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EFFECT OF COMMERCIAL BANKS' CREDIT ALLOCATED TO AGRICULTURAL SECTOR ON ECONOMIC GROWTH IN NIGERIA

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ABSTRACT

The empirical literatures on the effect of commercial banks' credit allocated to agricultural sector on economic growth in Nigeria are mixed. The objective of this paper is to evaluate the effect of commercial banks' credit allocated to agricultural sector on economic growth in Nigeria from 2014q1 to 2020q4 using error correction model (ECM). The results of the investigation revealed that commercial banks' credit allocated to agricultural sector had a significant positive effect on economic growth in Nigeria. A 1% increase in commercial banks' credit allocated to agricultural sector led to 23.37% increase in real GDP in Nigeria. The commercial banks' credit allocated to other sectors did not spur economic growth in Nigeria. The agricultural sector is the backbone of Nigerian economy. The apex bank should ensure that the commercial banks are efficient in the allocation of resources. The Central Bank of Nigeria should direct the commercial banks to allocate the highest percentage of their credit to agricultural sector in order to achieve a sustainable agri-food system and economic growth in Nigeria.

Keywords: Institutions and Economic Growth, Error Correction Model, Nigeria.
JEL Classification: E51, O43, Q14, C24

INTRODUCTION

The contribution of the banking system towards the growth of an economy is primarily credited to the role it plays in savings mobilisation and allocation of resources to deficit sectors of the economy (Nwakoby and Ananwude, 2016). Access to credit enables enterprises to enhance their productive capacity and their potential to grow (Were et al., 2012). The agricultural sector in Nigeria faces difficulty in the accessibility of financial resources especially from the commercial banks that hold about 90% of the total financial sector assets. The commercial banks in Nigeria are not interested in allocating credit to agricultural sector. The agricultural sector that is the backbone of Nigerian economy is not accorded the priority in credit allocation. The inadequate commercial banks' credit that was allocated to agricultural sector has resulted to a low level of economic growth in Nigeria.

The results of previous studies on the effect of commercial banks' credit allocated to agricultural sector on economic growth in Nigeria are mixed. For example, the studies by Ubesie, et al. (2019) and Nteegah (2017) indicate that commercial banks' credit allocated to agricultural sector had no significant effect on economic growth in Nigeria and the studies by Akujuobi and Nwezeaku (2015) and Oladapo and Adefemi (2015) show that commercial banks' credit allocated to agricultural sector had a significant positive effect on economic growth in Nigeria. The objective of this paper is to evaluate the effect of commercial banks' credit allocated to agricultural sector on economic growth in Nigeria.

This study is significant because of the followings reasons. It reveals that commercial banks' credit allocated to agricultural sector had a significant positive effect on economic growth in Nigeria. It also reveals that commercial banks' credit allocated to other sectors did not spur economic growth in Nigeria. It indicates that agricultural sector is the backbone of Nigerian economy. It suggests that the Central Bank of Nigeria should direct the commercial banks to allocate the highest percentage of their credit to agricultural sector in order to achieve a sustainable agri-food system and economic growth in Nigeria.

This paper consists of six sections. The next section is literature review. Section 3 presents the methodology. Section 4 discusses the results. Section 5 is the conclusions and recommendations and section 6 suggests areas for further studies.

LITERATURE REVIEW

According to Akintola et al. (2020), the link between finance and economic growth continues to be a subject of significant interest in macroeconomics. Financial development is considered to be the principal input for economic growth and an important component that affects growth through adjustment in productivity growth and efficiency of capital. It affects the accumulation of capital through its impact on the savings rate by altering the proportion of savings (Pagano, 1993; Levine, 1997). This theoretical support can be traced to the work of Schumpeter (1911), the first to argue that the development of the financial sector spurs technological innovation and economic growth (Agnes, 2009; James, 2011; Bah et al., 2016). Schumpeter posited that innovation in business is the major reason for increased investments and business fluctuations. These innovations could be in terms of new ideas and the commercial applications of new technology, new materials, new methods and new sources of energy. This was later buttressed in the seminal works of McKinnon (1973) and Shaw (1973) which underscored that financial liberalisation will increase savings and then capital accumulation that would be invested and lead to economic growth.

