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EFFECT OF CREDIT ON AGRICULTURAL EXPORTS IN NIGERIA (1980-2018)

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ABSTRACT

This study examined the effect of credit on agricultural exports in Nigeria. Time series data spanning the period between 1980 and 2018 were obtained from publications of Central Bank of Nigeria (CBN), National Bureau of Statistics (NBS) and Food and Agriculture Organisation database. Data were analysed using means, coefficient of variation, co-integration analysis and vector error correction mechanism (VECM). Descriptive results revealed a fluctuating trend in the volume of agricultural exports and credit to the agricultural sector with a mean of 351.99 tonnes and ₦80162.45 million respectively over the study period. There was a decreasing trend in the contribution of agricultural exports to GDP in Nigeria over the study period. Co-integration analysis affirmed a long run relationship among the variables. Results of VECM regression analysis revealed a positive relationship between credit to the agricultural sector, exchange rate and volume of agricultural exports in the short run. Exchange rate and inflation rate positively affects volume of agricultural exports, while ratio of export prices to producer prices and interest rate negatively affects volume of agricultural exports in the long run. The study concluded that credit to the agricultural sector, exchange rate, inflation rate, ratio of export prices to producer prices and interest rate are significant determinants of volume of agricultural exports. Hence, increased low interest rate commercial banks credit to the agricultural sector, effective and efficient monetary policies and bridging the gap between producer prices and world prices of agricultural export commodities will stimulate improved agricultural export earnings.

Keywords: Agricultural exports, Co-integration analysis, Commercial banks credit, Vector error correction analysis, Agricultural sector

INTRODUCTION

Agriculture plays a critical role in promoting inclusive growth by stimulating economic growth, reducing poverty, and creating employment for a large number of people particularly in developing countries. It accounts for about 29 percent of the gross domestic product (GDP) and employs 65 percent of the labor force in poor developing economies. In addition, more than 75 percent of the poor in the developing world live in rural areas with most of them earning their livelihoods directly or indirectly from agriculture (Oboh and Adeleke, 2016).

In Nigeria, the total labour force is made up of persons aged 15–64 years excluding students, home-keepers, retired persons, stay-at-home parents, and persons unable to work or not interested in work (Kale and Doguwa , 2015). It is generally expected that developing countries, facing a scarcity of capital will acquire external loan building up her external debt to supplement domestic saving (Aluko and Arowolo, 2010). External debt may be used to stimulate the economy. Economists hold the view that adequate investment is needed for economic growth and development in a nation. Hence domestic investment through capital formation is not just paramount but serves as a prerequisite for the geometric acceleration of growth and development of every economy as it provides domestic resources that can be used to fund investment effort of the economy (Udeh, Ugwu and Onwuka, 2016). A lot of economies depend on investments to resolve several economic problems, crisis and challenges. Less developed countries in Africa such as Nigeria is introducing various economic policies that will attract as well as keep hold of private investors (Imoisi, 2018).

Foreign direct investment (FDI) inflows to Nigeria have remained low compared to other developing countries though the growth has remained positive. It has been hypothesized that the response of private investors depends on the stage of the economy's business cycle, the availability of financing and the level of public investment (Offiong and Atsu, 2014). In agriculture, fund is needed to enable the farmer purchase more land, buy his inputs at the appropriate time and to pay for hired labor or farm machinery. Unfortunately, credits are not easily available for most of the farmers because of collateral and other documentation that are usually required by the commercial banks and other credit institutions. This makes it impossible for most of the farmers in Nigeria to access the required capital for investment in large scale agriculture, hence the reason for the recent low agricultural productivity.

With the recent move by the leading economies of the world to diversify their economy and Nigeria in a bid to join the rest of the developed economies is conscious of the danger signals observed both within and outside the country that underscores the need to move away from total reliance on petroleum related revenues. These signals according to Ashamu and Abiola, (2012) include the ongoing global economic crisis that is threatening the growth and development agenda of the present administration, the current decline in crude oil prices, and the frightening revelation that the united states of America, the highest buyer of Nigeria crude oil, Brazil and several other countries have seriously engaged in alternative source of energy. Hence, the need to

