



IMPACT OF BANK CREDIT ON AGRICULTURAL PRODUCTIVITY: EMPIRICAL EVIDENCE FROM NIGERIA (1981-2015)

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ABSTRACT

We examined the effect of bank credit on agricultural productivity in Nigeria so as to ascertain the existence of causal relationship between the dual. To achieve this objective, the time frame secondary data used in the study includes: written materials such as books and journals and also the use of time series data such as Agricultural Gross Domestic Product (AGDP), commercial bank credit to agricultural sectors (CBCA), Interest rate charges (INT), Government spending on agriculture (GSA), and Agricultural Credit Guarantee scheme (ACGSF). THE DATA collected were all sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin. The statistical tool of analysis is the Toda and Yamamoto granger non causality techniques. Conversely the variables were exposed to the Unit Root Test to ensure stationarity both with and without structural break, the Johansen Co-Integration Test which showed that a long term relationship does not exist among variables and also the Vector Autoregression Estimates Decompositions Test was also computed to shows the contribution of each endogenous variable to the forecast of other variables before the application of the Toda and Yamamoto non granger causality test to determine if a causal relationship exist among variable of which the result attained was that there is a unidirectional causality running from ACGSF to AGDP thereby buttressing the estimate of the VAR model with respect to the role of ACGSF in explaining changes to

AGDP. No other causality is found to run from AGDP to any other variable and vice versa.

Keywords: Bank credit, agricultural productivity, Nigeria, Unit root test, stationary.

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1. INTRODUCTION

Agriculture can be said to be the first and most thriven calling of humankind. Farming which is essentially the development of land, raising animal with the end goal of generation of sustenance for man, sustain for animals and crude materials for our modern reason. It additionally comprises of nourishment creation, ranger service, domesticated animals and fishing (Asaleye, A. J., Popoola, O., Lawal, A. I., Ogundipe, A. & Ezenwoke, O. (2018)).

The part farming plays in changing both the social and economic edge work of an economy can't be over emphasized. Anyanwu postulated that "agriculture has been the primary source of profitable work from which Nigeria country can sustain its populace, giving the country's industries its basic materials and as a solid source of income to government".

There are two sorts of agriculture, the subsistence farming and commercial farming : The subsistence agriculture is the sort of cultivating which includes the agriculturist and his family, that is, the agriculturalist produces for himself and his family with little or none to offer in the market, and it is rehearsed in little scale basis. It requires just a little amount of cash to practice unlike to commercial cultivating that includes gigantic measure of cash to practice. It doesn't include the utilization of machine to complete, since the land is little and divided (Asaleye, A. J., Isoha, L. A., Asamu, F., Inegbedion, H., Arisukwu, O., Popoola, O. (2018); Calderelli, Fiondella, Maffei, Zagaria (2016); Saqib, Kuwornu, Panazia & Ali (2018); Kirschenmann (2016); Chi & Li (2017); Bai, Shi, Liu & Sarkis (2019); Belaid, Boussaada, Belguith (2017).

The second category is commercial agribusiness, and this is the place a agriculturalist grow his crops and offers them for sale in the market. It is completed in vast scale with enough land and machines. This sort of cultivating includes a great deal of funding to fire up and furthermore tedious, the agriculturists' returns increases thus does it chance. Commercial cultivation helps agriculturists to participate in the development of various assortments of crops, since the cash, land and equipment could undoubtedly be utilized.

The nation Nigeria is honored with different natural resources, tremendous and gainful farmland, different range of crops, and river among others. In spite of its plentiful natural assets it is confronted with poor nourishment circumstance.

The rate of Agricultural Production in Nigeria is progressively on the decrease in relations to its commitment to the Gross Domestic Product (GDP) and in addition managing the nation's in teams sustenance (food) necessity, in spite of the fact that about 70 per cent of the people take part in farming, the Nigeria agricultural sector can't accomplish its most essential and customary starring role of being the source of food for the country, in this way the sustenance (food) import has kept on rising (Odigbo, 2000); (Lawal, A. I., Somoye, R. O. & Babajide, A. A. (2017); Lawal, A. I., Nwanji, T. I., Asaleye, A., & Ahmed, V. (2016);).

Lack of adequate agricultural finance in the past two decades has been the major issue behind the poor performance of agriculture. Toward that time, cultivating might have been viewed similarly as vocation for illiterates and in that capacity not many kin were locked in clinched alongside cultivating exercises. This issue pulled in consideration from both state and the federal government to formulate policies and programmes to address those issues about farmers. The agricultural credit guarantee scheme fund (ACGSF) was established by Decree 20 of 1999. Likewise in the year 1984, Nigeria agricultural and co- operative bank was established to finance rural farmers. The main aim of the Nigeria agricultural and co- operative bank (N A C B) is primarily to give spot loans to farmers to increase their crop production for the population and also for export.