The theoretical underpinning of this study is built on three competing theories of the finance and economic growth nexus - supply-leading, demand-following and the feedback hypothesis purported by Greenwood and Jovanovic (1990). Firstly, the supply-leading or finance-led growth hypothesis posits a causal relationship from financial growth to real growth. The deliberate creation of financial institutions and markets increases supply of financial services and catalyses growth in the real sector. This view which was advanced by Patrick (1966), states that the existence of a well-functioning financial sector in channeling the limited resources from surplus units to deficit units would provide efficient allocation of resources, thereby leading economic sectors in their growth process. Secondly, demand-following or growth-led hypothesis postulates a causal relationship from real growth to financial growth. As the real sector develops, the increased demand for financial services induces growth in the financial sector. This view was advanced by Robinson (1952), and in summary, it states that financial development follows economic growth and where enterprise leads, finance follows. Thirdly, the feedback hypothesis or the "bi-directional causality view" postulates that the finance and economic developments are mutually causal, that is, they have bi-directional causality. According to this hypothesis, a country with a well-developed financial system could promote high economic expansion through technological changes, product and services innovation. This in turn will create high demand on the financial arrangements and services (Levine, 1997). As the banking institutions effectively respond to these demands, higher economic growth will be achieved. Both financial growth and economic developments therefore are inter-dependent, and their relationships could lead to bi-directional causality (Choong et al., 2003).

There were previous studies on banks' credit and economic growth in other countries of the world. Wambugu (2019) evaluated the effect of sectoral distribution of commercial banks' credit to building and construction, agriculture, manufacturing, trade and transport, storage and communication sectors on economic growth in Kenya from 1970 to 2017 utilising autoregressive distributed lag (ARDL) bound approach. It was found that commercial banks' credit to agricultural sector had a significant positive effect on economic growth. Belinga et al. (2016) examined the relationship between bank credit and economic growth in Cameroon from 1969-2013 using vector error correction model (VECM). They found that there is a unidirectional causal relationship from domestic credit to the private sector by banks to gross domestic product per capita. Timsina (2014) analysed the impact of bank credit on economic growth in Nepal from 1975-2013 using error correction model ECM). The results indicate that bank credit to the private sector has a positive impact on economic growth in Nepal in the long run. The growth in real private sector credit by 1 percentage point contributes to an increase in real gross domestic product by 0.40 percentage point in the long run. The feedback effect from economic growth to private sector credit was found in the short run. Vazakidis and Adamopoulos (2009) examined credit market development and economic growth in Italy from 1965-2007 VECM. They found that economic growth had a positive effect on credit market development. Liang (2007) examined whether the quality of legal institutions matters in the banking sector development and economic growth in China from 1990 to 2001 using generalized method of moment (GMM) technique. The results of the investigation show that, without an effective and well-developed legal system, banking sector development only partially contributed to China's economic growth. Koivu (2002) investigated whether the efficient banking sectors accelerate economic growth in transition countries from 1993-2000 using a fixed-effects panel model and unbalanced panel data. The results show that the interest

rate margin has a significant negative relationship with economic growth and an increase in credit did not increase economic growth and in some cases it led to a decline in growth rates.

