Available online www.unicrossjournals.com

UNICROSS JOURNAL OF SCIENCE AND TECHNOLOGY, UJOST

RESEARCH ARTICLE VOL. 1(2) SEPTEMBER, 2022 ISSN:2814-2233

Date Accepted: 31st August, 2022 Pages 18-37

THE IMPACT OF BANK LENDING ON THE DEVELOPMENT OF AGRICULTURAL SECTOR IN NIGERIA: AN ECONOMETRIC APPROACH

Mboto, Helen Walter., Edom, Edom Onyam, Okoi, Innocent Obeten, Akeh, Monica Ukongim, Nkamare Stephen Ekpo.

Department of Banking and Finance, University of Calabar

Abstract

This study examined the impact of bank lending on the development of agricultural sector in Nigeria, using time series data from 1990 to 2020. The objectives of the study were to: ascertain the effect of commercial bank credit disbursement on the development of agricultural sector in Nigeria, to determine the extent to which government funds allocation has boosted agricultural productivity in Nigeria, to ascertain the effect of agricultural produce price on agricultural productivity in Nigeria and to ascertain the effect of agricultural credit guarantee scheme funds on the agricultural sector in Nigeria. To achieve the above objectives, the study employed the multiple regression statistical technique/ordinary least square (OLS) and error correction model (FCM) to obtain estimates of the parameters of economic relationship from statistical observations. The result showed that there was a negative and significant relationship between commercial bank credit to the agricultural sector and agricultural output index in Nigeria, the study also showed a positive and significant relationship between agricultural credit guarantee scheme loan and agricultural production output index. Again, government funds allocation had a negative and significant effect on agricultural production index. And there was a significant and positive relationship between agricultural produce price and agricultural production index. Based on the findings, it was recommended that banks should make more credit facilities available to farmers to enable them boost their productive capacity. Again government should ensure vigorous implementation of agricultural credit guarantee scheme fund by purpose to farmers for improved productivity. Also, there should be increased financial allocation to the agricultural sector for increase productive output, and finally, government should ensure that prices of agricultural produce are pegged in such a way that the beneficiaries of agricultural credit facilities will not find it difficult to repay the loans.

Keywords: Agricultural Production Output Index; Commercial Banks' Credit; Agricultural Produce Price; Government Financial Allocation to the Agricultural Sector.

Introduction

Agricultural development is a significant endeavor in Nigeria. It feeds the country's roughly 140 million people, employs 70% of the working population, generates around 30% of the country's export value, and accounts for 53% of overall income (Amin,1996). Agricultural development increases the production of both food crops and export crops. As a result, the agriculture sector's contribution to the country's foreign exchange revenues increases. When looking at the Nigerian economy as a whole, the obvious conclusion that can be reached is that non-mechanized agriculture is still the main practice, notwithstanding recent fast industrial expansion. As a result, agriculture's role in Nigeria's overall economic activity is not only significant, but also strategic. This may have led (Amin, 1996) to declare that no matter how much development or structural reform Nigeria achieves, agriculture will retain its relative dominance in the economy for many decades to come. More crucially, the Nigerian economy has received the majority of its economic boost from agriculture, notably agricultural exports (Akintola,2004)

In 1960-1970, the agricultural sector was the major sector of the Nigerian economy, accounting for around 55 percent of the gross domestic product (GDP). This performance level fell dramatically to around 26% in 1971-1980, then rose to around 40% in 1981-1990 and peaked at at 46% in 1991-2000. The agricultural industry outperformed the 6.0 percent target set by the National Economic Empowerment and Development Strategy (NEEDS) program. In 2005, staples output increased by 6.8 percent, compared to 6.3 percent in 2004. All major staple crops saw gains in output over the previous year (CBN Annual Report 2005). The agricultural sector is Nigeria's most important non-oil sector. It accounts for approximately 23 percent of total exports and approximately 2 percent of non-oil exports (Alhaji,2003). The agricultural sector spans several natural zones, from the Sahel Zone in the far north to the Sudan and Guinea Savannah Zones in the south. The majority of cereal crops are grown in off-the-grid locations where livestock are kept, while agriculture is focused on roots and plantation crops. Production is characterized by small holders employing conventional hand techniques. As a result of conscious British policy, the primary agricultural tools are hoes, cutlasses, axes, and knives, etc., which aimed primarily at the development of Nigeria's agricultural resources through the agency of their indigenous inhabitants, such as the Royal Niger Company, which buys from local farmers for exports (lawal,2011). Traditional agricultural output generation is not solely for subsistence consumption.

However, agricultural output has been steadily declining since the oil boom of the 1970s. This contradicts economic theories that argue agriculture should be a key supplier of labor to other sectors of the economy at a rate that the non-agricultural sector can absorb. Agriculture, which used to be the only source of food for Nigeria's teeming population and the country's major foreign exchange earner as well as a source of employment before the discovery of oil, has not been performing well in recent years, its contribution to GDP has been declining, the country is relying on other countries for food, and the country's agro-allied industries

rely heavily on imported raw materials. Despite the fact that agriculture has been prioritized by establishing special financial institutions such as the Nigerian agricultural and cooperative bank and schemes such as the agricultural credit guarantee scheme and the commercial agricultural credit scheme, the sector continues to perform below expectations (Ammani,2012). Furthermore, despite the huge expanse of rich soil, a significant percentage of her population suffer from hunger and malnutrition as a result of agricultural negligence. Few agro-industries in the area rely heavily on imported raw materials in their production, and many Nigerian young are unemployed. It is worth noting that numerous regulations have been implemented to address these issues, with banks being specifically targeted to play crucial roles in the field of funding through loan availability (Jaunky,2011). However, the realities remain that banks, namely commercial banks, have not dealt with the problem as much as has not been felt in the domain of agricultural financing. The accusation was that commercial banks prefer extending credit to commerce or trading rather than agriculture, and if loan was granted, the interest payable was extravagant with some restrictive securities, putting limits and scaring many prospective farmers. The study thus investigated the impact of bank lending on the development of Nigeria's agricultural industry from 1990 to 2020. The specific objectives of the study include:

a. To ascertain the effect of Commercial Banks credit on agricultural sector development in Nigeria.
b. To determine the extent to which government funds allocation has boosted agricultural productivity in Nigeria.
c. To ascertain the effect of agricultural product prices on agricultural productivity in Nigeria
d. To ascertain the effect of agricultural credit guarantee scheme fund on the agricultural sector in Nigeria.

