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Bank Credits and Economic Growth

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Abstract **Original Research Article**

This study examined the effect of bank credit on the growth of the Nigerian economy. The study was specifically meant to assess the impact of bank credit to the agricultural sector on the growth of the Nigerian economy; to determine the effect of bank credit to the manufacturing sector on the growth of the Nigerian economy and lastly to assess the effect of bank credit to the mining and quarrying sector on the growth of the Nigerian economy. To achieve these objectives, the study employed the ex-post facto research approach. Time-series data were collected from the CBN Statistical Bulletins using the desk survey method from 1985 to 2018. The data were analysed using various econometric techniques such as the descriptive statistics test, the Augmented Dickey-Fuller (ADF) unit root test, Correlation matrix, and Autoregressive Distributive Lag (ARDL). Findings from the analyses showed that there was an insignificant short-run effect of bank credit on the growth of the Nigerian economy. It was also revealed that there was a significant long-run effect of bank credit on the growth of the Nigerian economy. Based on these findings, the study recommend the establishment of an agency were all commercial farmers would be registered with responsibilities to interface with banks to ensuring that loans are free from collateral requirements, interest rate charges and loan administration bottlenecks in order to encourage commercial farming and towards enhanced economic growth in Nigeria. Also, policies targeted at reducing the interest rate charged on bank credit to the manufacturing sector in Nigeria should be implemented by the CBN through the conscious subsidy of all bank credit to the manufacturing sector as this is required to trigger productivity and enhance short term economic growth.

Keywords: Bank Credits, Gross Domestic Product, Nigerian Economy, Economic Growth, Time Series.

1. INTRODUCTION

One of the major functions performed by deposit money banks is the granting of loans and advances to the productive sector for productive purposes. Loans could be defined as the amount extended out with a promise to repay both the principal and interest at a stipulated future date which may range from just a day to several years. Loans could be classified basically as short term, medium-term or long-term loans depending on the maturity structure of the loan. Other functions performed by deposit money banks according to Ogar *et al*., (2015) are the encouragement of savings, provision of capital needed for development, encouragement of trading activities through the use of cheques, encouragement of investment, provision of managerial advice to industrialists who do not engage the services of specialists and rendering financial advice.

Deposit money banks are the most important institutions for savings mobilization and financial resource allocation. Consequently, these roles make them occupy important positions in economic growth and development. In performing this role, it must be realized that banks have the potential, scope and prospect for mobilizing financial resources and allocating them to productive investments. Therefore, no matter the sources of the generation of income or the economic policies of the country, deposit money banks would be interested in giving out loans and advances to their numerous customers bearing in mind the three principles guiding their operations which are; profitability, liquidity and solvency (Olukoyo, 2011). Other than the above principles, deposit money banks decisions to give out loans is influenced by many factors such as the prevailing interest rate, the volume of deposits, the level of banks domestic and foreign investment, banks liquidity ratio, prestige and public recognition to mention a few (Ogar *et al*., 2015).

Most businesses in Nigeria have no access to banks' credit due to poor accounting records, poor managerial skills, lack of creditworthiness and their inability to generate enough income to ensure loans repayment which is guaranteed at the maturity date, to sustain a viable intermediation process. Nigerian Government has recognized that one of the major tools for reducing unemployment and poverty in the country is to stimulate the economy by supporting businesses through the promotion of credits. This has resulted in the establishment and formulation of several credit schemes to guarantee the loans granted to businesses especially those in the priority sectors such as agriculture, manufacturing and export. Despite these schemes, there seems to be low access to credit by businesses in Nigeria, leading to low national productivity and massive unemployment.

Equally, there are reported cases of banks charging arbitrary rates on loans, resulting in repayments problems and deterring businesses from accessing these loans facilities by deposit money banks. Given these, there are unanswered questions on whether banks credit has a significant positive effect on the growth of national output in Nigeria. Furthermore, there abound many accusations that many banks are often not willing to release funds to these priority sectors since there are predominantly small-scale in nature. Instead, certain conditions such as high rate of interest, hidden bank charges and short repayment periods are introduced into their lending policies.

The continuous dwindling naira value relative to other currencies and the high volatility of inflation rate also limits bank deposits and savings with consequential effect on loanable funds. This is occasioned by the real value of money falling and thereby making the banking public to save less, the effect of this being the reduction in the volume of deposits and the loanable funds. Consequently, many business owners are unable to access funds for expansion and productivity. This in turn reduces the growth of the Nigerian economy. This study, therefore, seeks to examine the effect of deposit money bank loans on the growth of the Nigerian economy.

