

Agricultural Export Performance and Economic Growth in Nigeria: Error Correction Modelling Approach

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Abstract

This paper investigated agricultural export performance on economic growth of Nigeria for the period 1980 to 2016. The objective is to investigate the contribution of agricultural export performance on economic growth. Empirical test of the long run and short run relationship were carried out, using time series econometric techniques of co-integration, error correction estimation and ordinary least Square Regression Analysis. The results from unit root test show that all variables are order one integrated, Johansen cointegration shows the existence of long run relations among the variables and error correction estimation suggests the validity of long-run equilibrium relationship among the variables and that estimated coefficient of the error correction of 56 percent suggests that the system corrects itself by about 56 percent speed of adjustment. Finally, Ordinary Least Square Regression Analysis indicates that there is a positive and significant link between agricultural export performance and economic growth in Nigeria. The key finding in this study show that Agriculture export performance had a positive and significant effect on economic growth in Nigeria. The significance of the study is the facts that there is renewed effort by the government to revamp the sector and increase the level of agricultural exports. Moreover, the study applied the most recent data to explore the importance of agricultural exports performance on economic growth. The paper recommends an increase effort to be directed towards policies that will expand the volume of a country's agricultural exports and at the same time increase public/private participation in the sector.

Keywords: Agriculture Export, Economic Growth, Export Performance, Error Correction

INTRODUCTION

A strong and an efficient agricultural sector would enable a country to feed its growing population, generate employment, earn foreign exchange and provide raw materials for industries. Nigeria is generously endowed with abundant natural resources including biological and non-biological resources. The resources of the entire world should be developed to the fullest extent possible with available means as a whole can progress only by the efficient and rational use of the natural resources. Hence, agriculture constitutes one of the most important sectors of the Nigeria economy (Olajide, 2015).

The significance of agriculture resource in bringing about economic growth and sustainable development of a nation cannot be underestimated. Agriculture contributes to the growth of the economy, provides employment opportunities for the teeming population, export revenue earnings and eradicates poverty in the economy. Adebayo (2010) stated that stagnation in agriculture is the principal explanation for poor

economic performance, while rising agricultural productivity has been the most important concomitant of successful industrialization. Oji-Okoro (2011) is of the opinion that agriculture resource has been an important sector in the Nigerian economy in the past decades, and is still a major sector despite the oil boom; basically it provides employment opportunities for the teeming population, eradicates poverty and contributes to the growth of the economy. The pervasive influence of agriculture on Nigeria's economic and social development has also been articulated by Oluwasami (1966).

The Government of Nigeria, after years of benign neglect, began to reform the agriculture sector. To refocus the sector, the Government implemented a new strategy, The Anchor Borrowers Programme launched in November 2016, for small farmers to advance their status from small holder farmers to commercial or large growers. This however is in line with the CBN programme aimed at creating an Ecosystem to line out-

growers (small holder farmers) to local processors. It is also aimed at diversifying the economy by addressing local production of agricultural products. Another Agriculture Roadmap “the Green Alternative” an Agriculture Promotion Policy (2016-2020) the vision was to revive agric sector to boost food production in the country. The policy will serve as the new fulcrum for Economic Diversification inclusive growth and sustainable development in the sector.

Rostow (1960) argued that in the process of economic development, nations pass through several stages namely: traditional stage, the precondition for take-off, the take off stage, drive to maturity and the high mass consumption stage. Agriculture played crucial roles in the first three stages (Traditional society, pre-conditions for take-off and take-off stages). The agricultural sector has the potential to be the industrial and economic springboard from which a country’s development can take off. Indeed, more often than not, agricultural activities are usually concentrated in the less- developed

rural areas where there is a critical need for rural transformation, redistribution, poverty alleviation and socio-economic development. (Stewart, 2000)

Literatures have reported that in spite of Nigeria’s rich agricultural resource endowment, there has been a gradual decline in agriculture’s contributions to the nation’s economy (Manyong et al., 2005). Less than 50% of the Nigeria’s cultivable agricultural land is under cultivation. Even then, smallholder and traditional farmers who use rudimentary production techniques, with resultant low yields, cultivate most of this land. The smallholder farmers are constrained by many problems including those of poor access to modern inputs and credit, poor infrastructure, inadequate access to markets, land and environmental degradation, and inadequate research and extension services. The objective of this study is to examine the impact of agricultural sector performance on the economic growth in Nigeria.

