assumptions of the model include:

i. **Capital Accumulation**:

One of the central insights of the model is the role of capital accumulation in economic growth.

Investment in new capital (I) increases the capital stock (K) and contributes to economic growth.

However, the rate of capital accumulation is subject to diminishing returns, which means that as more capital is accumulated, the marginal increase in output diminishes.

ii. **Steady State**:

The Solow-Swan model identifies a long-term equilibrium state known as the steady state.

In the steady state, capital accumulation and population growth are balanced with the rate of technological progress.

In this state, output per capita and the standard of living stabilize, and the economy grows at a constant rate.

iii. **Technological Progress**:

Technological progress (represented by the variable A) is considered an exogenous factor in the model.

It contributes to long-term economic growth by enabling higher productivity and efficiency in production.

Technological progress allows the economy to continue growing even in the steady state.

iv. **Policy Implications**:

The Solow-Swan model suggests that policies aimed at increasing savings and investment can lead to higher long-term economic growth.

Additionally, policies that promote technological innovation and knowledge accumulation can have significant positive effects on economic growth.

Overall, the Solow-Swan model provides a framework for understanding the determinants of long-term economic growth and the role of factors such as capital accumulation, technological progress, and population growth in shaping the trajectory of an economy over time. Despite its simplicity, the model remains influential in macroeconomic theory and policy analysis. All of which are applicable to the Nigerian economy.

6. Methodology

As has been established in the theoretical framework, this study adopts the Solow Swan growth theory (1956), to meet the core objective of this study, which is to examine the impact of agricultural export (especially cocoa and rubber export) on economic growth in Nigeria, we specify two models. Model one is specified to evaluate the impact of total agricultural exports on economic growth in Nigeria and model two is specified to examine the impact of disaggregated agricultural export on economic growth. For the estimation equation, the study adapted Taiga and Ameji (2020) model stated as

GDP = f(AEXP, INF, EXCH)

The above model will be modified to incorporate relevant variables so as to reflect the objective of the study. Hence, the dependent variable is real GDP (RGDP), while the independent variables are; total agricultural exports, cocoa export, rubber export, real exchange rate, inflation rate and index of trade openness. Based on the theoretical framework, the adopted model, and the specific objective, the model for the study in its functional form is specified thus:

The structural form of the model is:

Model 1: RGDP = f(TAX, EXC) (1)

Model 2: RGDP = f(COX, RUX, EXC, INF, TOP) (2)

The mathematical form of the model is:

Model 1: $RGDP = \beta_0 + \beta_1 TAX + \beta_2 EXC$ (3)

Model 2: $RGDP = \beta_0 + \beta_1 COX + \beta_2 RUX + \beta_3 EXC + \beta_4 INF + \beta_5 TOP$ (4)

The econometrics form of the model is:

Model 1: $RGDP_t = \beta_0 + \beta_1 TAX_t + \beta_2 EXC + \mu_t$ (5)

Model 2: $RGDP_t = \beta_0 + \beta_1 COX_t + \beta_2 RUX_t + \beta_3 EXC_t + \beta_4 INF_t + \beta_5 TOP_t + \mu_t$ (6)

However, there is a need to standardize the variables so as to interpret their partial slope coefficient in terms of elasticities, hence the natural log of the variables are used. This is expressed below:

Model 1: $LnRGDP = \beta_0 + \beta_1 LnTAX + \beta_2 LnEXC + \mu$ (7)

Model 2: $LnRGDP = \beta_0 + \beta_1 COX + \beta_2 LnRUX + \beta_3 LnEXC + \beta_4 LnINF + \beta_5 LnTOP + \mu$ (8)

Where;

RGDP = Real gross domestic product

TAX = Total agricultural exports

COX = Cocoa exports

RUX = Rubber exports

EXC = Exchange rate

INF = Inflation rate

TOP = Trade openness

f = Functional relationship

β_0 = intercept of the model

β_1 - β_5 = parameters of the regression coefficients

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μi = Stochastic error term

Ln = Natural logarithm

Estimation Techniques and Procedures

The study applied modern empirical investigation techniques to examine the relationship between agricultural exports and economic growth in Nigeria. These procedures are the Augmented Dickey-Fuller (ADF) unit root test, which is used to test for stationary of the time series data in the study, Ordinary Least Square (OLS) technique, Johansen co-integration test is used to test the long run relationship between the dependent and independent variables.

econometric criterion.

