The Effect of Commercial Banks' Credit on Agricultural Production in Nigeria

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Abstract   This study examined the effect of commercial banks' credit on agricultural output in Nigeria. Four research hypotheses were formulated to guide and direct the study. The ex-post facto research design was adopted for the study. Data for the study were collected from published articles and the Central Bank of Nigeria Statistical bulletin. To estimate the specified equation, the ordinary least squares regression technique was employed. Based on the results obtained, the following result arose; the estimated results showed that there was a positive and significant relationship between agricultural credit guarantee scheme fund and agricultural production in Nigeria. This means that an increase in agricultural credit guarantee scheme fund could lead to an increase in agricultural production in Nigeria; there was a positive and significant relationship between commercial banks credit to the agricultural sector and agricultural production in Nigeria. This result signified that an increase in commercial banks credit to agricultural sector led to an increase in agricultural production in Nigeria. Again, there was a positive and significant relationship between government expenditure on agriculture and agricultural production in Nigeria and a negative relationship between interest rate and agricultural output also confirmed theoretical postulations. This is because an increase in the rate of interest charged farmers for funds borrowed discouraged many farmers from borrowing and thus less agricultural investment. The study recommended that the positive effect of agricultural credit guarantee scheme fund on agricultural production called for the proper funding of the scheme by the government. To this end, there was the need for the government to continue to guarantee loans lent to farmers as this would encourage the banks to lend more to farmers.

Keywords: *commercial bank credit, agricultural sector, agricultural production, interest rate*

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1. Introduction

The role of agriculture in any economy is indeed significant and requires no debate. It is the most dominant sector and indeed a major source of livelihood for its citizens (Ijaiya & Abdulaheem, 2000). This is because apart from providing food for the teeming population of the economy, it is the only source of raw materials that other sectors look out for before their production could take place. Also, the rearing of animals provides agro-allied products for industrial growth and development, provision of employment opportunities, especially to the rural population; provision of market for the industrial sector; and provision of the needed linkage between the traditional sector and the modern sector; ensuring food security and thus serving as a catalyst for the growth of the entire economy [3]. In line with these, Abayomi [1] stated that the increasing production in agriculture is regarded as the most vital attendant for achieving industrialization.

It accounts for about 70 percent of the sectors that generate employment for the working population (Abubi, 2000) In Nigeria, the mainstay of the economy before the 1970s was the agricultural sector. During this period, the structure of the Nigerian economy was largely agrarian in nature with agriculture, solid minerals and other metals forming the bedrock of the economy. Agricultural commodities were also the major export earner for the country. Nigeria was a key exporter of rubber, cotton, groundnut, palm oil, cocoa and palm kernel amounting into three per cent and four per cent in the 50s and 60s respectively of the annual rates of output growth for food and agricultural crops (Osuntogun, 1997). Agriculture also was the largest economic activity, contributing 50.2 per cent of the GDP in 1960. The dominance of the crude oil as major export revenue causes the agricultural sector to be neglected and its contributions to the GDP dropped drastically [4]. Several factors apart from the emergence of oil have been identified as causal in the decline factors.

Finance was identified as a major factor hindering agriculture production. For this reason various programmes, polices as well as institutions have been established with the aim of providing easy finance to the sector. Commercial Banks were at the forefront for this purpose. One of the major inputs identified over the years in the development of the Nigerian agricultural sector has been the agricultural credit (CBN, 2005). The sources for funding the agricultural sector have been micro and macro

sources of finance. The micro source relates the use of the commercial bank financing as capital for agricultural activities while agricultural funding through capital mobilization and allocation by government through such agencies as rural banking development programmes, Nigerian Agricultural Cooperative and Rural development Bank (NACRDB) and the Central Bank of Nigeria (CBN) [39].

Statistics has shown that the Nigerian agricultural sector received increased credit form the commercial banks up to about N7 million in 1970 representing 1.99 per cent of the N37.4 million credits in 1975 representing 2.6 per cent of the total credit by the commercial banks. In 1980, the amount of credit offered by the commercial banks to the agricultural sector rose to N462.2 million, representing 7.28 per cent of the entire credit and in 1985, total commercial banks credit to agriculture rose further to N1310.2 million and constituted 10.77 per cent of the overall credit by the commercial banks. By 1990, total credit to agriculture rose to N4221.4 million and represented 16.24 per cent of the overall credit in the economy and rose further to N25,278.7 million in 1995, which also accounted for about 17.49 per cent of the entire credit budgeted to the economy.

However, beginning from 2000, the share of credit to agriculture through increasing in absolute terms, has started to decline relatively. By 2000, total credit to agriculture was N41028.9 million in 2005, constituting 2.46 per cent of the total credit and in 2010, total commercial banks credit to agriculture had risen to N128, 406.0 million thereby accounting for only 1.67 per cent of the total commercial banks credit to the economy (CBN, 2011). By 2012, total credit to agricultural sector has risen to N316,364 million, representing 3.9 per cent of commercial bank total credit . Agricultural credit rose again from N343,696.80 million in 2013 to N478,911.78 million in 2014, representing 3.7 per cent of commercial banks total credit [12]. The preceding analysis, it can be observed that though total credit to agriculture has been increasing in absolute terms but when measured in term of percentage share in total credit to the economy, it is found that the credit to agriculture constitutes an insignificant proportion of the total credit.