1.1 Objectives of the Study

The broad objective of this study is to examine the effect of deposit money banks credit on economic growth in Nigeria. The specific objectives of this study are:

i) To assess the effect of bank credit to the agricultural sector on the growth of the Nigerian economy;
ii) To examine the effect of bank credit to the manufacturing sector on the growth of the Nigerian economy;
iii) To ascertain the effect of bank credit to the mining and quarrying sector on the growth of the Nigerian economy;

1.2 Research Questions

Based on the above-stated objectives, the following research questions are formulated:

i) To what extent does bank credit to the agricultural sector affect the growth of the Nigerian economy?
ii) What is the effect of bank credit to the manufacturing sector on the growth of the Nigerian economy?
iii) To what extent does bank credit to the mining and quarrying sector affect the growth of the Nigerian economy?

1.3 Research Hypotheses

The following research hypotheses are postulated from this study:

H_{O1}: Bank credit to the agricultural sector has no significant effect on the growth of the Nigerian economy;
H_{O2}: Bank credit to the manufacturing sector has no significant effect on the growth of the Nigerian economy;
H_{O3}: Bank credit to the mining and quarrying sector has no significant effect on the growth of the Nigerian economy.

2 LITERATURE REVIEW

2.1 Theoretical framework

This study is anchored on the supply leading theory. Other supporting theories include the Wicksell theory of lending and economic growth and Robert Solow's economic theory.

2.1.1 The supply-leading theory

The supply leading theory can be described as a finance lead hypothesis. It was propounded by Patrick (1966) and it postulates the existence of "financial institutions and markets that supply financial assets, liabilities and related financial services in advance of demand for them which lead to an efficient allocation of resources (credit) from surplus units to deficit units and enhancement in economic growth process" (Patrick, 1966). The supply-leading phenomenon performs two functions. First, it transfers resources from traditional (non-growth) sectors to modern sectors and second, it promotes and stimulates an entrepreneurial response in the modern sector. The supply – leading financial intermediation can be likened to the term "innovative financing" (Schumpeter, 1911).

One of the most significant effects of supply-leading approach is that as entrepreneurs have new access to the supply–lending funds, their expectations increase and new horizons as to possible alternatives are opened, thereby making the entrepreneur "think big".

It can also be argued that while the supply-leading finance is not a necessity for launching a country to the path of "self-sustained economic development", it presents an opportunity to induce real growth by

financial means. Its use, analysts believe, is more result-oriented at the early level of a country's development than later.

2.1.2 Wicksell theory of lending and economic growth

This theory was postulated by a Swedish economist called Knut Wicksell in 1901 with strong influence from the quantity theory of money, (Weise, 2006). The theory was based on a comparison of the marginal product of capital with the cost of borrowing money thus took a monetary approach to economic growth. Wicksell (1898) argued that if the interest rate of borrowing money was below the natural rate of return on capital, entrepreneurs would borrow at the money rate to purchase capital goods. This would lead to increased demand for all types of resources and, in turn, their prices. Conversely, if the interest rate of borrowing money was above the natural rate of return on capital, entrepreneurs would sell the capital goods and hold money. This would lead to a higher demand for money and in turn the cost of borrowing. Wicksell connected the rate of interest with the production gap. The production gap represented the variance between what ought to be produced and what is produced.

This theory is important to this study since it gives a direct connection between the demand for and the cost of money and output in a country. It shows how interest rates affect borrowing, which in turn affects the purchase of capital goods and how production is affected. If interest rates are higher than the natural rate of return, borrowing will reduce therefore reducing economic growth as a result of low investment. On the contrary, if the rate of interest is lower than the natural rate of return, then more borrowing will take place and this will spur economic growth through more investment (Weise, 2006).

2.1.3 Robert Solow model of growth

This theory was suggested by Robert Solow in 1956. This is a model of long-run economic growth within the neoclassical economics framework. The model attempts to explain long-run economic growth by means of capital accumulation, labour (population) growth, and the increases in productivity, otherwise called technological progress. The Solow model has the following assumptions. First, it assumes that capital is subject to diminishing returns in a closed economy. Secondly, holding the stock of labour constant, the impact of the last unit of capital accumulated on output will always be less than the one before. Thirdly, given no technological progress or growth of the labour force, at some point, the amount of new capital produced is only just enough to make up for the amount of existing capital lost due to depreciation. At this point, there is no more economic growth.

