Effect of Commercial Banks' Credit on Agricultural Productivity in Nigeria

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Abstract: The study investigated the effect of commercial bank on real sector development in Nigeria over a period of 37 years (1981-2017). Data on commercial bank credit to Agricultural sector, interest rate, Agricultural credit guarantee scheme and Agricultural productivity were sourced from Central Bank of Nigeria Statistical Bulletin. ADF unit root test, Johansen cointegration test and error correction model techniques where employed as analytical tools. The result showed that there exists a long-run relationship between the bank credit and Agricultural development in Nigeria. The study found that the ECM is negative and statistically significant at 5% level of significance. The study also found that commercial banks' credit to Agriculture and Agricultural credit guarantee scheme are positively related to Agricultural development while interest rate was found to be negatively related to Agricultural development in Nigeria. The study concluded that commercial bank significantly affect Agricultural development in Nigeria and suggested that delay and stringent conditions in assessing commercial bank credit and facility should be completely eliminated.

Keywords: Commercial Bank; Credit; Agricultural Productivity

JEL Classification: O4; Q1

1. Introduction

Commercial bank is described as a financial institution owned privately for receiving deposit from bank customers, keeping them and transforming it into loan for the borrower of fund (Solanke, 2007). Banks have number of functions which are not limited to providing investment advisory services, foreign exchange services, issuing of traveler's cheque to customers and standing as guarantor for its customer. This services provided by the banks goes a long way to influence income levels and citizens standards of living (Zhufany, 2014). Globally, banking sector has been acknowledged as the catalyst of growth and development of a nation. The intermediation role of a bank is incomplete until the resources mobilized from the surplus unit are made available to the deficit unit for productive investment activities. The commercial bank through its credit policy act as an engine that promotes growth

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in various sectors of the economy by channeling resources to real sector (Akpansung & Gidigbi, 2014).

Bank loans and advances are essential instrument for the advancement of any country. This implies that the duration and amount of loan facilities to the real sector determine the extent of growth and advancement of a nation. Banks operationally aimed at advancing credit to the real sector but irrespective of the loan disbursed to the real sector the returns from these sectors have been discouraging considering the amount of fund channeled and supplied (Akinleye, Akanji & Oladoja, 2013 cited in Sogules & Nkoro, 2016). Udih (2014) noted that bank loans and advance is expected to influence the Agricultural sector through Agricultural produce. He elucidates further that when agricultural project is solely funded by banks, it will in turn result to surplus food supply and also attract new investors into the system. Hence, if sufficient loan facilities is put place by banks and government, bulky and weighty agricultural productivity that can promote welfare of the citizen can be assured. Hitherto, the limitation facing the banks financial sector in Nigeria is how to adequately channel resources to the real sector. Since Nigeria is not only blessed with oil mineral resources but also with agriculture produce, proper funding of Agriculture and Manufacturing sectors should be prioritised in an effort to add up to the revenue generated through oil sector (Salami & Arawomo, 2013).

Obilor (2013) noted that deposit money banks favour credit and advances to other sector other than Agricultural sector, as a result, banks charges farmers with high interest rate knowing full well that farmers will not be able to meet up. However, federal government through Agricultural Credit Guarantee Scheme (ACGS) aimed at closing the gap by preparing warrant versus risk in Agricultural financing. Nevertheless the aim of the scheme was unaccomplished. Consequently, Itodo, Apeh and Adeshima (2012) argued that Nigeria relies heavily on weighty and heavy importation of fundamental food items and raw material which simultaneously result to increase in poverty rate coupled with increasing unemployment rate. However effort by government at all levels to support and empower the Agricultural sector is yet to fully manifest (Udensi, Orebiyi, Ohajianya & Eze, 2012). Therefore, the study examined the short and long run relationship between commercial bank credit and agricultural productivity. The remaining sections of the study were sectionalized into literature review, research method, result and discussion, conclusion and recommendations.

2. Literature Review

A theoretical literature exploring the interrelationship between banking sector and economic growth relays that banking system has tendency of impacting the real sector (Agricultural and Manufacturing) development by influencing the

composition of savings and allocation of same as loans and advances to the productive sector (Bencivenga & Smith, 1991). King and Levine (1993), Beck and Levine (1998), Driscoll (2004), Bayoumi and Melander (2008), and Akpansung and Babalola (2010) affirmed the essential role of banking sector to the real sector development by mobilizing resources from the savers and allocating of such savings as loans to credit worthy customers in an attempt to promote growth and sustainability of the economy. Udih (2014) opined that if financial resources were adequately made available to the Agricultural sector by banks it will not only cure food scarcity but also attract new and existing investors into the economy thereby creating room for employment.