This represents a sign of neglect of the sector. However, adequate credit availability is critical to the enhancement of production in the agricultural sector in the economy and this has been a top priority for the Federal Government of Nigeria, thus, commercial banks have been directed to devout a major part of their funding to finance this sector. Despite this huge investment in the agricultural sector by the government in the form of provision of the needed finance for farmers, the dwindling fortune of the sector seems to persists, prompting the question as to the role of the financial system in providing credit to agricultural sector in Nigeria. Other numerous problems hindering agricultural financing in Nigeria include: diversion of loans meant for agricultural projects into frivolous activities which may not engender growth. High interest rate charged on loans acquired by farmers, inability of farmers to provide collateral securities for loans; political interference on loan procurement by political big whips and in fact lack of "strong political will" by the government of the day to solve protracted agricultural problem facing modern farming in Nigeria. There are various problems militating against agricultural production in Nigeria, which this study intends to seek adequate solution to:

The major objective of this study is to investigate the impact of commercial banks credit on the agricultural sector in Nigeria. Specifically, this study seeks to:

i.   Examine the impact of commercial bank loans on the Nigerian agricultural output.
ii.   Assess the impact of government expenditure on the Nigerian agricultural production.
iii. Determine the impact of agricultural credit guarantee scheme on agricultural production in Nigeria.
iv.   Investigate the impact of interest rate on the Nigerian agricultural production.

For the objectives of this study to be achieved, we divided this study into five sections. The first section deals with the introduction, the second dwells on literature review while research methodology was captured in the third section. Data analysis and discussion of findings was captured in section four and finally, section five draws managerial implications.

2. Research Hypotheses

The research hypotheses were formulated after the order of the research objectives to include:

i.   H01: there is no significant effect of commercial bank credit on the Nigerian agricultural production.
ii.   H02: Government expenditure in agriculture does not have any significant effect on agricultural production in Nigeria.
iii. H03: There is no significant effect of agricultural credit guarantee scheme fund on agricultural production in Nigeria.
iv.   H04: Interest rate has no significant effect on the Nigerian agricultural production.

3. Literature Review and Theoretical Framework

3.1. The Financial Liberalization Theory

This theory was the original work by McKinnon [34] and Shaw [50]. Under this theory, the consideration is central on the part played by government intervention in the financial markets as a critical setback to growth, investment and savings mobilization. The role of government in interest rate control and credit allocation to the productive economic sectors in developing countries hinders the mobilization of savings and discourages financial assets holding, economic growth and capital formation. Interest rate ceiling on deposit indirectly inhibited financial saving which resulted in excess liquidity outside the banking industry.

Government pervasive intervention and financial system involvement through the supervisory and regulatory framework, especially interest rate control and credit allocation tends to facilitate financial market distortions [34,59]. As such, the intervention of government is adversely affecting the market players'

decision regarding investment and savings and resulted in financial mediation fragmentation. The resultant effect of this scenario is an economy that is financially repressed.

According to McKinnon and Shaw [34,59], the central position is that credit allocation should be determined by the free market and financial markets should also be liberalized. Hence, there will be adjustment in the real interest rate to the equilibrium level and the elimination of projects with low yields. This will result in improvement in the overall savings and investment efficiency and increased supply of total real credit. In return, this would induce increased volume of investment that will engender the growth of the economy. The primary critique of the theory of financial liberalization has been from the paradigm of imperfect information. The Paradigm of Imperfect information argued with the proponents of financial liberalization and examines financial development problems in the form of information asymmetry and credit rationing as a result of expensive information.

According to Stiglitz and Weiss [54], two critical problems are associated with information asymmetry. Adverse selection of imperfect information paradigm is the first and the second is moral hazard, that is, the effect of information asymmetries on higher rates of interest which emanates from financial liberalization and reform policies in particular, worsen the taking of risk in the economy and also threatens the financial system stability which can result easily to financial crises.

3.2. Empirical Literature

3.2.1. Agricultural Finance and Agricultural Production

Numerous studies have been conducted to reveal the impact of agricultural finance on agricultural production in both developed and developing economies. Majority of these studies seems to suggest that bank credit has a positive effect on economic growth and development. For instance, Zuberi [61] in his study discovered that about 70 per cent of the overall credit to the agricultural sector was employed in fertilizer and seed purchases and submitted that, the majority of the increased agricultural production could be attributed to changes in the quality and quantity of fertilizer and seed.

Siddiqi, Mazhar-ul-Haq and Baluch [52] reported that the flow of fund assessed by farmers was found to have increase inputs demand for the sole aim of increasing crop production. Irrigation, the elasticity of credit amount, the use of chemical pesticides and fertilizer and number of tractors etc with respect to agricultural income as the dependent variable on per cultivated as well as per cropped acre basis revealed that credit for production and tube wells has a significant and positive impact at 95 per cent level of confidence. The use of fertilizer and number of tractors was insignificant with positive contributions. This was due largely on the inappropriate use of tractors and fertilizer.