There were previous studies on banks' credit allocated to agricultural sector and economic growth in Nigeria. Obi-Nwosu et al. (2022) ascertained the effect of commercial banks' credit to agriculture on the agricultural sector's contribution to real gross domestic product in Nigeria from 1986 to 2020 utilising the ARDL model. They found that commercial banks' credit to agriculture does not affect the sector's contribution to real gross domestic product. Ubesie, et al. (2019) evaluated the effect of allocation of deposit money banks' credit to agricultural, industrial, building and construction and wholesale and retail trade on economic growth in Nigeria from 2008Q1 to 2017Q4 using ordinary least squares (OLS) regression model. They found that that deposit money banks' credit to agricultural sector had no significant effect on economic growth in Nigeria. Nteegah (2017) evaluated the effect of the allocation of banks' credit to selected sectors on economic growth in Nigeria from 1981-2015 employing VECM. The results showed that banking credit to agricultural sector had no significant effect on economic growth in Nigeria. Ihemeje and Ikwuagwu (2016) determined the effect of deposit money banks' credit to various sectors on economic growth in Nigeria from 1985-2014 employing ECM and OLS regression model. They found that deposit money banks' credit to agricultural sector had a positive effect on economic growth in Nigeria. Makinde (2016) examined the implications of commercial bank loans to industrial, manufacturing, agriculture and the service sectors on economic growth in Nigeria from 1986 to 2014 using OLS regression model. The findings revealed that only the agricultural sector had being enjoying much of bank credit and it has been making positive impact on economic growth in Nigeria. Akujuobi and Nwezeaku (2015) determined the effect of bank lending on economic development in Nigeria from 1980-2013 using OLS regression model. They found that the commercial banks' credit to production sector had a significant positive effect on economic development in Nigeria. Oladapo and Adefemi (2015) analysed the impact of sectoral allocation of banks' loans and advances to production, general commerce, services and 'other' sectors on economic growth in Nigeria from 1960-2012 using OLS regression model. They found that banks' credit allocated to production had a significant positive impact on economic growth during intensive regulation and deregulation. Nwaeze et al. (2014) determined the effect of commercial banks' loans and advances to agricultural and manufacturing sectors on economic growth in Nigeria from 1994 to 2013 using OLS regression model. They found that a 1% increase in commercial banks' loans and advances to agricultural sector led to 0.4097% increase in real GDP.

The results of previous studies on the effect of commercial banks' credit allocated to agricultural sector on economic growth in Nigeria are mixed. For example, the studies by Ubesie, et al. (2019) and Nteegah (2017) indicate that commercial banks' credit allocated to agricultural sector had no effect on economic growth in Nigeria and the studies by Akujuobi and Nwezeaku (2015) and Oladapo and Adefemi (2015) show that commercial banks' credit allocated to agricultural sector had a significant positive effect on economic growth in Nigeria.

METHODOLOGY

Theoretical Framework of the Study

The theoretical framework of this study is the supply-leading or finance-led growth hypothesis. This hypothesis posits a causal relationship from financial growth to real growth. The deliberate creation of financial institutions and markets increases supply of financial

services and catalyses growth in the real sector. This view which was advanced by Patrick (1966), states that the existence of a well-functioning financial sector in channeling the limited resources from surplus units to deficit units would provide efficient allocation of resources, thereby leading economic sectors in their growth process.

Model Specification

The effect of commercial banks' credit allocated to agricultural sector on economic growth in Nigeria from $2014q_1$ to $2020q_4$ is evaluated using error correction model. Based on the theoretical framework of the study, gross domestic product, and commercial banks' credit allocated to agriculture, industry, construction, trade/general commerce, government, and services are included in the model. The functional form of the model for this study is stated in equation (1) below.

$$GDP = f(CBA, CBI, CBC, CBT, CBG, CBS) \quad (1)$$

Where GDP is gross domestic product, CBA is commercial banks' credit to agriculture, CBI is commercial banks' credit to industry, CBC is commercial banks credit to construction, CBT is commercial banks' credit to trade/general commerce, CBG is commercial banks' credit to government, CBS is commercial banks' credit to services and f is functional notation. The effect of commercial banks' credit to agriculture, industry, construction, trade/general commerce, government, and services on economic growth in Nigeria is expressed with error correction model specification in equation (2).