Economic Criterion (A priori Expectation)

The a priori expectation shows whether each independent variable in the equation is comparable with the postulations of economic theory; that is, if the sign and size of the parameters of economic relationships follow with the expectation of the economic theory. The a priori expectations with economic growth (dependent/response variable) and the selected independent variables according to economic theory are depicted in the tables below thus:

Table 1a: Economic A Priori Expectations for Model 1

Parameters	**Variables**		**Expected Relationships**	**Expected Coefficients**
	Regressand	**Regressor**		
β_0	GDP	Intercept	+/-	$0 < \beta_0 > 0$
β_1	GDP	TAX	+	$\beta_1 > 0$
β_2	GDP	EXC	-	$\beta_2 < 0$

Source: Researcher's computation (2024) using E-view 10.0

Table 1b: Economic A Priori Expectations for Model 2

Parameters	**Variables**		**Expected Relationships**	**Expected Coefficients**
	Regressand	**Regressor**		
β_0	GDP	Intercept	+/-	$0 < \beta_0 > 0$
β_1	GDP	COX	+	$\beta_1 > 0$
β_2	GDP	RUX	+	$\beta_2 > 0$
β_3	GDP	EXC	-	$\beta_3 < 0$
β_4	GDP	INF	-	$\beta_4 < 0$
β_5	GDP	TOP	+	$\beta_5 > 0$

Source: Researcher's computation (2024) using E-view 10.0

A positive '+' sign indicate that the relationship between the regressor and regressand is direct and move in the same direction i.e. increase or decrease together. On the other hand, a '-'shows that there is an indirect (inverse) relationship between the regressor and regressand i.e. they move in opposite or different direction.

Nature and Sources of Data

The study made use of secondary data that spanned 1999 to 2022 sourced from the reports and bulletins of the, Central Bank of Nigeria (CBN), World Bank and Food and Agriculture Organization (FAO).

7. Empirical Results

Summary of Stationary Unit Root Test

The study test for stationarity using Augmented Dickey-Fuller (ADF) tests on the data. The ADF tests are done on level series, first and second order differenced series. The decision rule is to reject null hypothesis if the ADF statistic value exceeds the critical value at a chosen level of significance (in absolute terms). The result of regression is presented in in

Table 2: Summary of ADF Unit Root Test Results

	Level = *I*(0)		**1st Difference = *I*(1)**	
Variables	**No Trend**	**With Trend & Intercept**	**No Trend**	**With Trend & Intercept**
GDP	0.306062	-2.087381	-3.563628	-5.488395
TAX	-0.595590	-2.494312	-8.298786	-6.508919
COX	-0.919062	-2.601996	-7.886216	-8.426812
RUX	-0.582809	-2.906226	-5.494888	-5.585134
EXC	0.459609	-0.754548	-3.053717	-4.531445
INF	-1.213612	-2.761432	-4.989557	-4.902861
TOP	-0.874813	-2.085693	-6.437654	-6.319945
@1%	-2.641672	-4.273277	-2.644302	-4.296729
@5%	-1.952066	-3.557759	-1.952473	-3.568379
@10%	-1.610400	-3.212361	-1.610211	-3.218382

Source: Researcher's computation (2024) using E-view 10.0

Evidence from unit root table above shows that all the study or model variables are not stationary at level difference but stationary at first difference. Since the decision rule is to reject null hypothesis if the ADF statistic value exceeds the critical value at a chosen level of significance (in absolute terms), and accept stationarity when ADF statistics is greater than criteria value, the ADF absolute value of each of these variables is greater than the 1%, 5% and 10% critical value at their first difference but less than 5% critical value in their level form. Therefore, the study concludes that gross domestic product (GDP), Total agricultural exports (TAX), cocoa exports (COX), rubber exports (RUX), exchange rate (EXC), inflation rate (INF), and trade openness (TOP) are all stationary at their first difference integration *I*(1).