The study of Afangideh [3] on the investigation of the several networks by which financial development is being channeled to the agricultural sector and also examines the effect of the financial sector development on the output and investment of the agricultural sector using aggregate data from 1970-2005. He adopted the Johansen cointegration and Engel-Granger two-step (EGTS) approaches. The empirical result from this study shows a significant and positive relationship between bank lending to agriculture and agricultural sector real output. The paper revealed that, emphasis on investment in the agricultural sector should top the agenda of financial sector development as a primary focus on economic diversification by Nigerian governments. The lesson from this study maintained that, the performance of the Nigerian agricultural sector is enhanced by the development of the financial sector.

Enga, and Alimba [21] examine the effect of commercial bank funding on the Nigerian agricultural sector from 1986 to 2005. The result from the OLS multiple regression revealed that, agricultural sector repayment ability, cash reserve ratio and interest rate have the theoretical signs indicating that an increase in interest rate and repayment ability of the agricultural sector causes an increase in the amount of credit by commercial banks to the agricultural sector while cash reserve ratio increases tend to decrease commercial bank funding to the Nigerian agricultural sector. This means that a per cent increase in lending and repayment ability caused a 0.0014 per cent decrease in the supply of agricultural credit while a percentage increase in cash reserve ratio will result in 0.06 per cent decrease in the supply of credit by commercial bank to the Nigerian agricultural sector during the study period.

Udah and Obafemi (2011) undertook an empirical investigation of the financial sector reforms effect on the Nigerian manufacturing and agricultural sectors by employing annual time series data between 1980 and 2007. The estimation techniques of impulse response and variance decomposition were employed in the estimation of the equation. Results showed that credit to private sector positively impacts the agricultural and manufacturing sector of the economy and capacity utilization. This implied domestic investment would be facilitated with increased credit to private sector. Furthermore, results findings revealed that currency outside banks had a negative impact on actual output of agriculture and manufacturing sectors. Also, currency outside banks boosted agricultural and manufacturing sectors and capacity utilization in the long run.

However, gross domestic savings impacted negatively on capacity utilization and a positive influence on manufacturing and agricultural outputs. Nevertheless, political instability declined agricultural and manufacturing outputs in the short period and the both sectors experienced increase in outputs in the medium and long periods. The results further showed that political instability caused expansions in capital utilization in the short period, while contractions were experienced in the subsequent terms.

3.2.2. Government Expenditure and Agricultural Production

The sole provider of capital resources and financial incentives for the agricultural sector over the years has been the government. According to Nwosu (2004), there have been consistent attempt to increase these support incentives by government through increased budgetary expenditure and provision of available affordable credit facilities. However, Nwosu (1995) revealed that, over the

years, government budgeting provision has serves as a critical determinant of the output and performance of the Nigerian agricultural sector.

Food and Agricultural Organization (FAO) concluded in 2008 that the allocation of capital to the Nigerian agricultural sector from 1970 to 1980 averaged at 4.74 per cent. This figure rose to 7.00 per cent between 1980 and 2000, and further moved to 10.00 per cent between 2001 and 2007. In spite of this upward trend, it is far below what is being recommended by FAO that government should assigned about 25 per cent of its budgetary allocation to the development of the agricultural sector. Along this reasoning, several studies are focused toward examining the impact of the expenditure of government on agricultural output. For instance, Nafisat (2009) examined the impact of the expenditure of Nigerian government on output using the ordinary least square (OLS) estimation technique for the period 1977-2006. The results show that agricultural output does not respond significantly to government expenditure on agriculture. It confirms that the government contribution to agriculture is not enough for its development. The study therefore suggested that the unique role of agriculture is recognized so that the sector can obtain its right share of government expenditure.

Iganiga and Unemhilin (2011) conducted a study on the impact of agricultural expenditure of government and other determinants of agricultural outputon the value of the Nigerian agricultural output. They specified the Cobb Douglas growth model to accommodate food important, annual average rainfall, commercial credit to agriculture, GDP growth rate, consumer price index and population growth rate. The error correction result revealed that, the capital expenditure of government had a positive relationship with agricultural output.

Adofu, Abula and Agama (2012) studied on the examination of the impact of budgetary provision of the government to the agricultural sector on its performance employing annual data from 1995-2009. Employing the ordinary least squares multiple regression model, the findings revealed that the relationship that existed between budgetary provision to agricultural sector and Nigerian agricultural production was found to significant, strong and positive. The recommendations made from the study were that, the allocation from the budget to the agricultural sector should be increased and monitored to achieve employment, food security, and ultimately, enhanced growth and development of the Nigerian economy.

Idoko, Sunday and Sheri (2012) used data from 1975 to 2010 when studying the effect government expenditure on the Nigerian agricultural output. The variables of this study included foreign direct investment on agricultural sector, annual rainfall, government expenditure on agricultural sector, agricultural credit guarantee scheme fund, and commercial bank loans and advances to the agricultural sector. The result of the estimated OLS model revealed that, the relationship that existed between government expenditure on agriculture and Nigerian agricultural sector output was found to significant and positive during the evaluation period. Uger (2013) studied the effect of government expenditure on agricultural sector using annual time series data from 1991 to 2010. Employing the OLS model, the findings revealed that, a positive but insignificant relationship existed between agricultural financing (expenditure) and its output in Nigeria.