Theoretical framework

The study is anchored on the following theories:

Loan pricing theory

Stiglitz and Weiss proposed the hypothesis in 1981. According to this hypothesis, banks are always inclined to set high interest rates in order to gain more income or maximize profit. Banks should always be aware of the concerns of adverse selection and moral hazard while attempting to earn the highest possible interest revenue because it is extremely difficult to predict the borrower type at the outset of any banking relationship. Setting interest rates too high may produce adverse selection problems because high risk borrowers are more likely to engage in moral hazard behavior because they are more inclined to undertake highly risky projects or investments. 2014 (Olusegun, Akintoye, Dada)

Theory of multiple lending

Lambe first proposed the theory in 1983. According to the notion, banks should be more concerned with equity, mergers, and acquisitions that improve their lending capacity, and less concerned with share lending. This reduces the need for additional diversification and monitoring. This is only possible in the context of a well-developed

equities market. Banks should be less motivated to engage in share lending (credit syndication) in the presence of well-developed equity markets and following a consolidation process. Outside stock and mergers and acquisitions both boost a bank's multi-lending capacity, decreasing the requirement for increased diversification and supervision through share lending (Olusegun, Akintoye and Dada, 2014). This theory has a bigger impact on Nigerian banks in light of the banking industry's recent consolidation and recapitalization effort in 2005.

Boserupian Theory of Agricultural Development

In 2012, Imoisi, Sogules, and Ekpenyong proposed this theory. According to the notion, the size of the people (labor Force) active in agricultural activity determines the increase in agricultural growth and development. This contradicts Malthusian theory, which states that population size and growth are determined by food supply and agricultural methods; when food is insufficient for everyone, the excess population dies.

This study is anchored on loan pricing theory while other theories are in support of loan pricing.

Conceptual review

There are differing views on the importance of the financial system to economic growth. (Akpansung & Babalola, 2012) stated that the banking system aided capital mobilization for "immense works" throughout England's industrialization. According to Schumpeter (1912), well-functioning banks promote technical innovation by finding and backing entrepreneurs that have the best odds of successfully implementing novel goods and manufacturing processes. Other economists, on the other hand, do not believe in the existence of a relationship between credit and growth (Lucas, 1988). Levine (1997), on the other hand, believes that the level of financial development predicts future rates of economic growth, capital accumulation, and technical advancement. Financial tools, markets, and institutions, according to theory proponents, emerge to offset the consequences of information and transaction costs, whereas less developed theoretical literature shown that changes in economic activity could influence financial systems (Levine & Renelt, 1992). In recent years, significant research investigations have flourished in the literature employing the notion of credit channel theory, which states that policy factors have effects on both credit supply and demand in every economy. In the recently developed "credit channel view," Dobrinsky and Markov (2003) hypothesized that monetary policy shocks effect actual economic performance via credit supply by commercial banks and other financial institutions due to changes in their supply schedules. (Mishkin 2004) proposed that one of the reasons for poor growth rates in developing or transition nations is an underdeveloped financial system. According to Duican and Pop (2015), the stability of the financial sector plays a significant role in the economic development of any country, and there is evidence in the literature that there is a correlation between economic growth and the credit market. Korkmaz (2015) also believes that banks can ensure appropriate resource distribution in the economy by moving resources collected to specific regions and industries. However,

when they contract credits that they use, they might cause economic stagnation and hardship in some areas. Nwaigbo (1981) In general, the majority of theoretical work on financial development and economic growth supports the premise that credit market development promotes economic growth through increasing capital accumulation and technical improvements. According to Sassi (2014), economists agree that a well-developed credit system supports economic growth by improving resource allocation to investment, lowering communication and transaction costs, and allowing risk management to finance riskier but more productive projects and innovations. (Okolo, 2004). The rule of diminishing returns also provides a theoretical link between loans and agricultural output. In light of this, my study is based on the law of diminishing returns to scale. This economic law explains the proportional change in output in relation to the proportional change in input variables. In other words, the law of returns to scale states that when inputs change proportionally, the behavior of output changes. In response to a change in input, an output may change by a high proportion, the same proportion, or a tiny proportion. As a result, this study is founded on the theories that support the relevance of credit market development for growth (kortmaz,2015). Again, financial facilities have the potential to stimulate or drive other variables of production by making latent, prospective, or underutilized capacities operational. Credit acts as a catalyst, galvanizing the growth instrument and propelling it forward in the desired or anticipated path. As a result, the greater the influx of money in the form of credit, the greater the ability of the economy to advance along its predetermined route. Ijere (1986), Fosu (1992), Amin (1996), and Umoh (2003) Agricultural credit is given to farmers to help with crop planting and harvesting. It can be an overdraft, short-term, medium-term, or long-term loan, depending on the project's resolution and growth duration (Ijaiya, 2003). (Akpansung and Babalola, 2012) divided the problem of agricultural financing in Nigeria into two (2) parts: the problem of farmers and the problem of agricultural businesses (Okoi,2002). Farmers' challenges with financing agriculture stem from their illiteracy, inability to adopt cutting-edge farm input and mechanization, and poor financial management, which leads to a high rate of loan default. Unsystematic hazards (risks beyond the farmer's control, such as natural hazard), time lag (delay between cultivation and harvest), the character of land, and workforce immobility are all challenges linked with agricultural industry (some agricultural events require a very long incubation period).