Summary of Johansen Cointegration Test

Cointegration means that there is a correlationship among the variables. Cointegration test is done on the residual of the model. Since the unit root test shows that none of the variable is stationary at level, *I*(0) rather they integrated at their first difference *1*(1), the study therefore test for cointegration among these variables. The result is presented in tables below for Trace and Maximum Eigenvalue cointegration rank test respectively.

Table 3a: Summary of Johansen Cointegration Test for Model 1

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.295147	15.14623	12.49471	0.0006
At most 1 *	0.141176	3.803477	1.341466	0.0014

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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)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.295147	15.14623	12.49471	0.0006
At most 1 *	0.141176	3.803477	1.341466	0.0014

Max-eigenvalue 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

Source: Researcher's computation (2024) using E-views 10.0

Table 3b: Summary of Johansen Cointegration Test for Model 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.767463	93.89192	69.81889	0.0002
At most 1 *	0.539421	48.67207	47.85613	0.0218
At most 2 *	0.415720	29.63866	21.79707	0.0243
At most 3 *	0.200539	15.80037	9.249471	0.0376
At most 4	0.033045	1.041691	3.841466	0.2074

Trace test indicates 4 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)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.767463	45.21985	33.87687	0.0015
At most 1 *	0.539421	28.03341	22.58434	0.0036
At most 2 *	0.415720	21.65862	16.13162	0.0087
At most 3 *	0.200539	14.93834	6.326460	0.1965
At most 4	0.033045	1.041691	3.841466	0.3074

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Researcher's computation (2024) using E-views 10.0

Table 3a and b indicated that trace have 2 cointegrating variables in the model 1 and 4 cointegrating variables in the model 2 while Maximum Eigenvalue also indicated that there is 2 cointegrating variables in Model 1 and 4 cointegrating variables in the model 2. Both the Trace statistics and Eigen value statistics reveal that there is a long run relationship between the variables. This will prevent the generation of spurious regression results. Hence, the implication of this result is that there is a long run relationship between economic growth and other variables used in both models.

Empirical Result of the Model

Having verified the existence of long run relationship among the study model, the study therefore subjects the model to ordinary least square to generate the coefficients of the parameters of the regression models.

Table 4a: Summary of Regression Results for Model 1

Dependent Variable: RGDP Method: Least Squares Sample: 1999 2022 Included observations: 24				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.124687	1.015421	7.267112	0.0000
TAX	0.210737	0.139025	6.400874	0.0001
EXC	-0.140561	0.068678	-8.086545	0.0000
R-squared	0.819269	F-statistic		67.99627
Adjusted R-squared	0.807220	Prob(F-statistic)		0.000000
S.E. of regression	5.558756	Durbin-Watson stat		1.864861

Source: Researcher's computation (2024) using E-views 10.0

Table 4 b: Summary of Regression Results for Model 2

Dependent Variable: RGDP Method: Least Squares Sample: 1999 2022 Included observations: 24				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.68915	7.830012	6.280861	0.0000
COX	0.427282	0.459246	5.568920	0.0000
RUX	0.267839	0.565222	3.019028	0.0056
EXC	-0.921819	0.160434	-5.745790	0.0000
INF	-0.768070	0.691259	-2.981116	0.0263
TOP	0.419734	1.730725	4.242519	0.0017
R-squared	0.831989	F-statistic		26.74070
Adjusted R-squared	0.800876	Prob(F-statistic)		0.000000
S.E. of regression	5.646441	Durbin-Watson stat		1.854075

Source: Researcher's computation (2024) using E-views 10.0

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Interpretation of Results

To discuss the regression results as presented in Table 4a and b, the study employ economic a priori criteria, statistical criteria and econometric criteria.