EMPIRICAL LITERATURE REVIEW

Table 1: Summary of Empirical Literature

Author, Year of publication and period of study	Topic	Methodology	Findings of the Studies
Victor, U. I. (2015) 1970 to 2012	The Empirical Analysis of Agricultural Exports and Economic Growth in Nigeria	Unit Root Test, Johnhasen Co-Intergration Test and Error Correction Method	The co-integration test showed that, long run relationship exist among the variables and the finding from the error correction method show that agricultural exports has contributed positively to the Nigerian economy
Oluwaseun G. Gbaiye et al (2013) 1980 and 2010	Agricultural Exports and Economic Growth in Nigeria	Unit root tests and Johansen Maximum Likelihood Test of Co-Integration.	It was discovered that a long run equilibrium relationship exists between agricultural exports and economic growth and the relationship is elastic in nature meaning that a unit increase in agricultural exports would bring a more than proportionate increase in the Real Gross Domestic Product in Nigeria.
Tigist Yifru (2015) 1984-2009	Impact Of Agricultural Exports On Economic Growth In Ethiopia: The Case Of Coffee, Oilseed And Pulses	Co-Integration Model, Error Correction Model And Granger Causality Model	The findings of the study showed that Coffee export and oilseeds export have a positive and significant relationship with economic growth. While, pulses export was found to have negative and insignificant effect on economic growth in short run and positive but insignificant in the long run. On the other hand the causality relationship found that there is bi-directional relationship between coffee export, oilseed export and economic growth whereas unidirectional relationship was found between pulses export and economic growth
Abiodun, O. F and Solomon, A. O. (2010) 1970-2007	Determinants of Agricultural Exports in Oil Exporting Economy: Empirical Evidence From Nigeria	Error Correction Method And Ordinary Least Square	The outcome of the analysis revealed that world prices for Nigeria major agricultural commodities, world income and Nigeria past agricultural output were determinants of agricultural export
Amtul, H and Saif, UI. H. (2015) 1980-2015	Impact Of Agricultural Exports on the Economic Growth Of Pakistan: A Case Study Of Cotton And Rice Crops The Impact of	Augmented Dickey-Fuller (ADF), Johanson Co-Integration Technique And Error Correction Model	The results find that export of cotton and rice has strong positive relation with the economic growth of the country. In addition, inflation rate, labour force participation and gross fixed capital formation also have important effect on the economic growth of Pakistan.
		Descriptively and	The results of the empirical analysis shows that variables such as

Loto, M. A. (2011) 2005Q1 to 2008Q4	Economic Downturn on the Performance of Agricultural Export in the Nigerian Economy	Empirically Analysis	agricultural production index (AGI), exchange rate (EXCH), Inflation rate (INF) both indicate a significant shocks on the performance of agricultural sector export. The influence of (AGI), was positive, while that of (EXCH rate) and (INF) were negative. Direct foreign investment was positive but not significant.
Cynthia. S, and Johannes. P. S. S. (2017) 1990 to 2014.	Agricultural Exports and Economic Growth in Namibia	Augmented Dicky Fuller test, Johansen co-integration test, and error correction techniques	The empirical findings of the study show that the agricultural exports have a positive and insignificant effect on economic growth while non-agricultural exports have a positive and significant effect on Gross Domestic Product (GDP).
Saeid, M and Leelavathi, D. S. (2013) 1980 to 2010	Agricultural Export and Exchange Rate in India: The Granger Causality Approach	Granger-Causality Analysis	The finding shows that there is no significant relationship between quantity of agricultural export and real exchange rate. The result also shows that the variables are not co-integrated, so there is no the long run relationship between agricultural export and exchange rates in India.
Muhammd, A. H. (2015) 1972 to 2008	Agricultural Export and Economic Growth: A Case Study of Pakistan	Johansen Co- Integration Technique	The main findings of the study depict that agricultural exports have a negative relationship with economic growth of Pakistan while non-agricultural exports have positive relation with economic growth.
Ana, I., Sanjuan, L´ and Dawson., P. J (2010)	Agricultural Exports and Economic Growth in Developing Countries: A Panel Co- integration Approach	Panel Co-integration Methods	Results show that a long-run relationship exists, the agricultural export elasticity of GDP is 0.07 whereas that of non-agricultural exports is 0.13, and total exports Granger-cause GDP, which supports the export-led growth hypothesis.