In order to address the issue of agricultural financing in Nigeria, the government established the Nigerian Agricultural and Co-operative Bank (NACB) as an agricultural financing institution in 1972. Mustapha, Must (2006).

Agricultural financing offers farmers with access to funds to purchase other assets. Appropriate macroeconomic policies and

institutional financing for agricultural productivity will boost the sector's contribution to the economy in areas such as job creation, income, and foreign currency profits. Shepherd and Olomola (1997) (2002). Agricultural financing reactivates, modernizes, and expands agricultural productivity while also removing financial constraints that prevent farmers from embracing new technology that aid in quick productivity and growth. Qureshi, Nabiand, and Faruqee, Qureshi, Nabiand, and Faruqee, Qureshi, Nabiand, and Faruqee (1996).

Empirical review

From 1980 through 2013, Aguwa, Inaya, and Prosco (2013) evaluated the influence of commercial bank loans on agricultural output in Nigeria. The augmented Dickey Fuller (ADF) unit root test was used to determine whether the time series data had a unit root. The results showed that all of the variables were not stationary at level (at first), but became stationary at the first difference, indicating that the variables were integrated order one I. (1). The ordinary least squares (OLS) method was used to estimate the relationship between the variables in the model; the results showed that the alternative hypothesis, "commercial bank credit has a positive impact on agricultural productivity" between the periods was validated and the null hypothesis was rejected. The alternative was chosen above the second hypothesis (null), which stated that government spending on agriculture has no significant effect on agricultural productivity in Nigeria.

Chris and Fredrick (2013) used the Vector Auto regressive (VAR) approach on Friday to study the influence of credit supply and various commercial bank loan schemes on agriculture sector production in Nigeria. The study covered the years 1981 to 2013 and found that ACGSF fared poorly in explaining agricultural sector performance, whereas commercial bank loans to agriculture had a significant impact on agricultural productivity in Nigeria. Similarly, the Ordinary Least Squares approach is used.

Kareem, Osisanya, and Isiaq (2017) investigated the impact of commercial bank funding on agricultural sector output in Nigeria from 1981 to 2014. Commercial bank loans to agriculture explained 99.6 percent of the variation in real agricultural gross domestic output.

Similarly, Udoka, Mbat, and Duke (2016) investigated the impact of commercial bank loan on agricultural output in Nigeria from 1970 to 2014. The analysis used data from the Central Bank of Nigeria's Statistical Bulletin. To estimate the parameter that illustrates the correlations between the explanatory factors and agricultural production in Nigeria, the Ordinary Least Squares technique was used. The findings revealed a favorable and statistically significant association between commercial banks' credit to the agricultural sector and agricultural production in Nigeria. Interestingly, Olusegun, Akintoye, and Dada (2014) evaluated the impact of commercial bank lending on Nigeria's aggregate economic development from 1970 to 2011. Secondary data were used in the regression analysis, with non-oil GDP as the dependent variable and commercial bank credit for the present year and one year later as the independent variables. The findings

demonstrated that loans and advances to the service sector from the previous year had a greater beneficial influence on economic growth than loans and advances from the current year. The study also discovered that credit to other industries in the previous and current years had an adverse association with economic growth. In terms of subsectors, public utilities and transportation/telecommunications subsectors contributed positively to economic growth in the previous year, whereas current year credit contributed negatively.

Nnamocha and Charles (2015), on the other hand, used secondary data to analyze the influence of bank lending on only agricultural output in Nigeria from 1970 to 2013. The analysis used the Ordinary Least Square approach, and the empirical data demonstrated that in the long run, bank credit and industrial output contributed favorably to agricultural output in Nigeria. In Nigeria, however, only industrial output effects agricultural output in the near run.

Ebele and Iorember (2016) investigated the influence of commercial bank loan on manufacturing in Nigeria from 1980 to 2015. The study used secondary data for analysis, and the Cochrane-Orcutt method was used instead of OLS due to the presence of serial correlation as suggested by the Durbin Watson test statistic result. The findings revealed that inflation and interest rates had a negative impact on manufacturing sector output in Nigeria, whereas loans and advances and wide money supply have a favorable impact. However, (Olusegun, Akintoye, and Dada, 2014) empirically assessed the influence of commercial bank loan to farmers on agricultural development in Nigeria from 1984 to 2007. Using secondary data and the Ordinary Least Square method to estimate the relationships between the dependent and independent variables, the results revealed that commercial bank credit to the agricultural sector and agricultural product prices for this period had no significant positive effect on agricultural productivity in Nigeria, but agricultural credit schemes by purpose and government fund allocation to agriculture did.

Research methodology

Two designs were adopted for this study; the first was exploratory design. This was used in reviewing the empirical literature and the relevant theories. Ex-post facto research design was used in collecting secondary data from the CBN statistical bulletin using desk survey from the period 1990 to 2020.

Model Specification

This study is anchored on loan pricing theory and multiple lending theory. On the basis of this theory, the study employed Commercial Bank's Credit to the Agricultural Sector (CBCA), Agricultural Credit Guarantee Scheme loan by purpose (ACLP), Government Financial Allocation to Agricultural sector (GFAA) and Agricultural Produce Price (APR) to measure Agricultural Production Output Index (API). Hence, the functional relationship between the variables is expressed below:

API = f (CBCA, ACLP, GFAA, APPR) Where API = Agricultural Production Output Index CBCA = Commercial Bank's Credit to the Agricultural Sector, ACLP = Agricultural Credit Guarantee Scheme loan by purpose, GFAA = Government Financial

Allocation to Agricultural sector, APPR = Agricultural Produce Price. Then stating it individually as below, we have API = $bo+b_1$ CBCA + b_2ACLP + b_3GFAA + b_4APPR + e

Data analysis

Regression result on the impact of bank lending on the development of agricultural sector in Nigeria (1990-2020)

The unit root test

The outcome of the unit root test based on the Augmented Dickey-Fuller (ADF) is reported that the outcome of the test as reported revealed that no variable was found to be stationary at level. This is because the Augmented Dickey-Fuller (ADF) test statistics values calculated in absolute terms were less than their respective tabulated values at one, five and ten percent level of significance. However, all the variables of interest that were not stationary at level because their computed ADF test statistics values were less than the critical ADF statistics values at the one, five and ten percent level of significance, became stationary after the performance of first difference operation on them. Thus, at first difference, the computed ADF test statistics values for all the variables were greater than the tabulated values at five percent level of significance. The variables were therefore integrated of the first order.