According to Ijaiya and Abdulraheem (2000), credit is a financial resource that is obtainable from financial institution within a specified period of time based on agreed terms with the promising of paying back as and when due. Osuntogun and Adewunmi (2003) viewed agricultural credit as the aggregation of agreement where cash and kind contributions are visibly made available to farmers with the obligation of paying back with interest at a later date in future. Kolapo, Ayeni and Oke (2012) and Mohammed (2012) disclosed that the intermediation role played by bank sector can be said to be a catalyst for economic growth and development based on the premise that banks collect savings and resources from individual, entities, government and corporate bodies as investment funds and channel the savings to the users of resources for investment activities. This implies that the rate at which banks advance financial resources to the real sector determines the pace of a nation's economic growth.

Makinde (2016) examined the impact of deposit money banks' loan and advances on the growth of mining and quarrying, manufacturing and the building and constructions sectors, service sector and agriculture sectors from 1986 to 2014. By employing regression analysis, the study found that unlike mining and quarrying, manufacturing and the building and constructions sectors and service sector which have benefited in a little way from the deposit money banks credit, it has significant positive effect on agricultural sector, implying that agricultural sector has benefited from the funds thereby driving economic growth of Nigeria. Oleka, Sabina and Onyeze (2014) explored the impact of intermediation roles of banks on the performance of the manufacturing sector in Nigeria for the period of 8 year covering 2005-2013. Descriptive and inferential statistics results showed that the intermediation process of commercial bank positively contributed to real sector. The study concluded that there is competitiveness in the intermediation role of banks. Ajibola, Ishola and Samuel (2014) discussed the effect of commercial bank lending on Nigeria's aggregate economic growth for the period 1970-2011. The study concluded through regression analysis that previous term's credit to service sector positively influenced the growth of Nigeria whereas lagged and current loan and advances to other sectors related negatively with growth of Nigerian economy.

Nnamocha and Charles (2015) employed error correction mechanism to study the influence that bank loan and advances have on agricultural production in Nigeria between 1970 and 2013. Revelation from the study indicated that there existed presence of longrun relationship among the variables. The study revealed that bank loans and advances and industrial output positively contributed to agricultural output in Nigeria on the long run while industrial output was only found to affect agricultural production in the short-run. Adewole, Adekanmi and Gabriel (2015) investigated sectoral distribution of commercial banks' loans and advances to agricultural sector, liquidity ratio, cash reserve ratios and money market minimum rediscount rates from for the period of 2002-2014 in Nigeria. The study applied multiple regression of ordinary least square and discovered that cash reserve requirement, liquidity ratio and discount rate have no significant effect in financing agricultural sector. Hence, the study concluded that discount rate, liquidity ratio and cash reserve lower the degree of agricultural credit in Nigeria. Agunwa, Iyanya, and Proso (2015) evaluated the effect of deposit money banks on agricultural output in Nigeria, using least square regression estimation technique. They found that commercial banks credit and government expenditure have positive and significant influence on agricultural productivity while interest rate has negative effect on agricultural output.

Sogules and Nkoro (2016) used Johansen cointegration technique to analyze the long run relationship between bank loan and advances and performance of manufacturing sector from 1970-2013 in Nigeria. Evidence from the study showed that long run relationship existed in the model. The short run ECM showed negative significant relationship between bank loan and advances and performance of manufacturing sector. Bada (2017) employed ADF Unit root test; Co-integration test; Vector error correction test and Causality test to assess the relationship between banks' credit and real sectors for the period of 31 years covering 1984-2014. Data on manufacturing, and agricultural outputs, commercial banks' credits to private sector, interest rate, prime lending rate, M2, exchange rate, prime lending rate and agriculture credit guarantee scheme fund were sourced secondarily from CBN annual report. The study empirically disclosed that banks' credits have significant impact on Agricultural and Manufacturing sector in Nigeria.