Source: Author's Compilation

Motivation for the study

There are many existing literature on the subject matter of agricultural export and economic growth, but not without a controversy on whether agricultural export has an impact on economic growth or not. Although majority of these studies agree that agricultural export has a positive impact on economic growth, such view are support by victor (2012), Oluwaseun et al (2013), Abiodun and Solomon (2010) and Loto (2011) in their studies on Nigeria. However, all the Empirical literatures pointed out that export performance of agricultural sector in the Nigeria economy have been positive, but not significant effect on economic growth in Nigeria. The reason may not be far away from the neglect of the sector by the previous administration as pointed out by Maimuna and Benedict (2015). Amtul and Saif (2015) also supported this view in their studies on Indian economy. Contrary Seeid and Leelavathi (2013) and Muhammad (2015) in their studies in India and Pakistan respectively found that agricultural export does not actually affect the level of economic growth in those countries. With this contrivance on the relationship between agricultural export and economic couple with the recent policies implemented in the sector. It calls for the investigation on the relationship between agricultural export and economic growth in Nigeria.

THEORETICAL FRAME WORK

To investigate the contribution of agricultural exports to economic growth the study starts with the work, neo-classical growth model developed by Solow (1956). The neo-classical production function is specified in terms of traditional inputs like labour and capital.

$$Y_t = (L_t, K_t) \quad (1)$$

The aim of the present study is to derive a source of growth equation which can be estimated, and explore how agricultural exports affect economic growth also. Solow's aggregate production by incorporating both agricultural and non-agricultural exports.

$$Y_t = (L_t, K_t, X_t, X_t) \quad (2)$$

By taking the natural logs (ln) on both sides of the equation (3) in order to rule-out the differences in the units of measurements for our variables, it leads us to Model Specification.

Data Source

The main data source for this study is Central Bank of Nigeria Statistical Bulletin Various Issues. The data covers time series period from 1980 to 2016. The data for Gross domestic product, Agricultural output, agricultural exports, Agricultural Expenditure and Government Expenditure.

Model Specification**The model of this study is specified as:**

$$\log GDP = \log a_0 + a_1 AGOUP + a_2 \log AXPT + a_3 \log GEXP + a_4 \log AGEXP + e \quad (3)$$

$a_0, a_1, a_2, a_3, a_4, a_5 > 0$

Where: a_0, a_1, a_2, a_3, a_4 , and a_5 are parameters to be estimated

GDP = Gross Domestic Product

AGOUP = Agriculture Output

AEXP = Agricultural Exports

GEXP = Government Expenditure

AGEXP = agriculture Expenditure

e = Error Term

In order to explore the short run and long run relationship between agricultural sector exports and

economic growth, study used estimation procedures and the techniques of time series data analysis. Unit root test is applied to check the stationarity in the data. We have applied Co-Integration technique in order to determine the long run relationship. Furthermore, the Error Correction Model is used to estimate the equation to measure the short run impact of variables and the speed of adjustment as represented by $E(-1)$. To examine the agricultural sector export performance on economic

DATA PRESENTATION AND ANALYSIS

This segment presents and analysed the result based on apriori predictions and statistical criteria.