This theory is relevant to this study in the following sense; First, the model approaches the level of economic growth from the output perspective, just like in this research. Secondly, commercial loans are assumed to provide the capital which is used to improve production in a country's economy. The theory simply provides the connection between the capital, the other factors of production and level of national output given the level of technology (Romer, 2011).

2.2 Conceptual Framework

This study focused on the effect of bank credit on the growth of the Nigeria economy by supporting the idea that bank credit is the conduit for the economic growth of a country. The study based its assumptions on the supply leading theory of Patrick (1966) that the availability and access to funds by the economic agents, from the banking sector is a necessary trigger to the growth of economy both in the long-run and short-run.

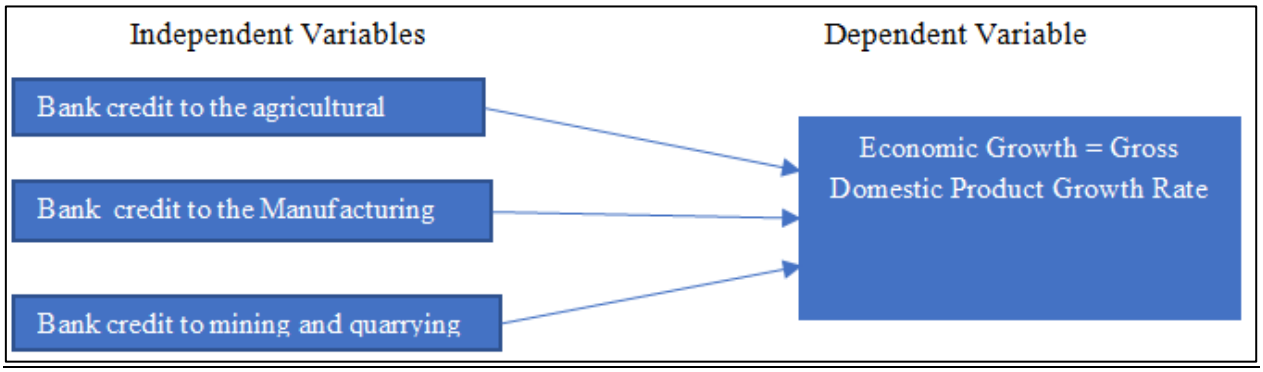

Figure 1: Diagram showing the relationship among the variables of the study
Source: Researcher's 2022

2.2.1 Commercial bank loans

Jacoby and Saulnier (2014) defined a loan in terms of term loan, which is credit extended to a business concern within the context of a direct relationship between a borrower and lender where some part of the principal is repayable after the passage of defined time period. However, there is the recognition that a loan can be given to non-business entities too. This widens the definition of a loan.

Dhikhary (2018) defined a loan as a written or oral agreement for a temporary transfer of a property,

usually, cash in cash form, from its owner called the lender to a borrower, who promises to return it according to agreed terms. The terms involve interest, time of repayment and the pattern of the repayment. If the loan is a term loan, it is repayable when the lender demands its repayment. If it is an instalment loan, the repayment will be based on the agreed monthly instalments. In case the lender requires a lump sum to be made at the end of the time agreed, then this type of loan is a time loan. Banks also classify their loans such as consumer loans, commercial loans, industrial loans, construction and mortgage loans, secured and unsecured loans, etc.

In this study, the adopted meaning of commercial bank loans is that used by De Haas *et al*., (2016) in which commercial bank loans were the sum of all the loans issued. Commercial banks loan is, therefore, any type of loan issued out to any type of borrower by a registered commercial bank in Nigeria. Credit is the extension of money from the lender to the borrower. Ajayi (2009) noted that credit implies a promise by one party to pay another for money borrowed or goods and services received. Credit cannot be divorced from the banking sector as banks serve as a conduit for funds to be received in form of deposits from the surplus units of the economy and passed on to the deficit units who need funds for productive purposes. Banks are therefore debtors to the depositors of funds and creditors to the borrowers of funds. According to CBN (2016), the amount of loans and advances given by the banking sector to economic agents constitute bank credit. Credit is often accompanied by some collateral that helps to ensure the repayment of the loan in the event of default. Credit channels savings into investment, thereby encouraging economic growth. Thus, the availability of credit allows the role of intermediation to be carried out, which is important for the growth of the economy.

