

Effect of Commercial Bank Credits on the Performance of Agricultural and Manufacturing Sectors in Nigeria; 1986-2016

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Abstract: Nigerian economy is a multi-sector economy with agricultural and manufacturing sectors as the prime sectors. This study focused on the effect of commercial bank credits on the output of agricultural and manufacturing sectors in Nigeria. It spanned for the period of 31 years (1986-2016) and made use of secondary data extracted from the Central Bank of Nigeria Statistical (CBN) Bulletin for various years. The study adopted ex-post facto research design and employed the Autoregressive Distributed Lag (ARDL) bound test and Ordinary least squares multiple regression analysis considering necessary diagnostic tests such as unit root test, test of normality, heteroskedasticity test, and cointegration test. The findings revealed that commercial bank credits have significant positive effect on the productivity of agricultural and manufacturing sectors in Nigeria. The implication of the findings is that more credits to agriculture and manufacturing sectors in Nigeria will increase output in the respective sectors. Hence, the researcher recommended among others more lending to agricultural and manufacturing sectors so as to boost productivity of these sectors.

Keywords: Bank Credits; Agricultural sector output; Manufacturing Sector output.

INTRODUCTION

Nigerian economy is a multi-sector economy with agricultural and manufacturing sectors playing the key role in the development of the economy. The manufacturing sector is responsible for productions of goods and services through combined utilization of raw materials and other factors of production such as labour force, land and capital or by means of production processes. It plays a catalytic role in the modern economy with dynamic benefits crucial for economic transformation. In a typical advanced country, the manufacturing sector is a leading sector in many respects, being an avenue for increasing productivity related to import replacement and export expansion, creating foreign exchange earning capacity and raising employment and per capita income which causes unique consumption patterns. On the other hand, agricultural sector ensures self-sufficiency in food and raw materials for the industrial sector and as well provides gainful employment for the teeming population. It also generates foreign exchange for the economy. Since, agriculture is also both labour and capital intensive venture and is associated with unsystematic risk [1, 2], it requires huge capital outlay and banks stand the best position to provide the needed finance.

Commercial bank credits are loans and advances given by the banking sector to the various economic agents. The credits according to Udih [3] are expected to impact positively on the investible sectors of the economy through improved agricultural production of goods and services as this will not only promote food security, but as well enhance the entrepreneurship performance of our young investors.

In spite of government's continuous policy and strategies to attract credits to the manufacturing sector, most Nigeria manufacturing enterprises have remained unattractive for bank credits. Thus, this study sets to determine the effect of commercial bank credits on the performance of agricultural and manufacturing sectors in Nigeria.

REVIEW OF EMPIRICAL LITERATURE

Ogar, Nkamare and Effiong [4] examined commercial bank credit and its contributions on manufacturing sector in Nigeria for the period of 1992-2011. The methodology adopted was Ordinary Least Squares (OLS) multiple regression analysis while the findings revealed that commercial bank credit has a significant relationship with output of manufacturing sector in Nigeria.

Agunuwa, Inaya and Proso [5] examined the impact of commercial banks' credit on agricultural productivity in Nigeria. The authors used annual time series data for the period of 1980-2013. They employed Ordinary Least Squares (OLS) multiple regression analysis and found a significant positive relationship between commercial banks credit and agricultural productivity in Nigeria.

Nnamocha and Eke [6] investigated the effect of bank credit on Agricultural Output in Nigeria using annual time series data for the period of 1970-2013. The researchers adopted Ordinary Least Squares (OLS) regression techniques and Error Correction Mode (ECM) procedures and found out that in the long-run, bank credit and industrial output contributed a lot to agricultural output in Nigeria, while; only industrial output influenced agricultural output in the short-run.

Ogbanje, Yahaya and Kolawole [7] examined the effect of commercial banks loan on the agricultural sector in Nigeria from 1981 to 2007. The study employed descriptive statistics and Ordinary Least Squares (OLS) regression analysis. The findings revealed that commercial banks' loan positively affect agricultural GDP in Nigeria.

Udoka, Mbat and Stephen [8] examined the effects of commercial banks credit on Agricultural production in Nigeria. The study used a sample period from 1970-2014. The methodology employed was Ordinary Least Squares (OLS) regression analysis, and the findings revealed that commercial banks' credit exert a significant effect on agricultural productivity in Nigeria.