A. Data Analysis and Diagnostic Test**I. Stationarity test**

Table 2: Unit root test

Variables	Critical values at 1 %	Critical values at 5 %	Critical values at 10 %	Lags	Other of difference	t- statistics	Probability
GDP	-4.252879	-3.548490	-3.207094	9	I(1)	-5.504688	0.0004
LOG (AGOUP)	-4.252879	-3.548490	-3.207094	9	I(1)	-4.837812	0.0023
LOG (AXPT)	-4.284580	-3.562882	-3.215267	9	I(1)	-4.596170	0.0244
LOG (GEXP)	-3.646342	-2.954021	-2.615817	8	I(1)	-5.550214	0.0001
LOG (AGEXP)	-3.646342	-2.954021	-2.615817	8	I(1)	-5.650214	0.0001

Source: Author Computation Using Eviews 8

The Stationarity test revealed that all the variables under investigation are found to be stationary at first difference I(1). Hence, this provides the bases for conducting cointegration test to determine the long term relationship between the variable under investigation.

Jan-Hansen Cointegration Test

The result of cointegration test shows that there are three cointegrating equation at 5% (0.05) level of significant, since both the trace statistics and the Max eigenvalue is greater than the critical value. This provides the bases for conducting error correction test to determine the speed of adjustment of the equilibrium

Table 3: Jan-Hansen Cointegration Test

Series: GDP AGOUP AXPT GEXP AGEXP

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.952136	158.9974	47.85613	0.0000
At most 1 *	0.656360	55.65783	29.79707	0.0000
At most 2 *	0.433164	19.34038	15.49471	0.0125
At most 3	0.001149	0.039096	3.841466	0.8432

Source: Author Computation Using Eviews 8

Error Correction Test.

The estimated coefficient of the error correction term (-0.56) is significantly different from zero at 5 percent level and with the appropriate negative sign. This suggests the validity of long-run equilibrium relationship among the variables. The estimated coefficient value of -0.56 suggests that the system

(economy) corrects its previous period disequilibrium by about 56 percent speed of adjustment in a year which can be considered a low speed of adjustment of economy. That indicates that results of the ECM estimation are appropriately signed and all the parameter are in conformity with the apriori expectation.

Table 4: Error Correction Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	112.6630	482.2610	0.233614	0.8174
D(AGEXP(-2))	0.383187	0.392300	0.976769	0.3453
D(GDP(-2))	-0.185121	0.143501	-1.290037	0.2099
D(AXPT(-1))	-38.82700	10.74440	-3.613697	0.0015
D(AXPT(-2))	42.31847	10.49065	4.033922	0.0005
D(AGOUP(-1))	7.082899	1.181144	5.996644	0.0000
D(AGOUP(-2))	-8.681764	1.191542	-7.286157	0.0000
D(GEXP(-1))	1.661304	2.391419	0.694694	0.4942
D(GEXP(-2))	9.815269	2.616385	3.751462	0.0010
ECM(-1)	-0.564104	0.187110	-3.014827	0.0062

Source: Author Computation Using Eviews 8

Serial Correlation

The result of Breusch-Godfrey Serial Correlation LM Test shows that there is no presence of serial correlation as indicated by high probability value of 0.9412. This implies that the null hypothesis of no serial correlation is accepted at 5 % significant level.

Table 5: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.060751	Prob. F(2,20)	0.9412
Obs*R-squared	0.169076	Prob. Chi-Square(2)	0.9189

Source: Author Computation Using Eviews 8

Ordinary Least Square Analysis

The result OLS revealed that there is positive relationship between agricultural output, agricultural export, government expenditure, Agricultural expenditure and GDP. This implies that 100 per cent change in agricultural output would increase GDP by 62.3, 100 per cent change in agricultural export would increase GDP by 30.1 per cent. 100 per cent increase in agricultural expenditure would increase GDP by 7.4 per cent and 100 per cent; change in government expenditure would increase GDP by 2.6 per cent. The value of intercept or constant of 2.623648 shows the rate at which GDP changes when agricultural output, agricultural export, government expenditure are held constant. The coefficients of all independent variables such as agricultural output, agricultural export, government expenditure, Agricultural expenditure are

rightly signed and are consistent with the theoretical expectation of this study.