3.2.3. Interest Rate and Agricultural Production

Interest rate constitutes a very important factor affecting the productivity of agriculture. As observed by Anyawu, Ukeje, Amoo, Igwe and Eluemunor (2010), one of the purposes of the policies of agricultural credit years over was the provision adequate credit to the agricultural players at an affordable cost and at the right time. According to Afolabi (2010), the intervention of government in form of sectoral credit allocation, oligopolistic tendencies, interest rate ceilings and highly concentrated market structure that resulted in monopoly as well as promoting other inefficiencies that are responsible for economic distortions. On the empirical ground, there are several studies investigating the effect of interest rate on agricultural productivity.

Omojimite (2012) carried out a study on the relationship between the growth of the Nigerian agricultural sector, macroeconomic policy and institutions finds significant signal in sustenance of the hypothesis that institutions are more critical in economic growth particularly the Nigerian agricultural sector growth. The study recommended that, interest rate should be liberalized to the agricultural sector and institutional supports should be strengthen basically on the areas such as extension services to farmers and subsidized inputs.

Amassoma, Nwosa and Ofere (2011) examined the nexus of lending rate, deregulation of interest rate and agricultural productivity in Nigeria using annual data spanning 1986 to 2009.The authors used ordinary least squares (OLS) econometric estimation technique and cointegration and ECM as well as long run relationship was revealed among the variables from the cointegration test while the error correction modelling revealed a significant and positive relationship between interest rate deregulation and agricultural productivity. The study further recommended that, interest rate should be market determined so as to serve as a catalyst for improved agricultural productivity. It is also expected that government must make it possible for the financial sector to carry out the policies that will guarantee available credit to the preferred sector, especially every sort of farmers and not bigger borrowers only like the government alone for the sole aim of boosting the productivity of the Nigerian agricultural sector.

Kolawole (2013) empirically investigated the effect of interest rate and some macroeconomic variables on the performance of the Nigerian agricultural sector using time series annual data from 1980 2011. The study employed the ECM model within the framework of OLS regression estimation. A long run relationship was revealed among the variables and the ECM model found out that there was an inverse relation between interest rate spread agricultural productivity. There was also a negative relationship between exchange rate and agricultural productivity. This means that assuming the interest rate spread levels and exchange rate is increased, there will be a decline in the degree of agricultural value added in the country.

3.2.4. Bank Credit and Economic Growth

Numerous studies exist examining the effect of bank credit on economic growth both in Nigeria and abroad. Ivie [25] and Udoka [55] analyzed the credit market

compositions in the United States and Nigeria to the degree to which financial markets have contributed to the growth of the economy. The Granger causality test was employed to test if private sector credit granger-caused the growth of the economy. A strong causal significant relationship was found between economic growth and credit.

Cooray [16] investigated the impacts of the efficiency of the financial sector on the growth of the economy comprising the middle and low income countries. Employing the financial augmented model, the study found support for a significant positive effect on economic growth by financial capital. Further investigation of the impacts of the activity, size and efficiency of the financial sector on the growth of the economy revealed that efficiency, size and activity are critical for the growth of the economy. The study revealed also the evidence of interaction between activity and size of the financial sector and financial sector efficiency and submitted that financial sector greater efficiency contributed to productive use of a financial capital of a country resulting in higher growth.

Mishra, Das and Pradhan [35] investigated the development of the credit market and the causality direction that runs between the development of the credit market and Indian economic growth from 1980 to 2008. The study revealed that, the development of the credit markets enhances Indian economic growth. It also revealed a significant and positive relationship between the development of credit markets and Indian economic growth.

4. Research Methodology

The quasi-experimental research design was adopted for this study. This type of research design employed empirical estimation techniques in estimating the causal relationship between the explanatory variables and the explained variable. In particular, the study adopts both descriptive and analytical methodologies in analyzing and in the estimation of the relevant relationships.

The descriptive methodology employs statistical tools such as simple tables, graphs, percentages and correlation analysis in analyzing trend performances of the variables captured in the study and examining the degree of relationship among the variables. The analytical methodology in this study was the ordinary least square (OLS) estimation techniques in estimating the relevant data. Times series data were collected on annual basis on the macroeconomic variables captured in the model.

4.1. Sources of Data

Data were secondarily sourced in this study. There were sourced basically from the secondary sources such as Central Bank of Nigeria (CBN) statistical bulletins (2014) and CBN statement of accounts and annual reports of various years. The data were collected on annual basis from 1970-2014.

4.2. Model Specification

This study is anchored on Mckinnon and Shaw [34] financial liberalization thesis. According to the theory, free market should be the basis for determining credit

allocation and the markets should be completely liberalized. By so doing, there will be enhancement in the efficiency of savings and investment and the overall real credit supply to the economy in general and agricultural sector in particular would increase.

Thus, an increase in credit to the agriculture sector by financial institutions provides investible funds needed for investment in agriculture in the country. This in turn leads to an increase in the output of agriculture. Based on this theoretical postulation, the study specified agricultural production as a linear function of credit disbursed by commercial banks to agricultural sector, government expenditure on agriculture, agricultural credit guarantee scheme fund, and interest rate. Agricultural output as the dependent variable was being proxied by agricultural gross domestic product (AGDP) was used as the dependent variable to represent agricultural output.