diversify Nigerian economy, especially through agricultural sector that has for long, been neglected. Nigeria is endowed with huge expanse of fertile arable land, and graze land, as well as a large active population that can sustain a high productive and profitable agricultural sector. George-Anokwuru (2018) admits that this enormous resource base if well managed could support a vibrant agricultural sector capable of ensuring self-sufficiency in food and raw materials for the industrial sector as well as, providing gainful employment for the teeming population and generating foreign exchange through exports. In spite of these endowments, the sector has continued to record a declining productivity. The capacity of the sector to fulfill its traditional role in the Nigerian economy has been constrained by various social-economic and structural problems. These include unavailability of credits to local farmers, high interest rates on loans to farmers, rural- urban migration and ineffective institutions charged with policy implementations. Not until recently, government has seriously developed a policy to mobilize potential credits for the rural farmers (Nnamocha and Eke, 2015).

According to Polycarp and Jirgi, (2011), even though, agriculture contribute 42% of the GDP, provides employment and a means of livelihood for more than 60% of the productivity engaged population, it receives less than 10% of the annual budgetary allocation, Thus, under funding in this regard is central to decline in agricultural output in Nigeria. As a follow up, the Nigerian Agricultural Development and Cooperative Bank Limited, which is meant to provide credit facilities to farmers, have its major challenges in effective delivery of' its duties (Nwankwo, Ewuim and Asoya, 2012). Financial institutions have given little attention to the approval of loans to farmers for fear of defaults. Where credits are received from other sources apart from government and commercial lending, the interest rates have been too high. These reported high interest rates are blunt realities to the peasant farmers. Thus, the study examined the effect of credit on the agricultural export sector. Thus, the study examined the effect of credit on the agricultural export sector. The main objective of the study was to examine the effect of commercial banks' credit on the agricultural export sector. Specifically, the objectives of the study are to examine the trend in the volume of agricultural exports in Nigeria, analyzing the trend in the commercial bank credit to the agricultural sector in Nigeria, evaluating the contributions of agricultural exports to agricultural Gross Domestic Products in Nigeria, and assessing the effect of credit on agricultural exports sector in Nigeria.

METHODOLOGY

Study area

The study was carried out in Nigeria which is one of the largest countries in Africa and lies wholly within the tropics along the Gulf of Guinea on the western coast in Sub-Saharan Africa. Nigeria lies between Longitudes 2° 49' E and 14° 37' E and Latitudes 4° 16'N and 13° 52' N. It has a total land area of 923,768, 622 km2 and an estimated population of over 170 million as of 2016 (NPC, 2016). The climate is tropical, characterized by high temperatures and humidity with marked wet and dry seasons, though there are variations between the South and North. Total rainfall decreases from

the coast northwards. The South, below Latitude 8° N has an annual rainfall ranging between 1,500 and 4,000 mm and the extreme North between 500 and 1000 mm. Food production in Nigeria is virtually rain-fed. For example, Nigeria's irrigated area as a share of total cultivated area is estimated at about 2 percent which is lower than average of only 6% for Africa, and 37% for Asia and 14% for Latin America (Oladimeji and Abdulsalam, 2014).

Sample population, sampling and sample size

The data for this research is in annual time series. The data sample was obtained from secondary sources. These sources included the publications of the Central Bank of Nigeria (CBN), and The Food and Agriculture Organization (FAO) Statistics (FAOSTAT). Specifically, data on credit to agricultural sector, interest rates, exchange rates, producer, and export and world prices of Nigeria's major agricultural export commodities and volume of agricultural exports were collected for the study.

Data Analysis

This study employed a number of analytical means based on the objectives of the study as stated earlier. These include; means, standard deviation, coefficients of variation, percentages and average growth rate. These were used to describe trend in credit to the agricultural sector in Nigeria, and the volume of agricultural exports. The Augmented Dickey-Fuller statistics was used to examine the stationarity of time series data. The Johansen's method was used in verifying co- integration among the variables of the model. The Error Correction Model (ECM) was used to determine the effects of credit to the agricultural sector on the volume of agricultural exports. Following, Tambi, 1999, Yusuf and Akinlade, 2011). The implicit model used in this study is given as:

$$\Delta lnYt = \alpha 1 + \alpha 2\Delta lnYt\text{-}1 + \alpha 3\Delta lnX2t\text{-}1 + \alpha 4\Delta lnX3t\text{-}1 + \alpha 5\Delta lnX4t\text{-}1 + \alpha 6\Delta lnX5t\text{-}1 + \lambda 1ECTt\text{-}1 + ut1 \ldots\ldots \quad (1)$$

Where

Y is the volume of agricultural exports in tonnes

X1 is the credit to the agricultural sector in billions Naira

X2 is the exchange rate in terms of units of foreign currencies (₦/USSD)

X3 is the ratio of export prices to producer prices of agricultural export commodities valued in Naira

X4 is the inflation rate in the economy measured in percentage

X5 is the interest rate in the economy measured in percentage

ECTt is the error correction factor.