Economic A Priori Criteria

This subsection is concerned with evaluating the regression results based on a priori (that is, theoretical) expectations. The sign and magnitude of each variable coefficient is evaluated against theoretical expectations.

From table 4a, it is observed that the regression line have a positive intercept as presented by the constant (c) = 6.124687. This means that if all the variables are held constant or fixed (zero), economic growth will be valued at 6.1%. Thus, the a-priori expectation is that the intercept could be positive or negative, so it conforms to the theoretical expectation.

As observed in table 4a, the study showed that total agricultural exports exhibit a positive impact on economic growth in Nigeria. Thus, a rise in total agricultural exports will increase economic growth in Nigeria and vice versa. On the other hands, exchange rate has a negative impact on economic growth in Nigeria. This showed that as exchange rate is increasing, economic growth will be decreasing in Nigeria and vice versa. Thus, total agricultural exports and exchange rate conform to the a priori expectation of the study.

On the other hands, from table 4b, it is observed that the regression line have a positive intercept as presented by the constant (c) = 15.68915. This means that if all the variables are held constant or fixed (zero), economic growth will be valued at 15.7%. Thus, the a-priori expectation is that the intercept could be positive or negative, so it conforms to the theoretical expectation. As observed in table 4b, the study showed that cocoa exports, rubber exports and trade openness exhibit a positive impact on economic growth in Nigeria. Thus, a rise in cocoa exports, rubber exports and trade openness will increase economic growth in Nigeria and vice versa. Also, exchange rate and inflation rate has a negative impact on economic growth in Nigeria. This showed that as exchange rate and inflation rate is increasing, economic growth will be decreasing in Nigeria and vice versa. Thus, cocoa exports, rubber exports, exchange rate, inflation rate and trade openness conform to the a priori expectation of the study. Thus, Table 5a and b summarises the a priori test of this study.

Table 5a: Summary of Economic A Priori Test for Model 1

Parameters	Variables		Expected Relationships	Observed Relationships	Conclusion
	Regressand	Regressor			
β_0	GDP	Intercept	+/-	+	Conform
β_1	GDP	TAX	+	+	Conform
β_2	GDP	EXC	-	-	Conform

Source: Researcher's computation (2024) using E-views 10.0

Table 5b: Economic A Priori Expectations for Model 2

Parameters	Variables		Expected Relationships	Observed Relationships	Conclusion
	Regressand	Regressor			
β_0	GDP	Intercept	+/-	+	Conform
β_1	GDP	COX	+	+	Conform
β_2	GDP	RUX	+	+	Conform
β_3	GDP	EXC	-	-	Conform
β_4	GDP	INF	-	-	Conform
β_5	GDP	TOP	+	+	Conform

Source: Researcher's computation (2024) using E-views 10.0

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Statistical Criteria

This subsection applies the R^2, adjusted R^2 and the F–test to determine the statistical reliability of the estimated parameters. These tests are performed as follows:

From the study regression result, Table 4a indicated that the coefficient of determination (R^2) is given as 0.819269, which shows that the explanatory power of the variables is extremely high and very strong. This implies that 82% of the variations in the economic growth is being accounted for or explained by the variations in total agricultural exports and exchange rate in Nigeria. While other possible determinants of economic growth not captured in the model explain about 18% of the variation in economic growth in Nigeria.

From the study regression result, Table 4b indicated that the coefficient of determination (R^2) is given as 0.831989, which shows that the explanatory power of the variables is extremely high and very strong. This implies that 83% of the variations in the economic growth is being accounted for or explained by the variations in coca exports, rubber exports, exchange rate, inflation rate and trade openness in Nigeria. While other possible determinants of economic growth not captured in the model explain about 17% of the variation in economic growth in Nigeria.

The adjusted R^2 in Table 4.3a supports the claim of the R^2 with a value of 0.807220 indicating that 81% of the total variation in the dependent variable (economic growth) is explained by the independent variables (the regressors). Thus, this supports the statement that the explanatory power of the variables is extremely high and very strong.