Based on these determinant factors, the model for this study is formulated and specified functionally as:

$$AGOUT = f\left(CBCRA,\ GEXPA,\ ACGSF,\ INT\right) \quad 4.1$$

Where:

AGOUT = agricultural output, measured by agricultural gross domestic product in Nigeria.
CBCRA = commercial banks' credit to agricultural sector in Nigeria
GEXPA = government expenditure on agriculture in Nigeria
ACGSF = agricultural credit guarantee scheme fund
INT = interest rate, represented by lending rate
The above model can be expressed in its estimated form as:

$$AGOUT = a_0 + a_1 CBCRA + a_2 GEXPA$$
$$+ a_3 ACGSF + a_4 INT + U \quad 4.2$$

The log form of the model can be written as:

$$LOG\left(AGOUT\right) = a_0 + a_1 LOG\left(CBCRA\right)$$
$$+ a_2 LOG\left(GEXPA\right) + a_3 ACGSF + a_4 INT + U \quad 4.3$$

Where:

AGOUT = the dependent variable
CBCRA, GEXP, ACGSF and INT = the independent variables
a_0 = the autonomous intercept of the model
a_1 to a_4 = the parameters to be estimated
U = random error term
The theoretical expectations about the signs of the coefficients of the parameters are:

$$a_1 > 0,\ a_2 > 0,\ a_3 > 0,\ a_4 < 0.$$

5. Data Presentation, Analysis and Discussion of Findings

5.1. Presentation of Data

Data as presented in Table 5.1 shows that agricultural output has been on the increase from 1970. Agricultural output rose to N10,011.5 million in 1980 from N2576.4 million in 1970. Output of agriculture further increased from N26,625.2 million in 1985 to N84,344.6 million in 1990 and then to N619,806.8 million in 1995. By 2000, agricultural output rose to N1,192,910.0 million and then

rose to N4,773,198.4 million in 2005 before reaching N13,413,842.5 million in 2012.

Table 5.1. Data Presentation on Selected Macroeconomic Variables

YEAR	AGDP	CBLA	GXPA	ACGSF	INT
1970	2,576.40	7.00	1.90	NA	7.00
1971	3,033.70	9.30	3.90	NA	7.00
1972	3,092.70	19.20	8.90	NA	7.00
1973	3,261.20	21.60	10.70	NA	7.00
1974	4,378.00	27.20	13.80	NA	7.00
1975	5,872.90	37.40	22.40	NA	6.00
1976	6,122.00	79.60	11.70	NA	6.00
1977	7,401.60	139.10	29.40	NA	6.00
1978	8,033.60	229.00	8.70	12,838.90	7.00
1979	9,213.10	329.60	9.10	35,816.70	7.50
1980	10,011.50	462.20	17.10	33,706.30	7.50
1981	13,580.30	590.60	13.00	36,770.80	7.75
1982	15,905.50	786.60	14.80	31,881.20	10.25
1983	18,837.20	940.40	12.80	39,881.10	10.00
1984	23,799.40	1,052.10	15.70	26,886.80	12.50
1985	26,625.20	1,310.20	20.40	48,213.10	9.25
1986	27,887.50	1,830.30	20.70	73,964.30	10.50
1987	39,204.20	2,427.10	46.10	108,780.80	17.50
1988	57,924.40	3,066.70	83.00	126,346.90	16.50
1989	69,713.00	3,470.50	151.80	134,066.70	26.80
1990	84,344.60	4,221.40	258.00	103,395.20	25.50
1991	97,464.10	5,012.70	208.70	80,859.60	20.01
1992	145,225.30	6,978.90	456.00	93,391.80	29.80
1993	231,832.70	10,753.00	1,803.80	81,273.80	18.32
1994	349,244.90	17,757.70	1,183.30	106,901.00	21.00
1995	619,806.80	25,278.70	1,510.40	166,645.10	20.18
1996	841,457.10	33,264.10	1,592.60	227,664.50	19.74
1997	953,549.40	27,939.30	2,058.90	242,028.30	13.54
1998	1,057,584.00	27,180.70	2,891.70	220,288.50	18.29
1999	1,127,693.10	31,045.70	59,316.20	241,839.00	21.32
2000	1,192,910.00	41,028.90	6,335.80	361,449.00	17.98
2001	1,594,895.50	55,846.10	7,064.50	728,545.40	18.29
2002	3,357,062.90	59,849.70	9,993.60	1,050,982.30	24.85
2003	3,624,579.50	62,102.80	7,537.40	1,151,015.00	20.71
2004	3,903,758.70	67,738.60	11,256.20	2,083,744.70	19.18
2005	4,773,198.40	48,561.50	16,325.60	9,493,854.50	17.95
2006	5,940,237.00	49,393.40	17,900.00	4,262,430.30	17.26
2007	6,757,867.70	149,578.90	32,500.00	4,425,461.50	16.94
2008	7,981,397.30	106,353.80	65,400.00	6,497,958.90	15.14
2009	9,186,306.10	135,701.30	22,440.00	8,328,565.80	18.99
2010	10,273,652.00	128,406.00	29,560.00	6,567,356.60	17.59
2011	11,590,120.20	255,205.30	41,169.90	10,189,604.20	16.02
2012	13,413,842.50	316,364.00	33,300.00	9,332,484.20	16.79
2013	16,816,553.01	343,696.80	39,431.01	9,256,676.80	16.72
2014	18,018,612.87	478,911.78	30,849.77	12,997,004.15	16.55

Source: CBN Statistical Bulletin, 2011 & 2014.