Δ is the difference operator

t-1 is the lagged values of variables

Ln is the logarithm operator

Uts are stochastic random errors

α1, α2, α3, α4, α5, α6, and λ1 are parameters to be estimated

RESULTS OF FINDINGS

Trend in the Volume of Agricultural Export (tonnes)

The trend in the volume of agricultural exports between 1980 and 2019 is shown in the Table 1 and Figure 1. The shows that average volume of agricultural exports increases steadily between 1980 and 2009, with a decrease in the 2000-2018 sub-period. The average volume of agricultural exports over the study period was 351.99 tonnes. A positive annual average growth rate in the volume of agricultural exports was recoded between 1980 and 2009, but a negative growth rate was recorded during the 2010-2018 sub-period. Average annual growth rate in the volume of agricultural exports ranged from a low of 252.30 tonnes in the 1980-1989 sub-period and highest of 407.36 tonnes in the 2010-2018 sub-period. The overall growth rate in the volume of agricultural exports for the period covered by the study was 10.85 percent . There was a high degree of instability in the volume of agricultural exports with the coefficients of variation ranging from 9.41 percent to 44.75 percent, with an average of 36.48 percent over the study period.

Table 1: Trends in volume of agricultural exports (tonnes) in Nigeria (1980-2018)

Sub-period	Average volume ('000 tonnes) per annum	Annual Percent growth	Coefficients of variation
1980-89	252.30	+0.18	44.75
1990-99	353.33	-13.35	38.92
2000-09	405.98	-6.71	33.01
2010-18	407.36	+38.34	9.41
All Period	**351.99**	**-3.00**	**36.48**

Source: Computed from CBN, NBS and FAOSTAT, 2019.

Trend in the Commercial Bank Credit to the Agricultural Sector

Table 2 and Figure 2 depict the trend in the volume of commercial bank credit to the agricultural sector between 1980 and 2018. The table reveals a steady increase in the average volume of commercial bank credit to the agricultural sector during the study period. The average volume of commercial bank credit to the agricultural sector ranged from a low of ₦1590.49 million in the 1980-1989 sub-period to a high of ₦241809.10 million in the 2010-2018 sub-period, with an average of ₦80162.45 million over the study period. The average growth rate of commercial bank credit to the agricultural sector was positive between 1980 and 2009, while a negative growth rate in commercial bank credit to the agricultural sector was recorded between 2010 and 2018, with an

overall average growth rate of 19.76 percent over the study period, implying that commercial banks increases their credit to the agricultural sector annually by 19.76 percent. There is a high degree of instability in the commercial bank credit to the agricultural sector, with the coefficients of variation ranging between 22.32 percent and 66.91 percent, with a mean of 123.70 percent.

Table 2: Trends in volume of commercial banks credit to agricultural sector in Nigeria (1980-2018)

Sub-period	Average credit (‘₦ million) per annum	Annual Percent growth	Coefficients of variation
1980-89	1590.49	+25.00	66.91
1990-99	18942.80	+27.88	60.00
2000-09	74472.10	+25.97	53.79
2010-18	241809.10	-2.00	22.32
All Period	**80162.45**	**+19.76**	**123.70**

Source: Computed from CBN, NBS and FAOSTAT, 2019.

Trend in the contribution of the agricultural exports (‘000 USSD)

This sub- section presents the result of the trend in the contribution of agricultural exports to economic growth in Nigeria for the period under study.

Table 3 shows the trend in the contribution of agricultural exports to GDP (economic growth) in Nigeria. As shown in the table, there was a decreasing trend in the contribution of agricultural exports to GDP in Nigeria. The contribution of agricultural exports to economic growth decreased from 13.24 percent to 12.84 percent, 1.79 percent and 0.49 percent, in the 1980-1989, 1990-1999, 2000-2009 and 2010-2018 sub- periods respectively.. The highest contribution of agricultural exports to GDP was recorded in the 1980-89 sub-period, while the lowest contribution was recorded in the 2010-18 sub-period. The all period contribution of agricultural exports to GDP stands at 7.09 percent.