The adjusted R^2 in Table 4.3b supports the claim of the R^2 with a value of 0.800876 indicating that 80% of the total variation in the dependent variable (economic growth) is explained by the independent variables (the regressors). Thus, this supports the statement that the explanatory power of the variables is extremely high and very strong.

The F-statistic: The F-test is applied to check the overall significance of the model. The F-statistic is instrumental in verifying the overall significance of an estimated model. The hypothesis tested is:

H_0: The model has no goodness of fit

H_1: The model has a goodness of fit

Decision rule: Reject H_0 if $F_{cal} > F_{\alpha}$ (k-1, n-k) at $\alpha = 5\%$, accept if otherwise.

Where

V_1 / V_2 Degree of freedom (d.f)

V_1 = n-k, V_2 = k-1:

Where; n (number of observation); k (number of parameters)

From table 4a

Where k-1 = 3-1 = 2

Thus, n-k = 33-3 = 30

Therefore: $F_{0.05(2,30)} = 3.32$ (From F-table) … … F-table

F-statistic = 67.99627 (From Regression Result) … F-calculated

From table 4b

Where k-1 = 6-1 = 5

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Thus, n-k = 33-6 = 27

Therefore: $F_{0.05(5,27)} = 2.21$ (From F-table) … … F-table

F-statistic = 26.74070 (From Regression Result) … F-calculated

Therefore, since the F-calculated > F-table as observed in Table 4a and b, the study reject H_0 and accept H_1 that the model has goodness of fit and is statistically different from zero. In other words, there is significant impact between the dependent and independent variables of the study.

Evaluation of Research Hypotheses

The t-test is used to know the statistical significance of the individual parameters. Two-tailed tests at 5% significance level are conducted. The result is shown on Table 6a and b below. Here, the study compare the estimated or calculated t-statistic with the tabulated t-statistic at $t_{\alpha/2} = t_{0.05} = t_{0.025}$ (two-tailed test).

For Model 1:

Degree of freedom (*df*) = n-k = 33-3 = 30

So, the study has:

$T_{0.025(30)} = 2.042$ … … … Tabulated t-statistic

For Model 2:

Degree of freedom (*df*) = n-k = 33-6 = 27

So, the study has:

$T_{0.025(27)} = 2.052$ … … … Tabulated t-statistic

In testing the working hypotheses, which partly satisfies the objectives of this study, the study employs a 0.05 level of significance. In so doing, the study is to reject the null hypothesis if the t-value is significant at the chosen level of significance; otherwise, the null hypothesis will be accepted. This is summarized in table 6a and b below.

Table 6a: Summary of t-statistic

Variable	t-calculated (t_{cal})	t-tabulated ($t_{\alpha/2}$)	Conclusion
Constant	7.267112	2.042	Statistically Significance
TAX	6.400874	2.042	Statistically Significance
EXC	-8.086545	2.042	Statistically Significance

Source: Researcher's computation (2024) using E-views 10.0

Table 6b: Summary of t-statistic

Variable	t-calculated (t_{cal})	t-tabulated ($t_{\alpha/2}$)	Conclusion
Constant	6.280861	2.052	Statistically Significance
COX	5.568920	2.052	Statistically Significance
RUX	3.019028	2.052	Statistically Significance
EXC	-5.745790	2.052	Statistically Significance
INF	-2.981116	2.052	Statistically Significance
TOP	4.242519	2.052	Statistically Significance

Source: Researcher's computation (2024) using E-views 10.0

Decision Rule

1. If calculated t-value > tabulated t-value, we reject the null hypothesis and accept the alternative hypothesis
2. If calculated t-value < tabulated t-value, we accept the null hypothesis and reject the alternative hypothesis

The study begins by bringing the working hypothesis to focus in considering the individual hypothesis.

Hypothesis One

H_0: Total agricultural export has no significant impact on economic growth in Nigeria.

H_1: Total agricultural export has significant impact on economic growth in Nigeria.