Enyim, Ewno and Okoro [9] analyzed banking sector credit and performance of the agricultural sector in Nigeria. The study applied Ordinary least squares regression techniques comprising unit root test, co-integration test, Error correction model and Grange causality test. The findings revealed that commercial banks' credit to the agricultural sector exert a positive but non-significant effect on the productivity of agricultural sector in Nigeria.

Ebele and Iorember [10] empirically examined the effect of commercial bank credit on the manufacturing sector output in Nigeria from 1980 to 2015. The study used five variables of manufacturing sector output, inflation rate, interest rate, loans and advances and broad money supply and employed the Cochrane-Orcutt analytical tool. The findings revealed that inflation rate and interest rate have negative effect on manufacturing sector output while loans and advances and broad money supply have positive effect on the manufacturing sector output in Nigeria. However, the authors suggested that policies which aim at reducing both inflation and interest rates on one hand and on the other hand, increasing both loans and advances as well as broad money supply be formulated and implemented so as to enhance improvement in the sector's output.

Abbas, Jiang, Jam, and Shahbaz [11] used a secondary data from 1996 to 2015 and analyzed impact of formal credit on agricultural output in Pakistan. The authors employed Ordinary least squares (OLS) techniques testing for stationarity of the data set, the Johansen Co-integration test for existence of long run relationship between formal credit and agricultural output. The findings revealed that formal credit has a significant positive impact on the agricultural output in Pakistan. The authors therefore, suggested among others that government of Pakistan should support small farmers through credit schemes on affordable interest rate since this will aid in raising agricultural productivity and the standard of living of the farmers.

Chisasa and Makina [12] empirically examined the impact of bank credit on agricultural output in South Africa using the Cobb-Douglas production function. The authors utilized time series data of agricultural output, bank credit, capital accumulation, labour and rainfall from 1970 – 2009. They employed ordinary least squares (OLS) estimates of the Cobb-Douglas production function and found out that bank credit has a positive and significant impact on agricultural output in South Africa.

Bada [13] examined the effect of banks' credit on agricultural and manufacturing outputs on the Nigerian economy. It covers the periods of thirty-one (31) years (1984-2014). The study employed annual time series data covering the period 1984 -2014. Data for the study was obtained from Central Bank of Nigeria's (CBN) Statistical Bulletin and CBN Annual Report and Nigeria Bureau of Statistics (NBS). The methodology employed was Vector Auto-regressive models considering some diagnostic tests such as Unit root test; Co-integration test; Vector error correction test; and Causality test. The findings revealed that banks' credits have significant impact on the agricultural and manufacturing sectors in Nigeria.

Chris, Mbat and Stephen [14] examined the effect of commercial banks' credit on agricultural output in Nigeria. The authors used ordinary least squares regression technique and found a positive and significant relationship between agricultural credit guarantee scheme fund and agricultural production in Nigeria. This means that an increase in agricultural credit guarantee scheme fund could lead to an increase in agricultural production in Nigeria; the findings also

revealed a positive and significant relationship between commercial banks credit to the agricultural sector and agricultural production in Nigeria. This result signified that an increase in commercial banks credit to agricultural sector led to an increase in agricultural production in Nigeria. Again, there was a positive and significant relationship between government expenditure on agriculture and agricultural production in Nigeria and a negative relationship between interest rate and agricultural output. This is because an increase in the rate of interest charged to farmers for funds borrowed discouraged many farmers from borrowing and thus less agricultural investments.

Kalu, Obasikene, Oleka, Nwadike, and Okoyeuzu [15] examined the relative impact of Bank credit on the manufacturing sector in Nigeria' 1986-2013. The study adopted the autoregressive distributed lag (ARDL) bound cointegration test approach and error correction representations. Focusing on the short run relationship, the authors found every explanatory variable and their following lags as significant functions of volume of output of the manufacturing sector at 5% except exchange rate and its lags. In the bound test following the ARDL, the study provided evidence in favour of cointegration among the variables regardless of whether they are stationary or not given that the observed test statistic exceeds the upper critical band. Our results imply the presence of co integrating vectors of long run equilibrium relationships among the variables of interest. The result which was also corroborated by the Dynamic ordinary least squares results as well as the long run estimates of the ARDL provided evidence of a certain return to the long-run equilibrium in the model.