2.2.2 Economic growth

The term economic growth is a term that is not easy to define, though it connotes changes in quantity. Economic growth can simply be defined as the sustained increase in the monetary value of the total output or productivity of an economy. Afees and Kazeem (2010) indicated that the measure of economic growth should have a quantitative aspect. In this perspective, he defined economic growth for any nation as a sustained increase in its population and product per capita. Economic growth is simply defined as an increase in a nation's total wealth. However, this definition ignores the effect of the population on wealth. It could be viewed as the continuous improvement in the capacity to satisfy the demand for goods and services, resulting from increased production scale, and improved productivity.

This study assumes a statistically simplified definition of economic growth provided by Haller (2012), that economic growth is the process of increasing the sizes of national economies as indicated by macro-economic indicators especially the GDP per capita in an ascendant but not necessarily linear direction.

2.2.3 Commercial bank loans and economic growth

Obamuyi *et al*., (2010), asserts that there is a close connection between commercial bank lending and economic output. This is because, ordinarily, more lending increases investment in the production of goods and services which by simple mathematical logic would increase the GDP of a country. On the contrary, reduced commercial bank lending would reduce investment in the production of goods and services and therefore contraction in GDP. This summarizes to a positive relationship between commercial bank lending and economic growth.

On the contrary, a study by Louzis *et al*., (2010) showed that lending was not an automatic means to economic growth. The contexts within which the loans are given out are a contributing factor to the effect of the lending on economic growth. The relationship was affected by the management of the loans both by the commercial banks and the borrowers.

This research expects a relationship between bank loans and economic development but cannot conclude whether the relationship is positive or negative. Other than the findings in the studies cited above, the theory by Wicksell in 1901 suggests that lending would be encouraged as long as interest rates are below the marginal productivity of capital and this would stimulate economic growth. On the other hand, if interest rates are higher than the marginal productivity of capital, borrowing would be discouraged leading to stifled economic growth.

2.2.4 Bank credit, real sector and economic growth nexus

Bank credit is the amount of money a bank of financial institution extends to a borrower who agrees to repay it with interest over time. It refers to the amount of credit available to a business or individual from a financial institution in the form of loan. Bank credit, real sector and economic growth nexus has been widely researched. Ojong *et al*., (2015), established that there exists a positive relationship between bank credit and real sector growth. In their words, credit extended by banks is an injection of funds into the business for expansion of business operations and modernization of its technology. This expansion often increases the productive capacity of businesses which translates to increase output.

Rajan and Zingales (2010) posits that industries in need of external finance grow faster in countries with more developed financial markets. They used U.S. firm-level data to estimate the external financial dependence of different manufacturing sectors. Their basic assumption is that financial markets are well developed in the U.S., so the firms can borrow at the desired

amount, which is determined only by the demand of the firm for external finance. Their view suggests that markets with concentrated and less competitive banks are not growing at their best potential, since firms do not have access to credit, which leads to slower growth.

Levine and Zervos (2009) identified a strong causal impact of banking sector development on real per capita GDP growth and per capita productivity growth. They saw loans as capable of altering the path of economic progress by affecting the allocation of savings and not necessarily affecting the saving rate. Kelly (2014) posits that ready availability of credit can itself be a factor in the growth process. The growth of the Irish Economy in the 1990s for instance was linked to the private sector credit made available to sectors such as manufacturing, Building and Construction, Hotels and Catering and Education. Growth in these sectors, in turn, helped to maintain the strong real growth in the economy. He cautioned however, that monetary growth over potential real sector activities could be inflationary as an overextension of credit could lead to financial crises. Favara (2017) examined the empirical relationship between financial development and economic growth. He had two main conclusions. First financial development and economic growth are correlated but financial development does not cause economic growth. Second, there was evidence that this relationship is quite heterogeneous across countries. However, he stated that there is no clear indication that finance spurs economic growth.

Despite the positive bank credit – real sector/economic growth nexus by authors reviewed above, some scholars still maintain a negative nexus or at best no relationship between the two important variables. For instance, Ho (2012) in his studies in Macao, found that a visible correlation between economic growth and financial intermediation seems not to exist. But given the level of the total cost, if one assumes that the availability of bank credit allows firms to stock fewer raw materials in warehouses, their output would increase as a result.

Bloch and Tang (2013) concluded that the prevalence of insignificant positive and negative correlation over time between financial development and economic growth in individual countries poses a serious challenge to those who claim a generally positive relationship between the two important variables. Loayza and Ranciere (2016) have provided evidence for the argument that there is a negative and significant impact of bank credit on economic growth in the short-run but the impact becomes positive and significant in the long-run.