In 2014, agricultural output has risen to N18,018,612.87 million. In the similar manner, commercial banks' credit to agriculture rose from N7.0 million in 1970 to N37.4 million in 1975 before reaching N462.2 million in 1980. Commercial banks' credit to agriculture further rose to N1,310.2 million in 1985 , N4,221.4 million in 1990, N25,278.7 million in 1995, N41,028.9 million in 2000, N48,561.5 million in 2005, N128,406.0 million in 2010 before reaching N316,364.0 million in 2012. By 2014, commercial banks' credit to agriculture rose to N478,911.78 million.

Government expenditure in agriculture also showed consistent rise since 1970. Government spending rose from N1.9 million in 1970 to N22.4 million in 1975 and rose further to N17.1 million in 1980 before rising to

N20.4 million in 1985. Further increases in government spending in agriculture were also recorded in 1990 to the tune of N258.0 million before reaching the all-time high at N59, 316.2 million in 1999. Government expenditure in agriculture however fell sharply to N6,335.6 million in 2000 but rose again to N16,325.6 million in 2005, N29,560.0 million in 2010 and further to N33,300.0 million in 2012. Government expenditure in agriculture however fell to N30,849. 77 million.

Statistics as presented in Table 5.1 showed that agricultural credit guarantee scheme fund's accumulated credit rose from N12,838.9 million in 1978 to N33,706.3 million in 1980. Agricultural credit guarantee scheme fund's accumulated credit further increased to N43,213.1 million in 1985 to N103,395.2 million in 1990 but fell sharply to N81,273.8 million in 1993. Agricultural credit guarantee scheme fund's accumulated credit rose again rapidly from N166,645.1 million in 1995 to N361,449.0 million in 2000. Agricultural credit guarantee scheme fund's accumulated credit further increased from N728,545.4 million in 2001 to N9,493,854.5 million in 2005 but fell sharply to N4,262,430.3 million and thereafter increased consistently to N10,189,604.2 million and fell to N9,256,676.8 million in 2013. By 2014, agricultural credit guarantee scheme fund's accumulated credit increased to N12,997,004.15 million.

Statistical information as presented in Table 5.1 indicated that lending rate was relatively fixed at 7.0 per cent from 1970 to 1974 but declined and remained at 6.0 per cent from 1975 to 1977. This fixing of lending rate was as a result of government regulation of the financial system. Lending rate however increased consistently from 7.0 per cent in 1978 to 12.5 per cent in 1984. But beginning from 1986, lending rate in Nigeria has increased rapidly, assuming double digits. In absolute terms, lending rate rose from 10.25 per cent in 1982 to 25.5 per cent in 1990 but fell slightly to 17.98 per cent in 2000 but rose slowly to 24.85 per cent in 2002 and later fluctuated between 2003 and 2010 before settling at 16.72 per cent in 2013. By 2014, lending rate has fallen slightly to 16.55 per cent.

5.2. Analysis of results

The empirical analysis of the estimation equation is presented in Table 5.2 below.

Table 5.2. Empirical Results

Dependent Variable: LOG(AGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.433424	0.476307	5.108938	0.0000
LOG(ACGSF)	0.266374	0.053710	4.959506	0.0000
LOG(CBLA)	0.589469	0.085427	6.900257	0.0000
LOG(GXPA)	0.253502	0.052507	4.827938	0.0000
INT	-0.012878	0.009624	-1.338195	0.1903
R-squared	0.991758	Adjusted R-squared		0.990727
F-statistic	962.5835	Durbin-Watson stat		1.814881

Source: Researcher's Computation, 2016.

The estimated result as presented in Table 5.2 above is analyzed in terms of three benchmarks: econometric criteria, statistical criteria and priori economic criteria.

5.2.1. Economic a Priori Criteria

All the explanatory variables in this conformed to expected signs. The constant term which represented the

estimated regression line revealed a positive intercept. The implication is that, all things being equal, the explanatory variables will cause a 2.43 per cent change in the dependent variable, agricultural output. The positive sign of the coefficient of agricultural credit guarantee scheme fund shows the existence of a positive relationship between agricultural credit scheme fund and agricultural output in Nigeria. This means that a one per cent increase in agricultural credit guarantee scheme fund result in the Nigerian agricultural output is increased by 0.27 per cent, other factors remaining the same.