Decision:

Applying the above decision rule to the hypothesis, it showed that the calculated absolute t-value of 6.400874 is greater than tabulated absolute t-value of 2.042 which result to rejecting the null hypothesis that total agricultural export has no significant impact on economic growth in Nigeria and accepting the alternative hypothesis that total agricultural export has a significant impact on economic growth in Nigeria.

Hypothesis Two

H_0: Cocoa export has no significant impact on economic growth in Nigeria.

H_1: Cocoa export has significant impact on economic growth in Nigeria.

Decision:

Applying the above decision rule to the hypothesis, it showed that the calculated absolute t-value of 5.568920 is greater than tabulated absolute t-value of 2.052 which result to rejecting the null hypothesis that cocoa export has no significant impact on economic growth in Nigeria and accepting the alternative hypothesis that cocoa export has a significant impact on economic growth in Nigeria.

Hypothesis Three

H_0: Rubber export has no significant impact on economic growth in Nigeria.

H_1: Rubber export has significant impact on economic growth in Nigeria.

Decision:

Applying the above decision rule to the hypothesis, it showed that the calculated absolute t-value of 3.019028 is greater than tabulated absolute t-value of 2.052 which result to rejecting the null hypothesis that rubber export has no significant impact on economic growth in Nigeria and accepting the alternative hypothesis that rubber export has a significant impact on economic growth in Nigeria.

Hypothesis Four

H_0: Exchange rate has no significant impact on economic growth in Nigeria.

H_1: Exchange rate has significant impact on economic growth in Nigeria.

Decision:

Applying the above decision rule to the hypothesis, it showed that the calculated absolute t-value of -5.745790 is greater than tabulated absolute t-value of 2.052 which result to rejecting the null hypothesis

that exchange rate has no significant impact on economic growth in Nigeria and accepting the alternative hypothesis that exchange rate has a significant impact on economic growth in Nigeria.

Hypothesis Five

H_0: Inflation rate has no significant impact on economic growth in Nigeria.

H_1: Inflation rate has significant impact on economic growth in Nigeria.

Decision:

Applying the above decision rule to the hypothesis, it showed that the calculated absolute t-value of -2.981116 is greater than tabulated absolute t-value of 2.052 which result to rejecting the null hypothesis that inflation rate has no significant impact on economic growth in Nigeria and accepting the alternative hypothesis that inflation rate has a significant impact on economic growth in Nigeria.

Hypothesis Six

H_0: Trade openness has no significant impact on economic growth in Nigeria.

H_1: Trade openness has significant impact on economic growth in Nigeria.

Decision:

Applying the above decision rule to the hypothesis, it showed that the calculated absolute t-value of 4.242519 is greater than tabulated absolute t-value of 2.052 which result to rejecting the null hypothesis that trade openness has no significant impact on economic growth in Nigeria and accepting the alternative hypothesis that trade openness has a significant impact on economic growth in Nigeria.

8. Conclusion and Recommendations

The discussion is done based on the analysis and result of the study. The study estimated the impact of agricultural export on economic growth in Nigeria and the findings showed that total agricultural export has a positive and statistical significant impact on economic growth in Nigeria. This means that increase in total agricultural export will increase the rate of economic growth and when total agricultural export falls or continue to fall, economic growth will fall or continue decreasing. Thus, total agricultural export do conforms to the a priori expectation of the study by exhibiting a positive impact on economic growth in Nigeria which is expected. The study estimated the impact of cocoa export on economic growth in Nigeria and the findings showed that cocoa export has a positive and statistical significant impact on economic growth in Nigeria. This means that as cocoa export increases, economic growth also increases. On the other hands, a fall in cocoa export brings about a fall in economic growth in Nigeria. Thus, cocoa export conforms to the a priori expectation of the study by exhibiting a positive impact on economic growth which is expected. The study ascertained the impact of rubber export on economic growth in Nigeria and the findings showed that rubber export has a positive and statistical significant impact on economic growth in Nigeria. This means that as rubber export increases, economic growth also increases. On the other hands, a fall in rubber export brings about a fall in economic growth in Nigeria. Thus, rubber export conforms to the a priori expectation of the study by exhibiting a positive impact on economic growth which is expected. The study established the impact of exchange rate on economic growth in Nigeria and the findings showed that exchange rate has a negative and statistical significant impact on economic growth in Nigeria. This means that as exchange rate increases, economic growth will be decreasing. On the other hands, a fall in exchange rate brings about a rise in economic growth in Nigeria. Thus, exchange rate conforms to the a priori expectation of the study by exhibiting a negative impact on economic growth which is expected. The study established the impact of inflation rate on economic growth in Nigeria and the findings showed that inflation rate has a negative and statistical significant impact on economic growth in Nigeria. This means that as inflation rate increases,