Table 1: Augmented Dickey-Fuller (ADF) test

Variables	At Level	At1st or 2nd Difference	Order of integration
API	-3.0207	-10.071	I(1)
APPR	-2.9608	-5.7703	I(1)
ACLP	-0.7064	-5.0516	I(1)
GFAA	0.1984	-6.6416	I(1)
CBCA	-2.3048	-4.4622	I(1)
	TEST OF CRITICAL VALUES:		
	1% = -3.6463		
	5% = -2.9540		
	10% = -2.6158		

Source: Researcher's computation, 2021

Cointegration test

The outcome of the co-integration test based on the Johansen-Jesulius multivariate approach using the trace statistic and maximum eigen value statistic are presented below. The outcome of the multivariate cointegration examination as reported established four (4) cointegrating equations, respectively deploying the trace statistic and maximum eigen value statistic. This is so because the trace test and the maximum eigen value test statistics values in each of

the four (4) cointegrating equations were all greater than the critical values at five percent level of significance. And since it is established from the multivariate test for cointegration that at least one cointegration equation have been established the study therefore rejected the null version of the hypothesis that there is no co-integration and hence no long run association among the variables in the specified equation and accept the alternative hypothesis that there is existence of a co-integration relationship among them and hence a long period equilibrium association among the various variables concerned. Based on this result, the study showed that the variables were co-integrated and hence there was a long run association among them.

Table 2: Unrestricted cointegration rank test (Trace)

Hypothesized		Trace	0.05	
No.of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None*	0.899659	161.4094	69.81889	0.0000
Atmost1*	0.669289	80.93824	47.85613	0.0000
Atmost2*	0.498510	42.21033	29.79707	0.0012
Atmost3*	0.387100	18.05431	15.49471	0.0201
Atmost4	0.025942	0.919946	3.841466	0.3375

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
*denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis(1999)p-values

Source: Researcher's computation, 2021

Table 3: Unrestricted cointegration rank test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None*	0.899659	80.47120	33.87687	0.0000
Atmost1*	0.669289	38.72792	27.58434	0.0012
ATmost2*	0.498510	24.15601	21.13162	0.0182
Atmost3*	0.387100	17.13437	14.26460	0.0171
Atmost4	0.025942	0.919946	3.841466	0.3375

Max-eigen value test indicates 4 cointegrating eqn (s) at the 0.05 level
*denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis(1999)p-values

Source: Researcher's computation, 2021

Vector error correction model (VECM) test: long run estimates

Since the optimal lag length for the study has been determined, the study therefore proceeded to estimate the VECM. The presence of stationarity of series (variables) at the same order of integration and the existence of one or more cointegrating justify the use and adoption of vector error correction model (VECM) to measure short run as well as long run behaviour of the variables. As an extension of the vector auto regressive (VAR) model, VECM helps to capture and forecast inter-dependency of the non-stationary trends in levels. It introduces the concept of long run relationships and error correction methods of how deviations from the long run relationship are deemed corrected.

With respect to economic growth (API) as the dependent variable, the VECM long run estimates showed hat, API which measure development would possibly increase as a result of lending measures in Nigeria in the long run. The constant coefficient of the VECM showed that, the level of development in Nigeria (API) is expected to increase by 32.68 percent as result of bank lending measures (CBCA, ACLP, GFAA, APPR) in the long run. Further analysis of the the long run estimates in the equation.

API = 32.68 + 0.0037* CBCA-0.07*APPR-3.39*ACLP+0.57*GFAA ……. 1

Equation1revealed that, the total value of commercial bank credit will enhance the level of development in Nigeria in the long run by 0.003 percent and was found to be significant, all things being equal. The relationship between agricultural product prices and the level of development in Nigeria in the long run had a negative but significant effect by 0.07 percent. The long run result further revealed that, the level of development in Nigeria had a 3.96 significant reduction as a result of the ACLP. Lastly, the relationship between GFAA and the level of development in Nigeria in the long run had a positive and non-significant effect by 0.57 percent.

Analysis of VECM short-run estimates

Given that the variables were mutually integrated, that is, the variables were integrated order I(1) suggests that the estimation of the VAR model units level form cannot be carried out. The estimation was then done using the difference form of VAR using the vector error correction model (VECM) variant of the structural VAR specification. Among many equations specified, the result of the vector error correction model (VECM) is represented. As depicted in the table, the error correction variable has the expected negative coefficient and was also statistically significant. The magnitude of the coefficient of-0.9556 implies that approximately 95.56 percent of the disequilibrium in the system would be corrected each year; indicating an extremely high speed of adjustment from the disequilibrium in the short run to equilibrium in the long run but was non-significant against theoretical expectations.

The result showed that the estimated output model has a moderately good fit and moderately high explanatory power, given its R-squared value of 0.7084 and adjusted R-square of 0.2375. In particular, the R-squared of 0.7084 showed that about 70.84 percent of the total variation in the dependent variable was attributed to

variations in the independent variables. In the similar way, the F-statistic value of 3.85 showed that the overall model was statistically significant at the five percent level of significance. This is because the computed F-statistic of 3.85 was greater than the tabulated f-statistic of 2.18 at the five percent level of significance. This means that the independent variables have joint impact on the dependent variable.