$$\Delta GDP_{t-1} = \beta_0 + \beta_1 \Delta CBA_{t-1} + \beta_2 \Delta CBI_{t-1} + \beta_3 \Delta CBC_{t-1} + \beta_4 \Delta CBT_{t-1} + \beta_5 \Delta CBG_{t-1} + \beta_6 \Delta CBS_{t-1} - \Pi_1 ECM_{t-1} + e_t \quad (2)$$

Where Δ is the first difference operator, β_0 is coefficient of constant term, β_1 to β_6 are the short run regression coefficients. The coefficients, β_1 to β_6 measure the short run effect of a change in commercial banks' credit to agriculture, industry, construction, trade/general commerce, government, and services on economic growth in Nigeria respectively. Π_1 is coefficient of the estimated lagged residual of equation (2) or error correction coefficient and it shows how much of the disequilibrium is being corrected. ECM_{t-1} is error correction term lagged for one period, subscript t is current time, and e_t is white noise error term with zero mean and constant variance and all other variables are as previously defined. Based on the theoretical framework of the study, the coefficients of commercial banks' credit to agriculture, industry, construction, trade/general commerce, government, and services are expected to be positive. The coefficient of ECM_{t-1} is expected to be negative. If the coefficient of ECM_{t-1} is zero, it shows that the model is in equilibrium. Suppose the coefficient of ECM_{t-1} is positive, it shows that the model is diverging from equilibrium and it will be restored to equilibrium but only after a long period of time. Conversely, a negative coefficient of ECM_{t-1} shows that the model is converging towards the equilibrium and it will be restored to equilibrium within the short period. The first differences of the variables are used for ECM specification because all the variables are stationary at the first differences.

Model Estimation Procedure

The time series properties of the data are analyzed using Phillips-Perron (PP) unit root test of Phillips and Perron (1988). The long-run relationships among the variables are verified using the Johansen (1988) cointegration test. The ECM is estimated in order to determine the effect

of commercial banks' credit to agriculture, industry, construction, trade/general commerce, government, and services on economic growth in Nigeria. The statistical reliability of the model is evaluated using Breusch-Godfrey serial correlation LM test, Cusum of squares test and histogram-normality test. The data are analyzed using e-view 10.

Source and Description of Data

The empirical analysis is conducted using quarterly data. The time span covered is $2014q_1$ to $2020q_4$. The choice of 2014 as a base year is due to the fact that the classification of Nigerian economy into agricultural, industrial, construction, trade/general commerce, government, and services sectors started in that year. Before 2014, Nigerian economy was classified into production, general commerce, services, and others sectors. The choice of 2020 as a terminal year is premised on the fact that the time series data of the variables that are used for the study are available up to that year. The gross domestic product at 2010 constant basic prices and commercial banks' credit to agriculture, industry, construction, trade/general commerce, government, and services are used in this study. The gross domestic product is a proxy of economic growth and commercial banks' credit to agriculture, industry, construction, trade/general commerce, government, and services are proxies of financial growth. All the data are in billions naira. The data of all the variables are obtained from Central Bank of Nigeria Statistical Bulletin.

RESULTS AND DISCUSSION

Pre-Estimation Tests

The results of Phillips-Perron (PP) unit root test are presented in table 1. Only GDP is stationary at level because PP test statistic is greater than test critical values in absolute terms at 1 percent, 5 percent and 10 percent levels of significance and p-value is less than 5 percent. All the other variables are non-stationary at levels because PP test statistic is less than test critical values in absolute terms at 1 percent, 5 percent and 10 percent levels of significance and p-value is greater than 5 percent. All the variables are stationary at first differences because PP test statistic is greater than test critical value in absolute terms at 5 percent level of significance and p-value is less than 5 percent.