In general, the contribution of agricultural exports to GDP decreased progressively during the study period.

Table 3. Trend in the contribution of the agricultural exports to the GDP (economic growth) in Nigeria

Sub-period	Average value of export (‘000 USSD)	Average GDP (‘000 USSD)	Contribution to Economic growth (Percentage)
1980-89	252.38	1905.59	13.24
1990-99	358.33	2752.33	12.84

2000-09	405.98	22747.39	1.79
2010-18	407.36	83907.23	0.49
All Period	**356.01**	**27578.14**	**7.09**

Source: Computed from CBN, NBS and FAOSTAT, 2019.

Unit Root Test

A major consideration in time series analysis is the presence or absence of a unit root that is whether a time series is stationary or not. Using a non-stationary (time series data with a unit root) in regression analysis will yield spurious results, which is unsuitable for statistical inference. It is therefore imperative that time series data must be stationary before it can be used in regression analysis for the results to be suitable for statistical inference and policy formulation.

Unit Root Test for Variables of the Study (Original Values)

Results of unit root test of the variables of the model using the Augmented Dickey Fuller (ADF) test in Table 4 reveals the presence of unit root (non-stationary) in the original values of the model, since the ADF statistics are less than the critical values at 1%, 5% and10% respectively; hence the null hypothesis of no unit root is rejected. Therefore, the series cannot be used for regression analysis in their original values, because the results will be spurious

Table 4: Result of ADF Unit Root for Variables (Original values)

Variables	ADF value	Mackinnon critical	values	Decision
		1%	5%	10%	
lnY	-3.02	-3.67	-2.97	-2.62	Non-stationary
lnX_1	-1.84	-3.67	-2.97	-2.62	Non-stationary
lnX_2	-2.30	-3.75	-3.00	-2.63	Non-stationary
lnX_3	-2.11	-3.75	-3.00	-2.63	Non-stationary
lnX_4	-3.13	-3.75	-3.00	-2.63	Non-stationary
lnX_5	-3.47	-3.75	-3.00	-2.63	Non-stationary

Source: Author Computation 2019

Unit Root Test for Variables of the Study (First Difference)

Table 5 shows the results of ADF unit root test of the first difference of the variables of the model. From the table, the ADF statistics is greater than the critical values at 1%, 5% and10% respectively; hence the null hypothesis of no unit root is accepted. Therefore, the series is stationary at the first difference and can be used for regression analysis in their first difference form, because the results will not be spurious.

Table 5: Result of ADF Unit Root for Variables (First difference values)

Variables	ADF value	Mackinnon critical values			Decision
		1%	5%	10%	
dlnY	-7.63	-3.68	-2.97	-2.62	I(1)
dlnX_1	-5.03	-3.68	-2.97	-2.62	I(1)
dlnX_2	-4.45	-3.68	-2.97	-2.62	I(1)
dlnX_3	-5.02	-3.68	-2.97	-2.62	I(1)
dlnX_4	-6.10	-3.68	-2.97	-2.62	I(1)
dlnX_5	-4.62	-3.68	-2.97	-2.62	I(1)

Source: Author Computation 2019

Lag length selection

The lag selection-order criteria for the variables of the study are shown in Table 6. From the table, based on AIC criterion a lag order of 4 is recommended for co-integration and vector error correction model regression analysis.

Table 6: Selection-order criteria for lag length of the variable

Lag	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	-1196.91	-	-	-	2.9e+22	68.74	68.83	69.00
1	-1062.96	267.90	36	0.000	1.1e+20	63.14	63.78	65.01
2	-1024.46	76.99	36	0.000	1.2e+20	62.99	64.19	66.46
3	-975.32	98.28	36	0.000	9.5e+19*	62.25	63.99	67.31
4	-919.22	112.20*	36	0.000	1.2e+20	61.10*	63.40	67.76

Endogenous: Y, lnX_1, lnX_2, lnX_3, lnX_4, lnX_5

Exogenous: _cons

Source: Author Computation 2019.