3. Research Method

3.1. Data

The time series data used in the study were sourced from Central Bank of Nigeria Statistical Bulletin, 2017 version. The annual time series data covered a period of 37 years ranging from 1981 to 2017. Explanatory variables used are the commercial banks' credit to the agricultural sector (CBCA); interest rate on commercial banks'

credit to agriculture (INT) and agricultural credit guarantee scheme fund (ACGS) while the dependent variable is the agricultural productivity (AGP).

3.2. Model Specification

The study modified the Agunwa, Iyanya, and Proso (2015) model, stated as:

$$AGP_t = \beta_0 + \beta_1 CBCA_t + \beta_2 GEX_t + \beta_3 INTR_t + \mu_t \qquad 1$$

Where: AGP_t = Agricultural Productivity; $CBCA_t$ = Commercial banks' credit to the Agricultural sector; GEX_t= Government expenditure, $INTR_t$= Interest rate. The study replaced government expenditure with Agricultural credit guarantee scheme fund to examine the extent at which agricultural output has been impacted by the scheme. Hence, the effective model used in this study is specified as follows:

$$AGP_t = \beta_0 + \beta_1 CBCA_t + \beta_2 INTR_t + \beta_3 ACGSF_t + \mu_t \qquad 2$$

AGP_t = natural logarithm of Agricultural Productivity at time t

$CBCA_t$ = natural logarithm of time t Commercial banks' credit to Agriculture

$INTR_t$ = natural logarithm of time t Interest on banks' credit to Agriculture

$ACGSF_t$ = natural logarithm of Agricultural credit guarantee scheme fund at time t

μ_t = Stochastic error term

β_0 = constant and $\beta_1 - \beta_3$ = coefficients of independent variables; t = time series

On *a priori*, it is expected that Commercial banks' credit to the Agricultural sector; Interest rate on Commercial banks' credit to Agriculture and Agricultural credit guarantee scheme fund will positively affect Agricultural productivity.

3.3. Estimation Technique

3.3.1. Unit Root and Cointegration tests

Time series data are mostly non-stationary and to solve this problem, the study employed Augmented Dickey Fuller (ADF) unit root test and Johansen co-integration econometric tools to determine the order of integration and the longrun relationship among the variables. The Augmented Dickey Fuller (ADF) unit root test is traceable to Dickey and Fuller (1979) and it is useful to ascertain the time-series property of the variables and level of integration. It is written as:

$$\Delta Y_t = \delta_0 + \lambda Y_{t-1} + \beta_i \Delta Y_{t-1} + \varepsilon_{t1} (for\ intercept) \qquad 3$$

$$\Delta Y_t = \delta_0 + \lambda Y_{t-1} + \delta_{it} + \beta_i \Delta Y_{t-1} + \varepsilon_{t2} (for\ trend) \qquad 4$$

Y_t = Variable tested for unit root, Δ = first difference operator, n = Lag no, t = time trend, ε_t = stationary disturbance error term. The t-statistics was used to test the null hypothesis of λ_1= 0 which implies no stationarity against the alternative that $\lambda_1 < 0$.

If the series are not stationary at level i.e. 1(0), it would be differenced *d* times for it to be stationary. If it is stationary without differencing, after differencing once or twice, it is integrated of order zero 1(0), one 1(1), two 1(2) respectively. The Johansen co-integration test was used to establish the existence of cointegration can be written as:

$$LR_{trace}(r) = -(TIn\ (1 - \lambda)\ \text{the trace statistics}$$

$$LR_{trace}(r) = -(TIn\ (1 - \lambda) = LR_{trace}(r + 1)\text{the maximum eigen}$$

Computed values are compared to the critical values to determine the exact number of co-integrating equations. There are 4 variables in this study, there can be at most 9 linearly co-integrating vectors, i.e. r ≤ 9. Where r is the number of co-integrating vectors under the null hypothesis, and λ is the estimated value for the ith Eigen value from the II matrix. The rule of thumb in the statistics was that: should the t-stat be higher than the critical value, the null hypothesis will be forced to be rejected and vice-versa.

3.3.2. Error Correction Estimate

The test was administered to check the short run estimate among the variables AGP, CBCA, INT and ACGS. The significance of error correction model lies in its ability to correct spurious regression results on time series data. Hence from equation (1), the ECM was specified as:

$$AGP_t = \beta_0 + \beta_1 CBCA_{t-1} + \beta_2 INTR_{t-1} + \beta_3 ACGSF_{t-1} + \mu_t + ECM_{t-1} + \Sigma_t\ 5$$

ECM_{t-1} represents the error correction term while $t - 1$ shows that the variables were lagged by one period and Σ_t is white noise residual.