The farmers through the support from commercial bank were finance cash which encourage them in farming and were to feed their families, build good houses and also train their children for schools. In fact, cultivating exercises presently are viewed as a very lucrative business due to the financial support from the government through commercial banks. Unfortunately, farmers particularly the illiterate ones find it exceptionally troublesome to acquire credit from these commercial banks. This may be due to energetic nature included for example, Hosting collaterals, security, and bottle neck services. Most of the times loans might not be given on time at they are required and we know that agriculture is based on seasons. The banks on other hand entertain fear that the money might not be returned because of the high rate of risk involve in agricultural business, risk such as theft, pest attack and natural disaster like drought (dry season), flooding and also diseases which brings about low agricultural return. Also the issue of loan been redirected (diverted) to other things other than those cultivating exercises. Some of the farmers make use of loan granted to them to increase the numbers of their wife's instead of investing the money on farming business. Although, those farmers were advised to protect their ranches in the protection scope. This will enable them to recoup their losses when any of these natural disasters occur through Nigeria Agricultural Insurance Company (N A I C).

Bank credit to the agricultural sector have been faced with several problem, in this study, the following problems are identified as the causal factors of the falling progress in agricultural finance by bank and also the development of the agricultural sector as a whole in Nigeria (Lawal, A. I., Oye, O. O., Toro J. & Fashina, O. A. (2018); Lawal, A. I., Babajide, A. A., Nwanji, T. I., & Eluyela, D. (2018); (Lawal, Nwanji, Adama, & Otekunrin, (2017); Fashina, Asaleye, Ogunjobi, & Lawal (2018) Lawal, Asaleye, IseOlorunkanmi, & Popoola (2018).

Instability and inconsistency of government agricultural policies: This is a major problem that have been affecting agricultural and it financing, due to the high rate of political instability in this nation which has led to changes in agricultural policies.

Insufficient credit facilities that will enhance the growth of the agricultural sector

Several studies in this area including Enyim, Ewno and Okoro (2013), have identified poor credit supply as one of the factors accounting for the poor performance of the agricultural sector in Nigeria.

The objective of this study is to evaluate the impact of bank credit on agricultural productivity in Nigeria, to determine the influence of interest rate on agricultural productivity in Nigeria and also to assess the effect of government spending on agriculture productivity in Nigeria.

The research covers a period 35 years between the periods of 1981 to 2015.

2. THEORETICAL LITERATURE

The theories that guide the work are: First; the quantity theory of credit which differentiates between money spent as GDT transactions and non-GDP transaction. In the present study, we assumed that agriculture credit falls under GDP transaction estimates. Second; the Delegate monitoring theory which stresses that bank advances credit to the extent that they can monitor its usage.

2.1. Empirical Review

Onder and Ozyildirim (2013) examined the lending activities of both privately and publicly owned banks in turkey using data sourced from 1992 to 2010, so as to know the effects of the credit they have on economic growth. The study focused on the impact of these banks facilities on agriculture, infrastructure and election periods. The study noted that banks facilities impact on agriculture, infrastructure and election winning strategy.

Kumar, Mishra, Saroj and Joshi (2017) employed IV 2SL estimation techniques to analyse large, national farm household level data sourced from India economy, to examine the impact of institutional farm credit on farm income and farm household consumption expenditures. The study observed that, for India, formal credit play significant role in enhancing net farm income and per capita monthly household expenditure for the farming commodities in India, and that formal credit social safety net generates unintended consequences, as it generates a reversal income for rural households.

Rehman, Chandio, Hussain and Jingdong (2017) employed a number of econometric techniques to analyze data sourced from 1960 to 2015 for the Pakistani economy, so as to know whether or not functional relationship exists between agricultural gross domestic product (AGDP) measured by bank credit to agriculture, loan disbursement, cooperative loan and total disbursement in the economy and total food productivity and cropped area. The study noted that total food production, loan disbursement have positive and significant impact on AGDP with little or no impact on cropped area.

Chandio, Jiang, Gessesse and Dunya (2017) investigated the effect of agricultural credit and farm size on the technical efficiency of rice productivity in Sindh, Pakistan, by employing the stochastic production frontier techniques to analyse data sourced on 180 rice growers in the region. The study observed that credit, farm size, fertilizer and labour significantly influence the productivity of the rice sector. The study also observed that significant impact was noticed for the credit-productivity platform with wider impact on farm size platform. The study concluded that credit and size play significant role in output for the studied economy (see also Kareem, Bakare, Raheem, Olagumela, Alawode and Ademoyewa (2013); Nwankwo (2013); Udih (2014);).