economic growth will be decreasing. On the other hands, a fall in inflation rate brings about a rise in economic growth in Nigeria. Thus, inflation rate conforms to the a priori expectation of the study by exhibiting a negative impact on economic growth which is expected. The study determined the impact of trade openness on economic growth in Nigeria and the findings showed that trade openness has a positive and statistical significant impact on economic growth in Nigeria. This means that as trade openness increases, economic growth also increases. On the other hands, a fall in trade openness brings about a fall in economic growth in Nigeria. Thus, trade openness conforms to the a priori expectation of the study by exhibiting a positive impact on economic growth which is expected.

The study showed that total agricultural export has a positive and statistical significant impact on economic growth in Nigeria. This implies that a rise in total agricultural export will increase economic growth in Nigeria and vice versa under the period been reviewed. The implication of the finding also showed that a 1% increase in total agricultural export will bring about 0.21 or 21% increase in economic growth in Nigeria and a unit fall will cause about 21% fall in economic growth in Nigeria scenario. The study revealed that cocoa export has a positive and statistical significant impact on economic growth in Nigeria. This implies that a rise in cocoa export will increase economic growth in Nigeria and vice versa under the period been reviewed. The implication of the finding also showed that a 1% increase in cocoa export will bring about 0.43 or 43% increase in economic growth in Nigeria and a unit fall will cause about 43% fall in economic growth in Nigeria scenario. The study indicated that rubber export has a positive and statistical significant impact on economic growth in Nigeria. This implies that a rise in rubber export will increase economic growth in Nigeria and vice versa under the period been reviewed. The implication of the finding also showed that a 1% increase in rubber export will bring about 0.27 or 27% increase in economic growth in Nigeria and a unit fall will cause about 27% fall in economic growth in Nigeria scenario. The study revealed that exchange rate has a negative and statistical significant impact on economic growth in Nigeria. This implies that a rise in exchange rate, decreases economic growth in Nigeria and vice versa under the period been reviewed. The implication of the finding is that a 1% increase in exchange rate will bring about 0.92 or 92% decrease in economic growth in Nigeria and a unit fall will cause a 92% rise in economic growth in Nigeria scenario. The study revealed that inflation rate has a negative and statistical significant impact on economic growth in Nigeria. This implies that a rise in inflation rate, decreases economic growth in Nigeria and vice versa under the period been reviewed. The implication of the finding is that a 1% increase in inflation rate will bring about 0.77 or 77% decrease in economic growth in Nigeria and a unit fall will cause a 77% rise in economic growth in Nigeria scenario. The study disclosed that trade openness has a positive and statistical significant impact on economic growth in Nigeria. This implies that a rise in trade openness will increase economic growth in Nigeria and vice versa under the period been reviewed. The implication of the finding also showed that a 1% increase in trade openness will bring about 0.42 or 42% increase in economic growth in Nigeria and a unit fall will cause about 428% fall in economic growth in Nigeria scenario.

The study recommends that policymakers should prioritize investments in infrastructure, research and development, and market access to unlock the full potential of agricultural exports. Additionally, implementing supportive policies that address challenges such as access to finance, technology adoption, and value chain development will be crucial in harnessing the transformative power of agriculture for sustainable economic growth and development in Nigeria. By leveraging its agricultural strengths and overcoming existing obstacles, Nigeria can pave the way for inclusive growth, poverty reduction, and food security, ultimately positioning itself as a key player in the global agricultural landscape.

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