TABLE4

Vector error correction model results

Standard errors in () & t-statistics in[]					
Cointegrating Eq:	CointEq1				
API(-1)	1.000000				
CBCA(-1)	-0.003456				
	(0.00103)				
	[-3.36752]				
APPR(-1)	0.078014				
	(0.01438)				
	[5.42530]				
LACLP(-1)	3.965154				
	(0.55307)				
	[7.16937]				
GFAA(-1)	-0.577323				
	(0.08351)				
	[-6.91344]				
C	-32.68684				
Error Correction:	D(API)	D(CBCA)	D(APPR)	D(ACLP)	D(GFAA)
CointEq1	-0.955601	116.4893	-5.343506	0.044931	0.716578
	(0.74696)	(48.1002)	(3.16436)	(0.04120)	(0.42916)
	[-1.27931]	[2.42181]	[-1.68865]	[1.09047]	[1.66971]
D(API(-1))	0.374830	-51.83290	2.779205	-0.025676	-0.410670
	(0.60264)	(38.8064)	(2.55295)	(0.03324)	(0.34624)
	[0.62198]	[-1.33568]	[1.08862]	[-0.77239]	[-1.18608]
D(API(-2))	0.565155	-55.61076	1.004827	-0.013081	-0.152478
	(0.40572)	(26.1257)	(1.71873)	(0.02238)	(0.23310)
	[1.39298]	[-2.12858]	[0.58463]	[-0.58452]	[-0.65413]
D(API(-3))	0.241006	-36.68940	3.754108	-0.035627	-0.408808
	(0.41921)	(26.9949)	(1.77591)	(0.02312)	(0.24086)
	[0.57490]	[-1.35912]	[2.11390]	[-1.54068]	[-1.69731]
D(API(-4))	0.147996	7.260284	2.217515	-0.021235	-0.266825
	(0.28795)	(18.5424)	(1.21985)	(0.01588)	(0.16544)
	[0.51396]	[0.39155]	[1.81787]	[-1.33694]	[-1.61282]
D(CBCA(-1))	-0.000580	0.549083	0.015003	-0.000159	0.000858
	(0.00317)	(0.20437)	(0.01344)	(0.00018)	(0.00182)

	[-0.18266]	[2.68670]	[1.11591]	[-0.90903]	[0.47073]
D(CBCA(-2))	-0.001259	0.286821	-0.024694	0.000316	-0.002380
	(0.00395)	(0.25440)	(0.01674)	(0.00022)	(0.00227)
	[-0.31879]	[1.12745]	[-1.47552]	[1.45081]	[-1.04859]
D(BCBCA-3))	0.004501	0.349571	-0.011428	0.000244	0.007454
	(0.00436)	(0.28069)	(0.01847)	(0.00024)	(0.00250)
	[1.03259]	[1.24541]	[-0.61886]	[1.01516]	[2.97649]
D(CBCA(-4))	-0.005705	0.399803	-0.007061	-8.65E-05	-0.008094
	(0.00425)	(0.27383)	(0.01801)	(0.00023)	(0.00244)
	[-1.34167]	[1.46004]	[-0.39195]	[-0.36862]	[-3.31276]
D(APPR(-1))	0.035238	-9.218799	0.483406	-0.004260	-0.059962
	(0.07361)	(4.74023)	(0.31184)	(0.00406)	(0.04229)
	[0.47869]	[-1.94480]	[1.55015]	[-1.04909]	[-1.41776]
D(APPR(-2))	0.132882	-4.736087	-0.141938	-0.000714	-0.068004
	(0.07743)	(4.98619)	(0.32803)	(0.00427)	(0.04449)
	[1.71611]	[-0.94984]	[-0.43271]	[-0.16718]	[-1.52858]
D(APPR(-3))	0.013041	-7.793074	0.358372	-0.005236	-0.066009
	(0.06552)	(4.21886)	(0.27755)	(0.00361)	(0.03764)
	[0.19905]	[-1.84720]	[1.29122]	[-1.44878]	[-1.75360]
D(APPR(-4))	0.040195	-4.035591	0.145355	-0.002685	-0.068459
	(0.07469)	(4.80961)	(0.31641)	(0.00412)	(0.04291)
	[0.53816]	[-0.83907]	[0.45939]	[-0.65176]	[-1.59531]
D(ACLP-1))	-7.534793	-1485.352	59.51129	-0.340543	-5.763934
	(8.13258)	(523.691)	(34.4520)	(0.44860)	(4.67252)
	[-0.92649]	[-2.83631]	[1.72737]	[-0.75912]	[-1.23358]
D(ACLP(-2))	12.55285	-47.29069	22.15901	-0.343781	-1.217560
	(7.44411)	(479.357)	(31.5354)	(0.41062)	(4.27696)
	[1.68628]	[-0.09865]	[0.70267]	[-0.83722]	[-0.28468]
D(ACLP(-3))	0.993236	-1311.224	22.89392	0.270528	0.018580
	(5.57598)	(359.061)	(23.6215)	(0.30758)	(3.20364)
	[0.17813]	[-3.65182]	[0.96920]	[0.87955]	[0.00580]
D(ACLP(-4))	11.03168	322.9027	28.86396	-0.377377	-4.137812
	(7.34769)	(473.149)	(31.1269)	(0.40531)	(4.22156)
	[1.50138]	[0.68246]	[0.92730]	[-0.93109]	[-0.98016]
D(GFAA(-1))	-0.138529	52.14255	-2.050806	0.015064	0.435789
	(0.57466)	(37.0047)	(2.43442)	(0.03170)	(0.33017)
	[-0.24106]	[1.40908]	[-0.84242]	[0.47522]	[1.31991]
D(GFAA(-2))	-0.999505	-21.65988	-1.028261	-0.013148	-0.191784
	(0.47509)	(30.5930)	(2.01262)	(0.02621)	(0.27296)
	[-2.10382]	[-0.70800]	[-0.51091]	[-0.50171]	[-0.70261]