The positive sign of the coefficient of commercial bank credit to the agricultural sector revealed that the relationship that existed between the Nigerian agricultural output and commercial bank credit was positive. This means that a percentage increase in commercial bank credit will lead to a 0.59 per cent increase in the Nigerian agricultural output, other factors remaining the same. Similarly, the positive sign of coefficient of government expenditure on agricultural sector also shows that the relationship that existed between government agricultural expenditure and the Nigerian agricultural output is positive. This finding was in line with theoretical expectation that an increase in government expenditure on agriculture will caused a 0.25 per cent increase in the value of the Nigerian agricultural output, ceteris paribus.

Lastly, the relationship between interest rate and the Nigerian agricultural output was negative by the negative sign of its coefficient. This result is in line with theoretical expectation meaning that, as interest rate increased by a per cent, agricultural output will decrease by 0.01 per cent, ceteris paribus.

5.2.2. Statistical Criteria

The statistical test of significance of the model estimates is by employing the student's t-test statistical analysis at five per cent significance level. The critical t-test value from the table is 2.021. The decision therefore requires that the tabulated value be compared with the calculated value.

If the critical value of the t-test is greater than the t-test calculated at five per cent significance level, the parameter estimated is statistically insignificant and vice versa. From the analysis of this study, the variables (agricultural credit guarantee scheme fund, commercial banks' credit and advances to agriculture, and government expenditure in agriculture) were found to be statistically significant. Their calculated t-test values of 4.960, 6.900, and 4.828 for agricultural credit guarantee scheme fund, commercial banks' credit and advances to agriculture, and government expenditure in agriculture, respectively were all greater than the 2.021 critical value at five per cent significance levels.

The implication is that, government expenditure in agriculture, commercial bank loans and advanced to agriculture and agricultural credit scheme fund were capable of bringing a significant short run changes in the Nigerian agricultural output during the reference period. The high value of R-squared of 0.992 and adjusted R-squared of 0.990 revealed that the model has a goodness of fit on the estimation. The 0.990 value of the adjusted R-squared revealed a 99 per cent systematic variations in the dependent variable (Agricultural gross domestic product) as a result of the changes in the explanatory variables

(agricultural credit guarantee scheme fund, commercial banks loans and advances to agriculture, government expenditure in agriculture and interest rate).

This is a clear indication that the model has a high explanatory power. In the same vein, the F-statistic value of 962.58 is reasonably high and showed that the overall estimated regression model was at the conventional significance levels of five per cent found to be statistically significant. This was as a result of the calculated f-statistics (962.58) found to be greater that the critical f-statistics (2.61) at five per cent significance levels. The statistical significance of the overall model shows that the linear relationship between variables in the model exhibits a high degree of linear relationship. Thus, the linear combination of all independent variables is suitable in explaining the changes in the Nigerian agricultural output in the short run. This also means that the independent variables have joint effect on the dependent variable.
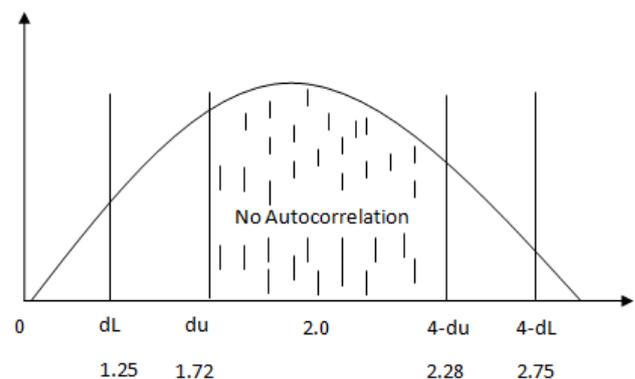
5.2.3. Econometric Criteria

The Durbin-Watson (DW) statistic is employed here to reveal if the model exhibits the presence/absence of autocorrelation. The DW statistic at five percent level of significance is computed as follows:-

$$N = 37 dL = 1.25; 4 - dL = 2.75$$

$$K^1 = 4 du = 1.72; 4 - du = 2.28.$$

From the computations above, the critical regions of the D-W graph is represented as follows.

The DW value of 1.81 was found to be within the accepted region from the result, implying that, the model has no autocorrelation. This region is represented by the shaded region of the D-W graph above, showing that there is no autocorrelation among the residual terms in the model. This means that the estimated equation is well-behaved. The model therefore can be applied in the short run for policy formation in the economy of Nigeria.

5.3. Test of Hypotheses

This sub-section conducts test of hypothesis to validate or invalidate the earlier formulated hypotheses in section one of this study. The test is conducted using the t-statistic test of significance earlier employed in testing the statistical test of significance. To carry out any meaningful test, the following decision rule is formulated to guide the testing process.

Decision Rule

If the value of the calculated t-test is greater than the value of the tabulated t-test at five per cent significance

levels, the alternative hypothesis (H1) of the study is accepted while the null hypothesis (H0) is rejected and vice versa.

Hypothesis One

Ho: There is no significant relationship between commercial bank credit and agricultural production in Nigeria. From the results obtained, the t-statistical value calculated for commercial banks' credit to agricultural sector of 6.900 was greater at five per cent significance levels that the 2.021 value of the critical t-test. Hence, the alternative hypothesis is accepted while the null is rejected. The implication is that, there exist a significant relationship between commercial bank credit and agricultural production in Nigeria.