Table 1
Results of Phillips-Perron Unit Root Test

Variables	Levels		First Differences		Order of Integration
	PP test statistic	Prob*	PP test statistic	Prob*	
GDP	-4.2732	0.0025	-7.0510	0.0000	I(0) & I(1)
CBA	2.2603	0.9999	-4.2385	0.0029	I(1)
CBI	-1.4587	0.5387	-4.0868	0.0041	I(1)
CBC	-0.4481	0.8868	-5.4952	0.0001	I(1)
CBT	-1.9833	0.2919	-6.5394	0.0000	I(1)
CBG	-0.7218	0.8247	-3.0777	0.0409	I(1)
CBS	-1.9019	0.3265	-8.1380	0.0000	I(1)

Test critical values: 1% level -3.7115
5% level -2.9810
10% level -2.6299

*Mackinnon (1996) one sided p-values

Source: Authors' Computation Using E-view 10

The results of Johansen test for cointegrating vectors are presented in table 2. The Trace statistic is greater than 5 percent Critical Value and p-value is less than 5 percent for all except at most 6 hypothesized numbers of cointegrating equations. The Trace test denotes rejection of 6 hypothesized numbers of cointegrating equations at 5 percent level. The Trace test

indicates 6 cointegrating equations at the 5 percent level. The Max-Eigen statistic is greater than 5 percent Critical Value and p-value is less than 5 percent for none, at most 1, at most 2 and at most 5 hypothesized numbers of cointegrating equations. The Maximum Eigenvalue test denotes rejection of 4 hypothesized numbers of cointegrating equations at the 5 percent level. The Maximum Eigenvalue test indicates 3 cointegrating equation at the 5 percent level. Both the Trace and Maximum Eigenvalue tests indicate that the variables that are used for this study are cointegrated.

Table 2
Johansen Test for Cointegrating Vectors

Hypothesized No. of CE(s)		**Trace**			**Maximum Eigenvalue**		
Trace	**Maximum Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob****	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob****
None*	None*	307.553	125.615	0.000	105.820	46.231	0.000
At most 1*	At most 1*	201.733	95.754	0.000	94.440	40.078	0.000
At most 2*	At most 2*	107.293	69.819	0.000	43.796	33.877	0.002
At most 3*	At most 3	63.497	47.856	0.001	26.302	27.584	0.072
At most 4*	At most 4	37.195	29.797	0.006	18.730	21.132	0.105
At most 5*	At most 5*	18.465	15.495	0.017	15.597	14.265	0.031
At most 6	At most 6	2.8683	3.8415	0.0903	2.8682	3.8415	0.090

*denotes rejection of the hypothesis at the 0.05 level
** Mackinnon- Haug- Michelis (1999) p-values
Source: Authors' Computation Using E-view 10

Error Correction Estimates

The error correction estimates of D[GDP(-1)] are presented in table 3. Only the coefficient of commercial banks' credit to agricultural sector is positive and statistically significant. The commercial banks' credit to agricultural sector has a significant positive effect on economic growth. A 1% increase in commercial banks' credit to agricultural sector led to 23.37% increase in real GDP in Nigeria. The finding that commercial banks' credit to agricultural sector has a significant positive effect on economic growth in Nigeria is in conformity with the supply-leading or finance-led growth hypothesis. This finding is also in conformity with the results of previous researchers. For example, Wambugu (2019) found that commercial banks' credit to agricultural sector had a significant positive effect on economic growth in Kenya and Oladapo and Adefemi (2015) found that banks' credit allocated to production had a significant positive impact on economic growth in Nigeria during intensive regulation and deregulation. The commercial banks' credit allocated to other sectors did not spur economic growth in Nigeria.

The coefficient of error correction term is negative and statistically significant. The negative sign of the coefficient of error correction term indicates a backward movement toward long run equilibrium from short run disequilibrium. Table 3 shows that the deviation of the model in the short run from long run equilibrium is corrected by 102 percent in one year. The coefficient of determination is 0.5678. This implies that 56.78 percent variation in gross domestic product is explained by a change in commercial banks' credit allocated to agriculture, industry, construction, trade/general commerce, government, and services and 43.22 percent variation in gross domestic product is explained by a change in other factors outside the model. The F-statistic of 3.3785 and p-value of F-statistic of 1.76 percent shows

that the overall regression model is statistically significant. The Durbin-Watson statistic is 2.0030. The estimated error correction model is free from autocorrelation because the Durbin-Watson statistic is approximately equal to 2.