D(GFAA(-3))	-0.652579	47.96954	-0.203161	-0.004418	0.064612
	(0.35065)	(22.5799)	(1.48546)	(0.01934)	(0.20146)
	[-1.86105]	[2.12443]	[-0.13677]	[-0.22840]	[0.32071]
D(GFAA(-4))	-0.076514	50.47838	-4.119900	0.034020	0.402480
	(0.53492)	(34.4458)	(2.26608)	(0.02951)	(0.30734)
	[-0.14304]	[1.46544]	[-1.81807]	[1.15296]	[1.30958]
C	0.275097	22.40034	-3.356679	0.091752	0.875220
	(0.97692)	(62.9078)	(4.13851)	(0.05389)	(0.56128)
	[0.28160]	[0.35608]	[-0.81108]	[1.70266]	[1.55933]
R-squared	0.708479	0.861266	0.574127	0.551965	0.728430
Adj. R-squared	0.237560	0.637157	-0.113822	-0.171785	0.289739
Sumsq. resids	192.9366	800033.7	3462.473	0.587053	63.68834
S. E. equation	3.852437	248.0747	16.32005	0.212504	2.213392
F-statistic	3.504462	3.843064	0.834548	0.762646	1.660464
Log likelihood	-79.53558	-225.3114	-130.0647	21.87694	-60.13928
Akaike AIC	5.802033	14.13208	8.689410	0.007032	4.693673
Schwarz SC	6.779681	15.10973	9.667057	0.984679	5.671321
Mean dependent	-0.220200	-176.2514	0.156000	0.039421	0.765714
S. D. dependent	4.411973	411.8346	15.46371	0.196310	2.626331
Determinant resid covariance (dofadj.)		6993687.			
Determinant resid covariance		49440.48			
Log likelihood		-437.4634			
Akaike information criterion		31.56934			
Schwarz criterion		36.67977			
Number of coefficients		115			

Summary of findings

The following major findings were made from the analysis:

1. The result revealed that there exist a positive and significant relationship between commercial banks' credit to the agricultural sector and agricultural output index in Nigeria.
2. Further examination of the result revealed that there is a negative and significant relationship between agricultural credit guarantee scheme loan and agricultural production output index in Nigeria.
3. Also, government funds allocation has a positive and significant effect on agricultural production index.
4. Again, there is a significant and positive relationship between agricultural produce price and agricultural production output index.

Conclusion/recommendations

From the statistical computation, analyses and findings of the test carried out, it was discovered that the joint action of commercial banks credit to the agricultural sector, agricultural credit guarantee loan by purpose, government financial allocation to agricultural sector and agricultural products

prices are significant factors that can influence agricultural production in Nigeria. Commercial banks' credit to agricultural sector for the period 1990 to 2020 has a positive impact on agricultural productivity in Nigeria. Agricultural scheme loan by purpose has led to a significant negative growth in agricultural productivity in Nigeria. Government fund allocation to the agricultural sector has led to a significant positive growth in agricultural productivity. Prices of agricultural products have not made any significant positive impact on agricultural productivity in Nigeria. The study therefore provides the following recommendations:

1. Banks should make more credit facilities available to farmers to enable them boost their productive capacity.
2. The government should ensure vigorous implementation of agricultural credit guarantee scheme fund by purpose to farmers for improved productivity
3. There should be increase financial allocation to the agricultural sector for increase productive output.
4. Government should ensure that prices of agricultural produce are pegged in such away that the beneficiaries of agricultural credit facilities do not find it difficult to repay the loans

References

Adegoke, S. K. (1998). Data on Agriculture, wvrw.nigeriabusinessinfo.com/agridata.

Adekanye F. (1982). *Elements of Banking*. (2nd Edi). United Kingdom.

Agunuwa, E. V., Inaya, L. & Proso, T. (2015). Impact of commercial banks' credit on agricultural productivity in Nigeria (time series analysis 1980–2013). *International Journal of Academic Research in Business and Social Sciences*, 5(11), 337-350.

Akintola, S. (2004, July 23). Banks move against Soludo. Nigerian Tribune,p.24.

Akolo, Christy Seyiisa Master of Science Student in Department of Finance, University of Ilorin, Nigeria.

Akpansung, A. O. and Babalola, S. J. (2012). Banking Sector Credit and Economic Growth in Nigeria: An Empirical Investigation. *CBN Journal of Applied Statistics*, 2(2):51-62.

Alhaji B. S. (2003). Agriculture and Rural Development: The News, An address at the launching in Bauchiover the Daimina Project, August.

Amin, A. A. (1996). *The effect of exchange rate policy on Cameroon's agricultural competitiveness*. Nairobi: ARC Publishers.

Ammani, A. A. (2012). An Investigation into the Relationship between Agricultural Production and Formal Credit Supply in Nigeria. *International Journal of Agriculture and Forestry* 2 (1): 46-52.

Anthony, O., Gabriel, E. E. & Arikpo, O. F. (2015). The contribution of deposit money banks on the growth of the agricultural sector in Nigeria. *Archive Research Journal*, 3(2), 33-42.

Anyanwu, A. C., Anyanwu, B. O. & Anyanwu, V, A. (1979). *Agriculture: Its Importance and Development*. Lagos: Africana Educational Publishers Nig.

Anyanwu, C. M. (2003). The role of CBN of Nigeria in enterprises financing. Paper presented at small and medium industries equity investment scheme (SMIEIS) seminar. Lagos: CBN Training Centre.

Ashamu, E. O. (1981). Problems of Agricultural Finance in Nigeria. Paper No. 7, presented during the seminar organized by CBN, April, 2006, Lagos, 27-30

Avinash, R. & Mitchell-Ryan, T. (2010). An assessment of the impact of the sectoral distribution of commercial bank credit on economic growth and development in Trinidad and Tobago. (CBB Working Paper, 2010). West Indies: Central Bank of Barbados.

Ayoola, G. B. & Oboh, V. U. (2006). A model of public expenditure to reveal the preference for agriculture in the budget. *Journal of Rural Economic Development*, 14(1), 56-73.