Using annual time series data obtained from Central Bank of Nigeria, Ali, Jatau and Ekpe [16] examined the impact of deposit money banks' credit on agricultural output in Nigeria from 1981 to 2014. The authors employed the ordinary least square regression analysis performing unit root test for data stationarity, while Variance Inflation Factor (VIF) and Heteroskedasticity test for data diagnosis. The result proved that deposit money banks' credit positively and significantly affect agricultural output while Deposit Money Banks' lending rate (DMBLR) has an inverse and insignificant impact on Agricultural output (AQ) in Nigeria. The authors thus, concluded that Deposit Money banks' credit is a viable source of finance for sustainable growth in the agricultural sector and recommended that Deposit Money banks' among other things should increase the volume of credit facilities to the agricultural sector to sustain food production for the teeming population of Nigeria.

Olorunsola, Adeyemi, Valli, Kufre and Ochoche [17] investigated the relationship between credit to agriculture and agricultural output in Nigeria by means of non-linear autoregressive distributed lag (NARDL) model using a time series data from 1992Q1 to 2015Q4. Results showed no evidence of asymmetry in the impact of credit to output growth in the agricultural sector (positive and negative changes) in the short-run, but different equilibrium relationships exist in the long-run. The dynamic adjustments show that the cumulative agricultural output growth is mostly attracted by the impact of the positive changes in credit to agriculture with a lag of four quarters of the prediction horizon. This calls for the need for a policy on moratorium on credit administration to agricultural sector.

METHODOLOGY

This study adopted *ex-post facto* research design. Annual time series data for the periods of 31 years (1986-2016) were extracted from Central Bank of Nigeria (CBN) statistical bulletin. Descriptive statistics, Augmented Dickey-Fuller (ADF) test of stationarity, and other higher diagnostic tests were performed on the variables under study so as to avoid running a spurious regression and in order to be able to make a meaningful conclusion. Autoregressive Distributed Lag (ARDL) bound test and Ordinary Least Squares (OLS) multiple regression analysis were used to test the research hypotheses. Decisions were based on a 5% level of significance. Commercial bank credits to agricultural and manufacturing sectors were used as independent variables while output of agricultural and manufacturing sectors stood as dependent variables.

The fundamental ARDL model used for the study was that with p-lags of Y and r-lags of X as developed and popularized by Pesaran, Shin, and Smith [18]. It is specified thus:

$$Y_t = \alpha + \beta_1 Y_{t-1} + \dots + \beta_p Y_{t-p} + \gamma_1 X_{t-1} + \dots + \gamma_r X_{t-r} + \mu_t \dots \dots \dots (3.1)$$

Where,

- Y_t = Dependent or Response variable at time t,
- Y_{t-1} = Dependent or Response variable at time lag 1,
- X_{t-1} = Independent or Explanatory variable at time lag 1,
- β_0 = Constant
- $\beta_1, \beta_2, \dots, \beta_k$ = Regression parameters or coefficients of the regression estimates.
- ε_t = Error term

Substituting with the study variables,

$$OAS_t = \beta_0 + \beta_1 CBCA_{t-1} + \beta_2 REXR_{t-1} + \sum \nabla OAS_{t-p} + \sum \nabla CBCA_{t-q} + \sum \nabla REXR_{t-r} + \mu_t, \dots (1)$$

Where,

- OAS_t = Output of Agricultural sector at time t, (Dependent variable).
- $CBCA_t$ = Commercial bank credits to agricultural sector at time t, (Independent variable).
- $REXR_t$ = Real Exchange Rate at time t, (moderating variable)
- β_0 = Constant
- β_1 is the regression coefficient or the coefficient of CBCA in the equation.
- β_2 is the coefficient of REXR in the equation.
- μ_t = Random error associated with the models.

On the other hand, the multiple regression model was as specified by Wooldridge [19]

$$Y_t = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \mu_t, \dots (3.2)$$

Where,

- Y_t = Dependent or Response variable
- X_1, X_2, \dots, X_k = Independent or Explanatory variables.
- β_0 = Constant
- $\beta_1, \beta_2, \dots, \beta_k$ = Regression parameters or coefficients of the regression estimates.
- ϵ_t = Error term

Such that,

$$OMS_t = \beta_0 + \beta_1 CBCM_t + \beta_2 REXR_t + \mu_t, \dots (2)$$

Where,

- OMS_t = Output of Manufacturing sector at time t, (Dependent variable).
- $CBCM_t$ = Commercial bank credits to manufacturing sector at time t, (Independent variable).
- β_0 = Constant
- $REXR_t$ = Real Exchange Rate at time t, (moderating variable)
- β_0 = Constant
- β_1 is the regression coefficient or the coefficient of CBCM in the equation.
- β_2 is the coefficient of REXR in the equation.
- μ_t = Random error associated with the model.