3. MATERIALS & METHODS

This study by design is an Ex-post factor research. This was chosen because of the availability of data already existing. The method of data collection used for this study was exclusively secondary data. Secondary data used in the study includes: written materials such as books and journals and also the use of time series data such as Agricultural Gross Domestic Product (AGDP), commercial bank credit to agricultural sectors (CBCA), Interest rate charges (INT), Government spending on agriculture (GSA), and Agricultural Credit Guarantee scheme (ACGSF). The data collected were all sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin. The scope of the study is 1981 to 2015. We followed Isola, Frank, and Leke (2015); Ayopo, Isola, & Olukayode, (2016a); Ayopo, Isola, & Olukayode (2016b) to employed Unit root test to analysis the data set. We equally followed

Lawal et al, (2018) to employ Toda and Yomato Granger causality test so as to analysis the partern of causality among the variables.

4. RESULTS

4.1. Stationarity test

The head step in any time series analysis is the identification of the order of integration of the variables. This is to avoid the spurious regression problem i.e. the stationarity test requires that all the variables should be stationary (unchanged) to avoid a misleading result that may arise due to its non-stationarity

The results of the ADF unit root test presented in Table 1 show that the variables are not stationary at levels. However, at first difference, the null of unit roots in the series was rejected at the 1 per cent significance level. This implies that the variables are integrated of order 1, i.e. I(1).

ADF unit root test

Variables	Level Data	First Difference	1% CV	5% CV	10% CV	Order of Integration
AGDP	-0.292540	-5.639540	-3.646342	-2.954021	-2.615817	I(1)
CBCA	-1.018545	-6.660715	-3.646342	-2.954021	-2.615817	I(1)
INT	-3.374386	-9.127380	-3.646342	-2.954021	-2.615817	I(1)
GSA	-1.424927	-8.088027	-3.646342	-2.954021	-2.615817	I(1)
ACGSF	-0.100009	-4.521039	-3.646342	-2.954021	-2.615817	I(1)

Philips-Perron unit root test

Variables	Level Data	First Difference	1% CV	5% CV	10% CV	Order of Integration
AGDP	-0.292540	-5.639540	-3.646342	-2.954021	-2.615817	
CBCA	-1.658180	-7.064078	-3.646342	-2.954021	-2.615817	I(1)
INT	-3.334022	-9.254743	-3.646342	-2.954021	-2.615817	I(1)
GSA	-1.394059	-8.740760	-3.646342	-2.954021	-2.615817	I(1)
ACGSF	-0.100009	-4.518084	-3.646342	-2.954021	-2.615817	I(1)

Table above, showed the result of PP unit root test which was conducted to confirm the ADF unit root test, the result suggests that all the variables were originally non-stationary.

However, they became stationary after the first difference was taken. Agricultural Productivity (AGDP), Commercial banks' credit to the agricultural sector (CBCA), Interest rate on Commercial banks' credit to agriculture (INT), Government spending on the agricultural sector (GSA) and Agricultural credit guarantee scheme fund (ACGSF) were all stationary at 1% level.

Since the conventional ADF test is biased towards non-rejection of the null hypothesis in the presence of structural breaks, I have also conducted the ADF unit root test with structural break and the results are shown below.

Unit root with structural brake

Variables	Level Data	Break Date Yr.	First Difference	Break Date Yr.	1% CV	5% CV	10% CV	Order of Integration
AGDP	-16.18415	2001	-10.98893	2002	-5.347598	-4.859812	-4.607324	
CBCA	-3.815113	2003	-7.896157	2007	-5.347598	-4.859812	-4.607324	I(1)
INT	-4.898956	2003	-5.481075	2003	-5.347598	-4.859812	-4.607324	I(1)
GSA	-3.805871	2008	-5.288856	1999	-5.347598	-4.859812	-4.607324	I(1)
ACGSF	-3.375925	2000	-4.889501	1993	-5.347598	-4.859812	-4.607324	I(1)

Based on the results shown in Table 3 and the asymptotic critical values of ADF unit root test with structural break at 5 per cent, we further confirm that the variables are integrated of order 1, although with structural breaks happening at different time periods, depending on the assumptions made in respect of the nature of the structural break. Overall, the results using the ADF unit root test with structural break supported the findings of Table 1, hence, we concluded that the variables are I (1) variables.