Bagehot,W. (1973). Lombard street. Homewood, IL: Richard D. Irwin,

Balogun, E. D. & Out, M. F. (1991). Credit Policy and Agricultural Development in Nigeria: CBN Economic and Agric Review, Lagos. Central Bank of Nigeria (CBN) (2005) Statistical Bulletin. CBN. Abuja.

Bassey, N. E. & Ibok, O. W. & Amba, E. A. (2014). The effect of selected financial indicators on formal agricultural credit supply in Nigeria. *International Journal of Management Sciences and Business Research*, 3(9), 1-8.

Bassey, N. E., Akpaeti, A. J. & Udo, U. J. (2014). Impact of bank credit financing on agricultural output in Nigeria. *American International Journal of Contemporary Scientific Research*, 1(3), 75-84.

Beck, T., & Levine, R. (2001). Stock Markets, Banks and Growth: Correlation or Causality. Washington: The World Bank.

Cappiello, L., Kadareja, A., Kok-Sørensen, C. and Protopapa, M. (2010). Do Bank Loans and Credit Standards have an Effect on Output? A Panel Approach for the Euro Area, *ECB Working Paper Series*, No. 1150.

Central Bank of Nigeria Annual Report (CBN) (2014). Statistical Bulletin.

Chang, P. C., Jia, C. & Wang, Z. (2010). Bank Fund Reallocation and

Economic Growth: Evidence from China, *Science direct*, 34 (11): 2753-2766.

Coers, R. & Sanders, M. (2013). The energy-GDP nexus; addressing an old question with new methods. *Energy Economics, 36, 708-715.*

Demetriades, P. O. & Hussein, A. K. (1996). Does financial development cause economic growth. Time series evidence from 16 countries. *Journal of Development Economics*, 51,381-411.

Demirguc-Kunt, A., & Levine R. (2008). Finance, Financial Sector Policies and Long-Run Growth. World Bank Policy Research Working Paper 4469, World Bank.

Dobrinsky, R. & Markov, N. (2003). Policy regime change and corporate credit in bulgaria: a symmetric supply and demand responses. William Davidson Institute Working Paper Number 607.

Duican E. R. & Pop A. (2015). The implications of Credit Activity on Economic Growth in Romania. 3rd Economics & Finance Conference, Rome, Italy, April 14-17, 2015 and 4th Economics & Finance Conference, London, UK, August 25-28, 2015.

Ehikioya, I. L. & Mohammed, L. (2013). Commercial bank credit accessibility and sectoral output performance in a deregulated financial market economy: Empirical evidence from Nigeria. *Journal of Finance and Bank Management*, 1(2), 36-59.

Emecheta, B. C. & Ibe, R. C. (2014). Impact of Bank Credit on Economic Growth in Nigeria: Application of Reduced Vector Auto regressive (VAR) Technique." *European Journal of Accounting Auditing and Finance Research,* 2(9): 11-21.

Eze, C. C., Lemchi, J. I., Ugochukwu, A. I., Eze, V. C., Awulonu, C. A. O. & Okon, A. X. (2010). Agricultural Financing Policies and Rural Development in Nigeria. Paper presented at 84th Annual Conference of the Agricultural Economics Society, Edinburgh.

Fapetu, O. & Obalade, A. A. Sectoral Allocation of Banks' Credit and Economic Growth in Nigeria. *International Journal of Academic Research in Business and Social Sciences,* 5, (6) 161-169.

Festschrift in Honorof Peter Schmidt, W. C. Horrace and R. C. Sickles, eds., Forthcoming. Available at SSRN: https://ssrn.com/abstract=1807745or http://dx.doi.org/10.2139/ssrn.1807745.

Fosu, K. F. (1992). *The Real Exchange Rate and Ghana's Agricultural Export*. Nairobi: ARC Publishers.

Friedman, M. & Schwartz, A. J. (1963). A Monetary History of the United

States, 1867–1960. Cambridge: National Bureau of Economic Research.

Hicks, J. (1969). *A Theory of Economic History*. Oxford: Clarend Press,.

Hollinger, F. (2003). Financing Term Investments in Agriculture: A Review of International Experiences. Paper presented at Paving the Way Forward for Rural Finance, an International Conference on Best Practices Case Study, Washington DC, USA.

Ijaiya, G. T. & Abdulraheem, A. (2000) Commercial banks credits to the agricultural sector and poverty reduction in Nigeria: A calibration analysis. *Nigerian Journal of Agricultural Business and Rural Development*, 1(1), 143-57.

Ijaiya, M. A. (2003). Commercial bank credits to the agricultural sector and the Nigerian economy: An analysis of the future trend. *Advances in Management Journal,* 3(1), 86-93.

Imoisi, A. A., Sogules, I. W. & Ekpeyong, B. I. (2012). An Appraisal of Credit Facilities on Agricultural Output and Productivity in Nigeria: 1970-2010. *British Journal of Humanities and Social Sciences*, 7(2).

Jaunky, V. C. (2011). The CO2 emissions-income nexus: Evidence from rich countries", Energy Policy, 39, 1228-1240.

Kelly R., McQuinn K. & Stuart R. (2013). Exploring the Steady-State Relationship between Credit and GDP for a Small Open Economy: The Case of Ireland. *European Central Bank Working Paper Series, 153(1).*

King, R. G. & Levine, R. (1993). Finance, entrepreneurship, and growth: theory and evidence, *Journal of Monetary Economics* 32, 513-542.

Korkmaz S. (2015). Impact of Bank Credits on Economic Growth and Inflation. *Journal of Applied Finance & Banking,* 5(1)57-69.

Lambe, O. (1983). Problems and Prospects of Agriculture in Nigeria: Nigeria Herald, Tuesday, March 29, pages 7-8.

Lawal, W. A. (2011). An analysis of government spending on agricultural sector and its contribution to GDP in Nigeria. *International Journal of Business and Social Science,* 2(20), 244-250.

Levine R. (1997). Financial Development and Economic Growth: Views and Agenda. *Journal of Economic Literature,* 688–726.