Table 3
Error Correction Estimates of D[GDP(-1)]

Variable	Coefficient	Std Error	t-Statistic	Prob.
C	-245.9251	322.5020	-0.7626	0.4556
D[CBA(-1)]	23.3739	8.8855	2.6306	0.0170
D[CBI(-1)]	-1.1495	0.9057	-1.2692	0.2205
D[CBC(-1)]	-3.1654	5.7285	-0.5526	0.5873
D[CBT(-1)]	2.0220	2.8159	0.7181	0.4819
D[CBG(-1)]	0.8040	2.5437	0.3161	0.7556
D[CBS(-1)]	-1.0433	0.4959	-2.1040	0.0497
ECM(-1)	-1.0243	0.2470	-4.1471	0.0006

R-squared: 0.5678 F-statistic: 3.3785 Prob(F-statistic): 0.0176 D-W stat: 2.0030
Source: Authors' Computation Using E-view 10

Post-Estimation Tests

The results of Breusch-Godfrey serial correlation LM test are presented in table 4. The error correction model assumes that there is no autocorrelation among the error terms. The Breusch-Godfrey serial correlation LM test statistic is used to verify the assumption of no serial correlation, or no autocorrelation. In an application, if p-value of chi-square of Breusch-Godfrey serial correlation LM test is less than 5 percent, one can accept the hypothesis that there is no residual autocorrelations. The p-value of chi-square of Breusch-Godfrey serial correlation LM test is equal to 0.01 percent. This result shows that there is no autocorrelation among the error terms.

Table 4
Breusch-Godfrey Serial Correlation LM Test

F-statistic	20.52686	Prob. F(2,19)	0.0000
Obs*R-squared	19.14126	Prob. Chi-Square(2)	0.0001

Source: Authors' Computation Using E-view 10

The Cusum of Squares test is used to verify whether the error correction model is stable. The error correction model is stable if the Cusum of squares lies within 5 percent critical bound dotted red lines. As we can see in Figure 1, the Cusum of squares lies within 5 percent critical bound dotted red lines. The Cusum of squares test indicates that the error correction model is stable at 5 percent level of significance.

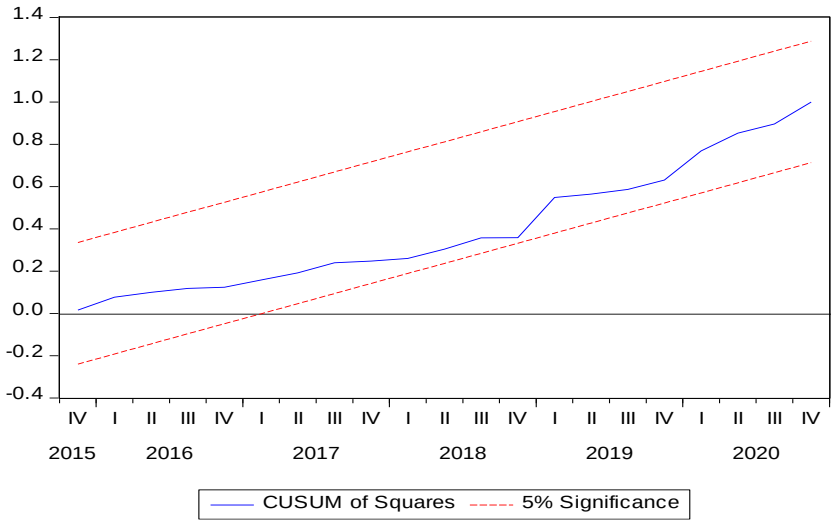

Figure 1: Cusum of Squares Test

The histogram-normality test is shown in figure 2. The Jarque-Bera statistics is a goodness-of-fit test of whether sample data have the skewness and kurtosis matching a normal distribution. The Jarque-Bera statistics is close to zero and the probability of Jarque-Bera statistic is greater than 5 percent. These results show that the estimated error correction model is normally distributed.