RESULTS AND INTERPRETATION

Description of Variables

The variables used in the study were described in terms of mean, standard deviation, skewness, kurtosis, and Jarque-Bera goodness-of-fit test.

Table-1: Descriptive statistics of the variables under study

Variables	Mean	Std. Dev.	Skewness	Kurtosis	Prob (J-B)
CBCA	109.18	145.38	1.54	4.06	0.0010
CBCM	472.58	588.23	1.27	3.58	0.0122
OAS	6048.68	6887.22	0.90	2.40	0.0990
OMS	2237.53	2808.27	1.42	3.75	0.0037
REXR	88.83	70.29	0.21	2.00	0.4656

Source: Author's computation from E-views 9 output

The descriptive statistics result in table 1 above indicates that all the variables are positively skewed with excess kurtosis in CBCA, CBCM, and OMS ($k > 3.0$). The CBCA stood at average of ₦109.18 billion with a standard deviation of ₦145.38 billion; the CBCM stood at average of ₦472.58 billion with a standard deviation of ₦588.23 billion; the OAS stood at average of ₦6048.68 billion with a standard deviation of ₦6887.22 billion; while the OMS stood at average of ₦2237.53 billion with a standard deviation of ₦2808.27 billion for the period of review. The exchange rate stood at average value of ₦88.83 per US dollar with associated standard deviation of ₦70.29 per US dollar. These measures of standard deviations indicate that the variables are volatile and hence, cannot be accurately relied upon for prediction. The Jarque-Bera (J-B) statistics indicates that output of agricultural sector (OAS) and real exchange rate (REXR) follow a

normal distribution within the period, while the rest series of the dataset are not normally distributed. This therefore motivates for stationarity test as presented in table-2 below.

Table-2: Summary of ADF unit root test

Variable	ADF-Stat	Levels of Critical Values			p-value	Stationarity O(I)
		1%	5%	10%		
LNCBCA	-6.171	-3.679*	-2.968**	-2.623***	0.0000	I(1)
LNCBCM	-4.567	-4.356*	-3.595**	-3.233***	0.0062	I(1)
LNOAS	-3.047	-3.670	-2.964**	-2.621***	0.0419	I(0)
LNOMS	-3.038	-3.679	-2.968**	-2.623***	0.0431	I(1)
LNREXR	-5.471	-3.679*	-2.968**	-2.623***	0.0001	I(1)

*, **, *** Indicates stationary at 1%, 5%, and 10% level of significance; LN = log

Source: Author's computation from E-views 9 output

The stationarity test result in table 2 shows that the ADF-stats of LNCBCA, LNCBCM, LNOMS, and LNREXR were more negative than the critical values at first differencing, hence, they are said to be integrated of order one (i.e., I(1)) while the ADF-stat of LNOAS was more negative than the critical values at level form (i.e., I(0)), hence, integrated of order zero. The researcher therefore employed Autoregressive Distributed Lag (ARDL) model to validate hypothesis one and Ordinary least squares multiple regression analysis in hypothesis two.

Table-3: Results of higher Diagnostic Test

J-B test (prob.)	B-P-G HET test (prob.)	R-sqr (Adj)	D-W stat.
0.184 (0.9122)	1.566 (0.2043)	0.997	1.518037

Source: Author's compilation

The Jarque-Bera statistic value of 0.184 and associated probability value of 0.9122 > 0.05 indicates that the residuals of the estimates follow a normal distribution. While the Breusch-Pagan-Godfrey heteroscedasticity F-statistic value of 1.566 with p-value of 0.2043 > 0.05 indicates that the variances are equal (homogeneous).