Levine R. & Renelt D. (1992). A Sensitivity Analysis of Cross-Country Growth Regressions. *Amer. Econ. Rev*. 82 (4): 942–63.

Lucas, R. E., Jr. (1988). On the Mechanics of Economic Development. *Journal. Monetary. Economics.,* 22 (1):3–42.

Marshal, I., Solomon,. I. D. and Onyekachi, O. (2015). Bank Domestic Credits and Economic Growth Nexus in Nigeria (1980-2013). *International Journal of Finance and Accounting*, 4(5): 236-244.

Mishkin, S. F. (2004). The Economics of Money, Banking and Financial Markets (7th Edi), Columbia University, 188.

Nageri, Kamaldeen Ibraheem is working as Lecturer II in Department of Banking and Finance, Al-Hikmah University, Ilorin, Nigeria.

Nnamdi, I. S. & Nwiyordee (2014). Private Sector Micro credit Programmes, Financial Inclusion and Sectoral Entrepreneurship: Evidence and Insights from Nigeria. *European Journal of Business and Management* ,6(35) 204-214.

Nnamocha, P. N. & Eke, C. N. (2015). Bank Credit and Agricultural Output in Nigeria (1970–2013): An Error Correction Model (ECM) Approach. *British Journal of Economics, Management & Trade,* 10(2):1-12.

Nwaigbo, E. C. (1981). Problems of Agriculture and Agricultural Finance in Nigeria: Paper No.6 presented at a seminar organized by CBN, Lagos, April, Pages 27-30.

Nwakanma, P. C., Nnamdi, I. S. & Omojefe, G. O. (2014). Bank Credits to the Private Sector: Potency and Relevance in Nigeria's Economic Growth Process. *Accounting and Finance Research*, 3,(2), 23-35.

Nzotta, S. M. (1999). *Money, Banking and Finance*: Theory and Practice. (1stedi). Owerri God's time Publishers.

Obua, N. (2003). Nigeria's Agricultural Sector Business Investment Opportunities, www.nigeriabusinessinfo.com/agricdata.

Oji-Okoro, I. (2011). Analysis of the Contribution of Agricultural Sector on the Nigerian economic development. *World Review of Business Research*, 1(1), 191-200.

Okafor I. G., Ezeaku, H. C., & Ugwuegbe, U. S. (2016). Relationship between Deposit Money Bank Credit and Economic Growth in Nigeria under a VARG-Causality Environment. *IOSR Journal of Economics and Finance,* 7(2): 41-46.

Okoi, L. O. (2002). The Effects of Institutional and Policy Changes on Bank Lending to Agriculture-The Farmers Perspective. CBN Biennial Conference, Calabar.

Okolo, D. A. (2004). Regional Study on Agricultural Support, Nigeria's Case.

A study prepared for FAO. www.fao.org/tc/tca/work05/NigeriaAssessedAugust30th2007.

Okwuosa, E. E. (1970). New Direction for Economic Development in Africa, African Books-a division of African Journal Ltd.

Olowofeso E. O., Adeleke A. O. & A. O. Udoji (2015). Impact of Private Sector Credit on Economic Growth in Nigeria. *The CBN Journal of Applied Statistics* 6(2)81-101.

Olusegun, A. J., Akintoye, I. R. & Dada, S. O. (2014). Commercial Bank Credit and Sectoral Growthin Sub-Saharan Africa: Evidence from Nigeria. *Global Advanced Research Journal of Management and Business Studies*, 3(9) 423-431.

Onoja, A. O., Onu, M. E. & Ajodo-Ohiemi, S. (2012). Contributions of Financial Sector Reforms and Credit Supply to Nigerian Agricultural Sector (1978-2009).

Pesaran, M. H., Shin, Y. & Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16(3), 289-326.

Roman, K (2009), *Financial Econometrics*, Roman: Kozhan & Ventus Publishing.

Shutze, J. (1964). *Transforming Traditional Agriculture*, New Haven, Tele University Press.

Sassi S. (2014). Credit Markets Development and Economic Growth: Theory and Evidence. *Theoretical Economics Letters*, 4,767-776.

Schumpeter J. A. (1912). *The Theory of Economic Development*. In: Leipzig: Dunker & Humblot, Cambridge, MA: Harvard U. Press.

Shin, Y. & Yu, B. & Greenwood-Nimmo, M. (2013). Modelling Asymmetric Cointegration and Dynamic Multipliers in a Nonlinear ARDL Framework, (October21,2013).

Shin, Y., Yu, B. & Greenwood-Nimmo, M. J. (2011). Modelling Asymmetric Cointegration and Dynamic Multipliers in an ARDL Framework.

Thomas H. Wonnacott & Ronald J. Wonnacott (1990), *Introductory Statistics for Business and Economics* (4thEd). New York: John Wiley & Sons.

Tomori, S. (1979). Structure of the Nigeria Economy, Forestry and Fishing: London: The Macmillan Press Ltd. World Bank (2000). Rural Financial Markets in Nigeria: Focus Notes on the Issue and Options. World Bank Rural Development 2. Washington DC.

Udoka, C. O., Mbat, D. O. & Duke, S. B. (2016). The Effect of Commercial Banks' Credit on Agricultural Production in Nigeria, *Journal of Finance and Accounting,* 4(1), 1-10.

Umoh, O. J. (2003). An empirical investigation of the determinants of aggregate national savings in Nigeria. *Journal of Monetary and Economic Integration*, 3(2), 113-132.

Were, M., Nzomoi, J. & Rutto, N. (2012). Assessing the impact of private sector credit on economic performance: Evidence from sectoral panel data for Kenya. *International Journal of Economics and Finance*, 4(3), 182–190.

Vazakidis, A. & Adamopouslos, A. (2009). Credit Market Development and Economic Growth, *American Journal of Economics and Business Administration,* 1(1):34-40.

Yakubu, Z. K. & Affoi, A. Y. (2014). An analysis of commercial banks' credit on economic growth in Nigeria. *Current Research Journal of Economic Theory*, 6(2), 11-15.