The coefficients of agricultural output, agricultural export, Agricultural expenditure and constant are statistically significant at 1 per cent level as indicated by probability value of 0.0000, 0.0043, 0.0006, 0.0929, 0.0205 respectively. Thus the null hypotheses were rejected. But government expenditure is statistically insignificant at 5 per cent level. Because there probability values of 0.9029 is greater than 0.05 per cent. Therefore, the null hypothesis is accepted.

Table: 6: Empirical result

Dependent Variable	Variable:	LOG(GDP)		
Variable	Coefficient	Std. Error	T-Statistic	Prob. Value
C	2.623648	0.423506	6.195068	0.0000
LOG(AGROUP)	0.622950	0.202834	3.071237	0.0043
LOG(AXPT)	0.301044	0.079084	3.806640	0.0006
LOG(GEXP)	0.026730	0.217465	0.122916	0.9029
LOG(AGEXP)	0.073621	0.319786	0.230218	0.0205
R-squared 0.969906		D.W.Statistics 1.652806		
Adjusted R-squared 0.958960				
F-statistic 1046.100				
Prob(F-statistic) 0.000000				

Source: Author Computation Using Eviews 8

The F-statistic 1046.100 which is a measure of the joint significance of the explanatory variables, is found to be statistically significant at 1 per cent level as indicated by the corresponding probability value of 0.000000. Hence, accept that the independent variables are simultaneously significant. The R^2 of 0.969906 (96.9%) implies that about 96.9 per cent total variation in GDP is explained by the regression equation. Coincidentally, the goodness of fit of the regression remained high after adjusting for the degree of freedom as indicated by the adjusted R^2 ($R^2 = 0.958960$ or 95.8%).

The Durbin-Watson statistic of 1.652806 in the result above is observed to be greater than R^2 0.969906 indicating that the model is not spurious (i.e. it is meaningful). This implies that the model can be used for policy purpose. From the result, it shows that there is presence of auto correlation because Durbin-Watson statistic 1.652806 is less than two. This provides the basis for conducting serial correlation test.

DISCUSSION OF THE FINDINGS

The result of this study shows that increase in agricultural output, agricultural export, Agricultural expenditure and government expenditure affect GDP positively over the years in Nigeria. Meanwhile, agricultural output, and agricultural export, has significant and positive impact on GDP in Nigeria for

the period under review, while government expenditure has positive and insignificant impact on GDP. Moreover, all the variables are found to be stationary at first difference I(1) after conducting unit root test. Jan-hansen cointegration test was conducted which shows that there are three cointegrating equation at 5% level. The result of the error correction revealed that the economy would restore it previous disequilibrium by about 56% speed of adjustment.

CONCLUSION AND RECOMMENDATION

The paper investigates the relationship between agricultural export and economic growth in Nigeria using OLS and ECM. The result stationary test found all variable to be at first difference I(1) after conducting unit root test. Jan-hansen cointegration test found that there are three cointegrating equation at 5% level, indicating a long run relationship between the variables and error correction reveals that the economy would restore it previous disequilibrium by about 56% speed of adjustment.

Moreover, the OLS result found that there is a positive, strong and significant link between economic growth and agricultural export in Nigeria, implying that if government increase spending in agricultural sector and other sub-sector it will boost agricultural export and economic growth of Nigeria. In the light of this finding, the paper recommend that both the private sector and the government need to increase the level investment

and expenditure in the sector in order to improve agricultural sector export and economic performance of Nigeria

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