The Adjusted R-squared result shows that the model is a good one as the explanatory variables could explain about 99.7% of the total variations in the response variable. While the Durbin-Watson statistic value of 1.518037 which is closer to 2 than to zero indicates that there is no first order autocorrelation in the model

Table-4: Result of ARDL estimates

Dependent Variable: LNOAS				
Model selection method: Akaike info criterion (AIC)				
Selected Model: ARDL(3, 0, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNOAS(-1)	0.688379	0.231799	2.969720	0.0090
LNOAS(-2)	-0.261648	0.203437	-1.286134	0.2167
LNOAS(-3)	0.278671	0.159616	1.745890	0.1000
LNCBCA	0.203066	0.089749	2.262606	0.0379
LNREXR	-0.046250	0.078503	-0.589152	0.5640
LNREXR(-1)	0.011757	0.090737	0.129570	0.8985
LNREXR(-2)	0.115438	0.090725	1.272393	0.2214
LNREXR(-3)	0.365778	0.097588	3.748182	0.0018
LNREXR(-4)	-0.160250	0.103033	-1.555336	0.1394
C	1.014520	0.401993	2.523725	0.0226
@TREND	-0.024115	0.019101	-1.262497	0.2249
F-statistic = 771.4127; Prob(F-statistic) = 0.000000				
*Note: p-values and any subsequent tests do not account for model selection.				

Source: Author's computation using E-views 9

The ARDL result in table-4 shows that commercial bank credits to agricultural sector (LNCBCA) with a coefficient value of 0.2031 and associated probability value of 0.0379 < 0.05 has a short run significant positive effect on the productivity of agricultural sector in Nigeria. The negative trend indicates that agricultural sector is declining in Nigeria.

Table-5: Result of ARDL bound test results

Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	k
F-statistic	1.185560	2
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	4.19	5.06
5%	4.87	5.85
2.5%	5.79	6.59
1%	6.34	7.52

Source: Author's extract from E-views 9 output

The ARDL bound test with F-statistic = 1.186 < lower bounds shows that there is no long run relationship between output of agricultural sector and commercial bank credits in Nigeria.

Table-6: Ordinary Least Squares (OLS) Result

<i>LNOMS</i>	=	2.595	+	0.766	<i>LNCBCM</i>	+	0.092	<i>LNREXR</i>
<i>SE</i>	=	(0.223)		(0.063)				(0.079)
<i>t*</i>	=	[11.656]		[12.207]				[1.157]
Probability	=			0.0000				0.2578
Adj-R ²	=	0.994 (99.4%)						
F-statistic	=	1227.057						Prob (F-statistic) = 0.00000
D-W stat.	=	1.587134						

Source: Author's extract from E-views 9 output

The empirical result above shows that with exchange rate as a control variable in the model, commercial bank credits to manufacturing sector (LNCBCM) with a coefficient value of 0.766 and associated probability value of 0.0000 < 0.05 has a positive and significant effect on the output of manufacturing sector in Nigeria. The exchange rate though used as moderating variable has positive and non-significant influence on the output of manufacturing sector in Nigeria.

The Adjusted R² value of 0.994(99.4%) indicates that the model is a good one while the Durbin-Watson (D-W) statistic value of 1.587134 which is closer to 2 than to zero indicates that there is no first order serial correlation in the model.

CONCLUSION AND RECOMMENDATIONS

The findings of the study revealed that commercial bank credits to agricultural sector has a short run significant positive effect on the productivity of agricultural sector in Nigeria while bank credits to manufacturing sector has a significant positive effect on the output of manufacturing sector in Nigeria. Based on the findings, it is recommended that:

- Commercial banks in Nigeria should be encouraged to extend more credits to the agricultural and manufacturing sectors since this helps to increase the productivity of these sectors and as well enable the manufacturing and agricultural sectors to operate at their full capacity and optimize output.
- Low lending/interest rates should be maintained by the commercial banks in Nigeria so as to attract more borrowing to the manufacturing and agricultural sectors which in turn will encourage sustainable growth of the economy.
- The government through its relevant authorities should hold unto her policies that will make commercial banks in Nigeria extend more credits to the agricultural and manufacturing sectors for massive development of the economy as well as job creation for the teeming population. More so, since there is target to meet the millennium developmental goals and objectives, Nigeria should patronize products and services produced within her boundaries, hence the need to encourage the manufacturing and agricultural sectors. This will also bring about favourable balance of payments and favourable terms of trade which are among the fundamentals for economic growth and development in the 21st century.

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