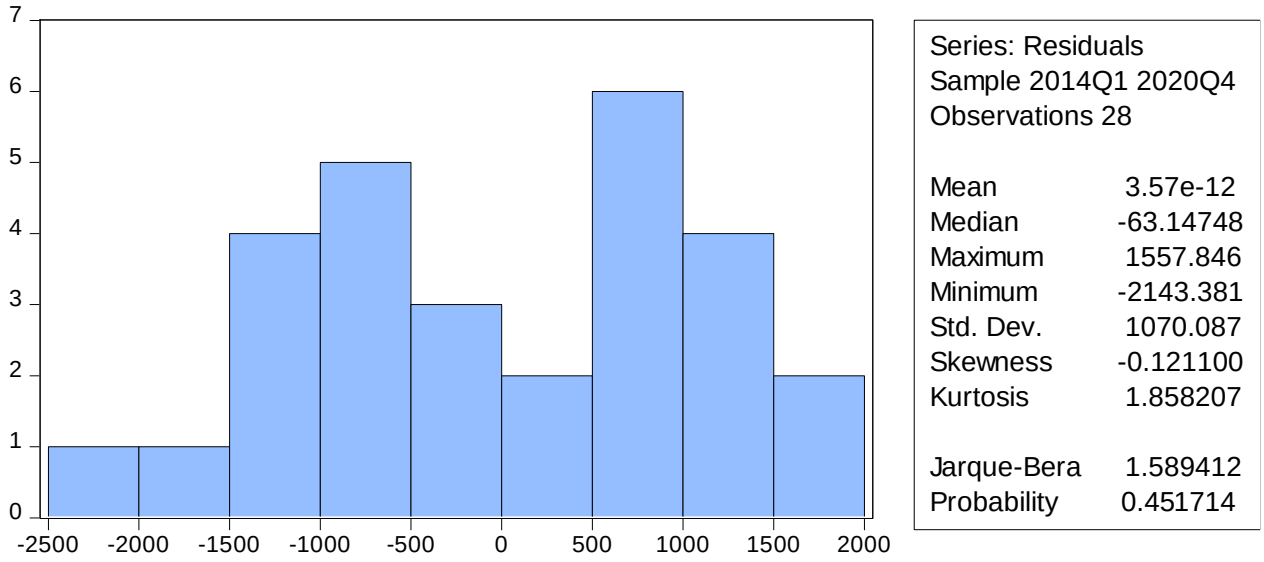

Figure 2: Histogram-Normality Test

CONCLUSIONS AND RECOMMENDATIONS

The commercial banks' credit allocated to agricultural sector had a significant positive effect on economic growth in Nigeria. The commercial banks' credit allocated to other sectors did not spur economic growth in Nigeria. The agricultural sector is the backbone of Nigerian economy. The agricultural sector that is the backbone of Nigerian economy is not accorded the priority in credit allocation. The inadequate commercial banks' credit that was allocated to agricultural sector has resulted to a low level of economic growth in Nigeria. The apex bank should ensure that the commercial banks are efficient in the allocation of resources. The Central Bank of Nigeria should direct the commercial banks to allocate the highest percentage of their credit to agricultural sector in order to achieve a sustainable agri-food system and economic growth in Nigeria.

Future Work

The percentages of commercial banks' credit that are allocated to the various sectors and the percentage contributions of the various sectors to gross domestic product in Nigeria are outside the scope of this study. **T**he effect of commercial banks' credit that is allocated to agricultural sector on output of agricultural sector in Nigeria is also outside the scope of this paper. These issues are left for future studies.

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