4. Results and Discussion

4.1. Descriptive Statistics

Table 1 showed that Agricultural development (AGR), commercial bank credit to Agricultural sector (CBCA), Interest rate (INT) and Agricultural credit guarantee scheme (ACGS) have mean of 2.947218, 1.330336, 1.308649 and 5.710412 respectively, with minimum of 1.231780, -0.228707, 1.000000 and 4.391903 to a maximum of 4.293074, 2.680256, 1.557387 and 7.095387 respectively. The variables also possessed a standard deviation of 1.036363, 0.863946, 0.131502 and 0.924397 with probability value of 0.203219, 0.363988, 0.210856 and 0.167138 respectively. More so, Agricultural development, commercial bank credit to Agricultural sector and interest rate variables were negatively skewed while Agricultural credit guarantee scheme was positively skewed.

Table 1. Descriptive Result

	AGR	CBCA	INT	ACGS
Mean	2.947218	1.330336	1.308649	5.710412
Median	3.127442	1.492001	1.329144	5.383526
Maximum	4.293074	2.680256	1.557387	7.095387
Minimum	1.231780	-0.228707	1.000000	4.391903
Std. Dev.	1.036363	0.863946	0.131502	0.924397
Skewness	-0.266766	-0.247396	-0.729222	0.279470
Probability	0.203219	0.363988	0.210856	0.167138

Source: Author's estimation (2019)

4.2. Unit Root Test

The result in Table 2 revealed that all the variables were stationary at 5% level and integrated of the order I(I). The confirmation of the presence of non-stationary variables in the series brought to book the possibility of spurious relationship in the short run due to the presence of random walk, and the fact that they are integrated of the same order after differencing, suggested that long run association test was imperative. Hence, co-integration test was done using Johansen maximum likelihood ratio approach.

Table 2. ADF Unit Root Test Results at First difference

Variables	ADF t-stat	Critical value	Integration	Remarks
LnAGR	-3.773122	-2.954021	I(1) **	Stationary
LnCBCA	-6.660715	-2.954021	I(1) **	Stationary
LnINT	-5.856472	-2.954021	I(1) **	Stationary
LnACGS	-5.823228	-2.954021	I(1) **	Stationary

Source: Author's estimation (2019)

Note: *(**) denotes acceptance at 1&5 percent level of significant

4.3. Johansen Co-Integration Test

Table 3a and Table 3b revealed the Trace Statistics test as well as Max-Eigen Statistics test. Meanwhile, Trace test and Max-Eigen value test revealed 1 cointegrating equation each at 5% and 1% level of significance respectively.

Table 3a. Trace Statistics Result

Hypothesized No. of CE(s)	Eigen value	Trace Statistics	5% Critical Value	Significance Level
None *	0.877509	111.6721	88.80380	0.0004
At most 1	0.676653	57.07937	63.87610	0.1634
At most 2	0.389577	27.72462	42.91525	0.6385
At most 3	0.192622	5.563057	12.51798	0.5177

Source: Author's estimation (2019)

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Table 3b. Max-Eigen Value Statistics Result

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistics	5% Critical Value	Significance Level
None *	0.839088	47.49932	33.87687	0.0007
At most 1	0.513511	18.73409	27.58434	0.4353
At most 2	0.315065	9.839222	21.13162	0.7596
At most 3	0.108781	2.994280	3.841466	0.0836

Source: Author's estimation (2019)

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Evidence from Table 4 indicated that there existed a long run cointegration in the model. Evidently, the dependent variable (i.e. Agricultural development-AGR) depicted positive long-run equilibrium alongside with commercial bank credit to Agricultural sector (CBCA) and Agricultural guarantee credit scheme (AGCS). Contrarily, interest rate was negatively related with Agricultural development in the long-run.

Table 4. Normalized Cointegrating Coefficients

1 Cointegrating Equation(s): Log likelihood 98.95650			
	LNCBCA	LNINT	LNAGCS
LNAGR	3.872892	-4.153217	4.991641
1.000000	(2.44244)	(2.46562)	(2.50387)

Source: Author's estimation (2019)

The estimated long-run model revealed that direct relationship flows among commercial bank credit to Agricultural sector, Agricultural guarantee credit scheme and Agricultural development while inverse relationship flows between interest rate and Agricultural development respectively. This implied that 1% change in the level of Commercial bank credit to Agricultural sector and Agricultural guarantee credit scheme brought about an increase of 38% and 49% respectively to output of Agricultural development. However, 1% change in interest rate (INT) brought about 41% reduction to Agricultural development within the study period.