Co-integration Test

Results of Johansen test of co-integration among the variables of the model is presented in Table 7. Results in the table reveals that there 4 co-integrating equations among the variables of the model; showing a long run relationship among the variables of the model, which satisfies the condition for Vector Error Correction Model (VECM) analysis.

Table 7: Result of Johansen tests for co-integration

Maximum rank	Parms	LL	Eigen value	Trace statistics	5% critical value
0	114	-1008.17	-	177.90	94.15
1	125	-972.31	0.87	106.18	68.52
2	134	-946.87	0.77	55.31	47.21
3	141	-931.11	0.57	25.39*	29.68
4	146	-921.77	0.44	5.12	15.41
5	149	-919.58	0.12	0.74	3.76
6.	150	-919.22	0.02		

Source: Author Computation 2019.

Results of Short Run Vector Error Correction Model Regression Analysis

The short run results of VECM regression analysis is presented in Table 8. The table reveals that the error correction factor (-1.319) is negative and statistically significant at 1% level which satisfies the apriori expectation. The result implies that the speed of adjustment of the model to equilibrium if shocked is 131.90%. The R^2 is 0.896, Chi square is value (103.57) is statistically significant at 1% level, showing that the model has good fit.

From the table, the coefficients of credit to the agricultural sector (X_1) and exchange rate (X_2) are positive and statistically significant at 1% and 10% respectively. This shows that there is positive relationship between credit to the agricultural sector (X_1), exchange rate (X_2) and volume of agricultural exports in the short run.

Table 8: Short Run Vector Error Correction Model Regression Analysis Results

Variables	**Coefficient**	**Standard error**	**z-value**	**p-value**
ce_1	-1.319	0.459	-2.88	0.004*
Volume of agricultural exports (Y)	0.306	0.344	0.89	0.373
Credit to the agricultural sector (X_1)	0.004	0.001	3.67	0.000*
Exchange rate (X_2)	3.119	1.792	1.74	0.082***
Ratio of export prices to producer prices (X_3)	-12.461	13.333	-0.95	0.343
Inflation rate (X_4)	2.605	4.115	0.63	0.527
Interest rate (X_5)	-17.190	17.863	-0.96	0.336
Constant	0.300	5.810	0.05	0.959
R^2	0.896			
Chi-square	103.57*			
p-value	0.000			
AIC	61.31			

*mean significant at 1% level ***mean significant at 10% level.

Results of Long Run Vector Error Correction Model Regression Analysis

Long run results of VECM regression analysis is presented in Table 9. The results reveals that the positive and significant relationship between volume of agricultural exports, exchange rate (X_2) and inflation rate (X_4) in the long run.

However, there is negative and significant relationship between volume of agricultural exports, ratio of export prices to producer prices (X_3) and Interest rate (X_5) in the long run.

In summary, exchange rate (X_2) and inflation rate (X_4) positively affects volume of agricultural exports, while ratio of export prices to producer prices (X_3) and interest rate (X_5) negatively affects volume of agricultural exports in the long run.

Table 9: Long Run Vector Error Correction Model Regression Analysis Results

Variables	Coefficient	Standard error	z-value	p-value
Volume of agricultural exports (Y)	1	-	-	-
Credit to the agricultural sector (X_1)	0.000	0.000	-1.42	0.157
Exchange rate (X_2)	-4.831	0.793	-6.09	0.000*
Ratio of export prices to producer prices (X_3)	54.378	6.277	8.6	0.000*
Inflation rate (X_4)	-16.246	2.679	-6.06	0.000*
Interest rate (X_5)	46.358	8.181	5.67	0.000*
Constant	-1197.191	-	-	-

*mean significant at 1% level

CONCLUSION

From the findings of the study, it can be concluded that credit to the agricultural sector and exchange rate have a positive effect on the volume of agricultural exports in the short run, while exchange rate and inflation rate positively affects, and ratio of export prices to producer prices and interest rate negatively affects volume of agricultural exports in the long run respectively. Based on the findings of this study, it is the therefore recommended that policy focus should be formulated to encourage commercial banks to increase credits to the agricultural sector a low interest rate. There should be effective and efficient monetary policies that will monitor exchange and inflation rate in order to promote agricultural export earnings. Also, bridging the gap between producer prices and world prices of agricultural export commodities will stimulate improved agricultural export supply.

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