Hypothesis two

H0: Government expenditure in agriculture has no significant impact on agricultural production in Nigeria. The findings revealed that, the t-statistical value calculated for government expenditure in agricultural sector of 4.828 was greater at five per cent significance levels that the 2.021 value of the critical t-test. Hence, the alternative hypothesis is accepted while the null is rejected. The implication is that, there exist a significant relationship between government expenditure in agriculture and agricultural production in Nigeria.

Hypothesis Three

H0: There is no significant effect of agricultural credit guarantee scheme fund on agricultural production in Nigeria. The findings revealed that, the t-statistical value calculated for agricultural credit guarantee scheme fund of 4.960 was greater at five per cent significance levels that the 2.021 value of the critical t-test. Hence, the alternative hypothesis is accepted while the null is rejected. The implication is that, there is no significant effect of agricultural credit guarantee scheme fund on agricultural production in Nigeria.

Hypothesis Four

H0: Interest rate does not have any significant effect on agricultural production in Nigeria. The findings revealed that, the t-statistical value calculated for interest rate of 1.338 was lower at five per cent significance levels that the 2.021 value of the critical t-test. Hence, the alternative hypothesis is rejected while the null hypothesis is accepted. The implication is that, there is no significant effect of interest rate on agricultural production in Nigeria.

5.4. Discussion of Findings

The analyzed results from the preceding section showed that commercial banks' credit to agricultural sector has resulted to increased output of agriculture in Nigeria. This result is not surprising as increase in the quantum of credit given to farmers will increase their investment in agricultural activities and hence leads to an increase in the output of agriculture in Nigeria. In the same vein, the results also showed that an increase in government investment in agriculture has resulted in the increase in agricultural output in Nigeria. This result means that an increase in government spending in agriculture in terms of providing infrastructural facilities and farm inputs will result in the Nigerian agricultural output experiencing an increase.

Further investigation of the result revealed that there existed a significant relationship between agricultural

credit guarantee scheme fund and agricultural in Nigeria. This means that increased guarantee of credit by the government via agricultural credit guarantee scheme fund spurred more farmers to collect more loans for agricultural investment and hence increase in agricultural production. Meanwhile, the results revealed the absence of a significant relationship between interest rate and agricultural production in Nigeria. This because an increase in interest rate makes cost of borrowing very high and leads to reduction in agricultural investment as farmers find it difficult to borrow at high interest rate.

6. Summary of Findings, Conclusion and Recommendations

6.1. Summary of Findings

The main focus and purpose of this study is to examine commercial bank credit effect on agricultural output in Nigeria. The OLS estimation technique was employed in specifying the model of the study. The analysis of this study resulted in the following summary of findings:

i.   The estimated results showed the existence of a significant and positive relationship between agricultural credit guarantee scheme fund and agricultural production in Nigeria. The implication is that, an increase in agricultural credit guarantee scheme fund resulted in increased agricultural production in Nigeria.

ii. The estimated result showed the existence of a significant and positive relationship between commercial bank credit to agricultural sector and agricultural production in Nigeria. The implication is that, an increase in commercial bank credit resulted in increased agricultural production in Nigeria.

iii. The estimated result showed the existence of a significant and positive relationship between government expenditure in agricultural and agricultural production in Nigeria. This result was also in line with theoretical expectation, showing that government spending in the agricultural sector brings about a boost in the output of farmers.

iv. Meanwhile, the negative relationship between interest rate and agricultural output also confirms theoretical postulation. This is because an increase in the rate of interest charged farmers for funds borrowed will discourage many farmers from borrowing and hence less agricultural investment.

7. Conclusion

Agricultural credit is believed to be a very important ingredient in farming activities as adequate provision of funds to famers makes all activities in the farm possible and leads to increase in output. Based on this perception, the study was basically to ascertain the impact of commercial bank credit to agriculture on output of agricultural sector in Nigeria. From the results obtained, there existed a significant relationship between

agricultural credit guarantee scheme fund and agricultural production in Nigeria. The result also showed that commercial banks credit to agricultural sector related significantly and positively with the agricultural production in Nigeria.

Further investigation revealed that, government expenditure on agriculture has a significant and positive effect on agricultural production in Nigeria. Lastly, the result showed a negative effect existed between interest rate and agricultural production in Nigeria.

8. Recommendations

The following policy recommendations emanated from the findings of this study:

i. The positive effect of agricultural credit guarantee scheme fund on agricultural production calls for the proper funding of the scheme by the government. To this end, there is need for the government to continue to guarantee loans given to farmers as this will encourage the banks to lend more to farmers.

ii. The positive effect of commercial banks' credit to agriculture on agricultural production calls for more allocation of credit to the agricultural sector in Nigeria. This can be achieved by the central bank of Nigeria (CBN) lowering the interest rate charged on farmers for money borrowed for the purpose of agricultural production.

iii. The positive impact of government expenditure on agriculture and agricultural production also calls for more government spending in the sector as such spending provides the needed fund for the farmers for increased agricultural production.

iv. The negative effect of interest rate on agricultural output calls for policy to lower interest rate charged by commercial banks to farmers, the lowering of interest rate will able famers to borrow more funds for the purpose of agricultural investment and hence the increase in agricultural production.

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