4.4. Error Correction Results

Evidence from the error correction model depicted that the model is correctly signed and statistically significant thereby validated the presence of long run relationship in the model and that 22% of the short run inconsistencies are corrected and incorporated into the long run dynamics, annually. Furthermore, it was indicated that

GDP, CBCA,2), and AGCS,2) were positive and significant at 5%. The commercial bank credit to Agricultural sector (CBCA) indicated that a percent change in CBCA increased Agricultural development by 12%. Also, Agricultural guarantee credit scheme (AGCS) pronounced significant positive effect on Agricultural development which implied 22% increase in Agricultural development. Conversely, interest rate (INT,2) depicted an insignificant negative effect on Agricultural development by 3% decrease. More so, it was shown that the overall model is significant. The F-statistics (34.25352) is significant (p-value 0.000<0.05). R-square value of 0.9236 shows that about 92% of changes in Agricultural development can be explained by commercial bank credit to Agricultural sector, Agricultural guarantee credit scheme and interest rate. Based on the Durbin Watson Statistics, it was revealed that 2.188750 fell in the region of no serial auto-correlation which symbolized that the model is free from the presence of serial autocorrelation.

Table 5. Error Correction Model Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.804838	2.681577	6.716439	0.0000
GDP(-1)	5.119907	8.106108	6.310934	0.0000
D(CBCA,2)	1.207125	0.483980	2.494162	0.0232
D(INT,2)	-0.030192	0.061894	-0.487796	0.6319
D(AGCS,2)	0.215237	0.085447	2.518942	0.0221
ECM(-1)	-2.268753	0.228203	-9.941840	0.0000

Source: Author's estimation (2019)

R-squared = 0.923603; Adjusted R-squared = 0.896639; F-statistic = 34.25352

Prob(F-statistic) = 0.000000; Durbin-Watson stat = 2.188750

5. Discussion and Recommendations

The study examined the impact of bank credit on real sector economy in Nigeria for the period of 37 years which spanned from 1981 through 2017. The study employed Johansen cointegration technique to found long run relationship in the model. Evidence from the Error correction mechanism showed that CBCA and AGCS have greater influence in determining the level of credit in the Agricultural productivity. The implication from the study is that if commercial banks facilitate credit to Agricultural sector for strictly agricultural produce it will yield a significant effect which will enable the borrower to pay back the principal plus interest as and when due. More so, it will aid the bank to trust the borrower against next occurrences. The economic implication of this is that if Agricultural sector can access commercial bank credit as and when due for productive use, sooner than later it will help to improve the Agricultural produce and help the economy to diversify from the

dwindling crude oil. Conversely, the negative and insignificant nexus between interest rate and Agricultural productivity connote that there is need for government to foster economic policy aimed at maximally reducing interest rate charged by deposit money banks on farmers, that is, if interest rate s lowered it will enhance farmers to assess more resources strictly for Agricultural investment which on the long run will certainly yield to Agricultural productivity (Udoka, Mbat & Duke, 2016).

The major conclusion of the study was that there existed long run relationship between commercial bank loans and the real sector (Agricultural) in Nigeria. This was on the basis that an upward shift in commercial banks loans and advances to the Agricultural sector boost the Agricultural sector to enlarge its business activities leading to increase in Agricultural produce. The study further proved that lack of access to credit facility of Commercial banks could be linked to high unemployment rate in the country. The study concluded that bank credit significantly impact Agricultural productivity of Nigeria under the period reviewed. The result of the study is in consonance with Ogar, Nkamare and Effiong (2014), Rahman, Hussain and Taqi (2014), and Udoka, Mbat and Duke (2016) who concluded that commercial bank significantly affect Agricultural productivity in Nigeria.

The following recommendations were proffered based on the outcome of the study; the delay and stringent conditions in assessing commercial bank credit and facility should be overhaul; Commercial banks should set up panel investigating committee that will ensure that the funds disbursed are strictly used for its purpose without any possible diversion; the government should allocate funds to Agricultural sector as well as other sectors like Manufacturing sector to have large revenue base aside the oil sector.

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