Test for Johansen co-integration using trace statistic

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob **
None	0.527376	45.68753	69.81889	0.8082
At most 1	0.270032	20.95550	47.85613	0.9849
At most 2	0.150320	10.56861	29.79707	0.9706
At most 3	0.124885	5.193069	15.49471	0.7880
At most 4	0.023681	0.790888	3.841466	0.3738

Source: Author's Compilation from Eviews9

From the table above the trace test indicates no co-integration at the 5 percent level. Denotes rejection of the hypothesis at the 5 percent level

Test for Johansen co-integration using max-eigen value

Hypothesized No. of CE(s)	Eigen Value	Max-Eigen Statistic	0.05 Critical Value	Prob **
None	0.527376	24.73203	33.87687	0.4034
At most 1	0.270032	10.38688	27.58434	0.9787
At most 2	0.150320	5.375543	21.13162	0.9924
At most 3	0.124885	4.402181	14.26460	0.8146
At most 4	0.023681	0.790888	3.841466	0.3738

Source: Author's Compilation from Eviews9

From the table above the Max-Eigen value test indicates no co integration at the 5 percent level. Donates rejection of the hypothesis at the 5 percent level.

Long run normalized co-integration estimates

AGDP	CBCA	INT	GSA	ACGSF
1.000000	-0.086359	-0.001955	0.051571	-0.296503
	(0.03678)	(0.00171)	(0.02168)	(0.01930)

Source: Author's Compilation from Eviews9

The table above shows the normalized co-integration co-efficient with the standard error in -parenthesis.

A negative relationship exists between AGDP and CBCA. A negative relationship exists between AGDP and INT. A positive relationship exists between AGDP and GSA. A negative relationship exist between AGDP and ACGSF

Variance decomposition of AGDP:

Period	S.E.	AGDP	CBCA	INT	GSA	ACGSF
1	0.030766	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.039837	88.73764	0.733396	0.005028	0.138447	10.35549
3	0.046953	77.42739	1.690827	0.449296	1.395219	19.04332
4	0.053034	69.33304	2.839371	1.246941	3.312930	23.26771
5	0.058311	63.82251	4.250762	1.822877	5.283833	24.88770
6	0.062987	59.85431	5.924359	2.048651	7.042297	25.13038
7	0.067243	56.72584	7.796857	2.038906	8.550697	24.88770
8	0.071206	54.06597	9.782556	1.917790	9.842644	24.39004
9	0.074955	51.70140	11.80723	1.762131	10.95914	23.77010
10	0.078537	49.55484	13.80913	1.610089	11.93244	23.09350

Source: Author's Compilation from Eviews9

The variance decomposition shows the contribution of each endogenous variable to the forecast of other variables.

From the variance decomposition table above ACGSF contributes the most to the forecast error variance of AGDP other than the AGDP itself right from period 3 which is taken as the short run period to period 15 which is taken as the long run period.

Toda-Yamamoto Granger Non-causality Test: VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable AGDP			
Excluded	Chi-sq	Df	Prob.
CBCA	0.221247	1	0.6381
INT	0.003965	1	0.9498
GSA	0.058544	1	0.8088
ACGSF	5.060609	1	0.0245
All	5.400880	4	0.2486
Dependent variable: CBCA			
Excluded	Chi-sq	Df	Prob.
AGDP	0.028969	1	0.8649
INT	0.009200	1	0.9236
GSA	0.541187	1	0.4619
ACGSF	0.159810	1	0.6893
All	0.784859	4	0.9405
Dependent variable: INT			
Excluded	Chi-sq	Df	Prob.
AGDP	1.031950	1	0.3097
CBCA	0.016868	1	0.8967
GSA	0.151152	1	0.6974
ACGSF	2.039117	1	0.1533
All	2.443671	4	0.6548

Dependent variable: GSA			
Excluded	Chi-sq	Df	Prob.
AGDP	0.179080	1	0.6722
CBCA	0.292735	1	0.5885
INT	2.387986	1	0.1223
ACGSF	0.348495	1	0.5550
All	3.753380	4	0.4404
Dependent variable: ACGSF			
Excluded	Chi-sq	df	Prob.
AGDP	1.079338	1	0.2988
CBCA	0.001127	1	0.9732
INT	2.068486	1	0.1504
GSA	0.538181	1	0.4632
All	3.239576	4	0.5186

Source: Author's Compilation from Eviews9

The output shows that at the 5% level of significance, ACGSF Granger-causes AGDP but the reverse does not ensue. Hence there is a unidirectional causality running from ACGSF to AGDP thereby buttressing the estimate of the VAR model with respect to the role of ACGSF in explaining changes to AGDP. No other causality is found to run from AGDP to any other variable and vice versa.

5. CONCLUSION

5.1. CONCLUSION AND RECOMMENDATION

This study examined the impact of credit facilities on agricultural output in Nigeria based on data sourced from 1981 to 2015. We employed a number of econometrics techniques to analyze our data. Our results show that bank credit induces positive impact on agricultural output. The study therefore recommends that policy makers should push for downward review of the interest rate regime, strengthen the agricultural credit guarantee scheme, and increase agricultural budget and spending. The study also recommends that in line with the delegated monitoring framework, bankers should strengthen their loan monitoring schemes to avoid non-performing loans.

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