2.3 Empirical literature review

There are various related empirical studies carried out by various scholars in a view to establishing the effect of bank credit on economic growth. Ijaiya and Abudulraheen (2000) study in Pakistan modelled bank credit, inflation rate and lending rate on economic growth and employed the ordinary least square multiple regression techniques. The study found bank credit had a positive effect on economic growth in Pakistan. Also, inflation rate and lending rate had insignificant effects on economic growth in Pakistan.

Oriavwote and Eshenake (2014) in examining the effect of financial sector development on poverty reduction in Nigeria applied bank credit to the private sector, interest rate and money supply to measure financial development and per capita income to proxy poverty reduction. The study revealed that bank credit to the private sector had a significant effect on poverty reduction in Nigeria. In specific terms, it was found that the interest rate and inflation rate had insignificant effects on poverty reduction.

Aliyu and Yusuf (2013) studied the effect of financial sector development on economic growth. Economic growth was proxied by gross domestic product growth rate and the financial sector was measured using financial deepening variables. The Ordinary Least Square (OLS) technique was the method of data analysis. Findings showed that financial sector development had a remarkable impact on real sector growth. However, credit allocated to the private sector was shown to wield a significant impact while liquid liabilities and the size of financial intermediaries where shown to exert significant positive influence.

Udoh and Ogbuagu (2012) using an autoregressive distributed lag (ARDL) approach examined the relationship between financial sector development and industrial production between 1970 and 2009. The study discovered that financial sector development measured by a credit to the private sector, money supply, credit to the private sector to GDP ratio, money supply to GDP ratio has a significant adverse effect on industrial production.

Samsi *et al*., (2012) investigated how the financial and real sectors interact in Malaysia during the period 1986Q1 to 2011Q4. The study adopted the ordinary least square approach and findings showed that real sector output has a strong association with the banking sector and the banking sector is the major contributor to output growth.

Onwumere *et al*., (2012) assessed the impact of financial deepening on economic growth in Nigeria between 1992 and 2008 using the vector error correction technique. The study found that broad money velocity and stock market liquidity foster economic growth while money stock diversification, economic volatility and market capitalisation failed to promote economic growth.

Odhiambo (2009) studied the relationship between banking sector stability and real output growth in Organisation and Economic Cooperation Development (OECD) countries using the panel least square analytical technique. The study found, with a sample of 18 OECD countries, that there is a positive link between banking sector stability and real output growth. It was also discovered through Fed forecast errors that banking sector stability (instability) resulted in a significant underestimation (overestimation) of GDP growth in the successive quarters.

Odhiambo (2008) used ordinary least squared multiple regression to examine the effect of financial development on poverty reduction. The study concluded that the causal link between financial sector development and poverty reduction was responsive to the choice of financial sector development index, and the demand-following response tends to prevail in Kenya.

Sendeniz-Yüncü *et al*., (2006) evaluated whether the credit-view hypothesis holds in 11 OECD countries from 1987Q1 to 2003Q3. The co-integration tests revealed that the banking sector and real sector are related, in the long-run, in all countries. The Granger causality tests provided strong evidence of the credit-view hypothesis (i.e. banking sector lead real sector) in some countries while no causality between both sectors in other countries.

Calderón and Liu (2002) study showed that financial deepening drives growth of 109 economies comprising both developing and industrial via two channels namely; rapid capital accumulation rate and productivity growth, with the channel of productivity growth being the strongest. Rasheed (2010) investigated the productivity in the Nigerian manufacturing subsector using co-integration and an error correction model. The study indicated the presence of a long-run equilibrium relationship index for manufacturing production, determinants of productivity, economic growth, interest rate spread, banks credits to the manufacturing subsector, inflation rates, foreign direct investment, exchange rate and quantity of graduate employment. The finding has a research gap in the area of factors that affect the manufacturing sector in Nigeria.

Sangosanya (2011) used a panel regression analysis model and Gibrat's law of proportionate effect in investigating the firm's growth dynamics in the Nigerian manufacturing industry. The study observed that the manufacturing firms finance mix, utilization of assets to generate more sales, an abundance of funds reserve and Government policies are significant determinants of manufacturing industry growth in Nigeria.

Charles (2012) investigated the performance of monetary policy on the manufacturing sector in Nigeria, using econometrics test procedures. The result indicated that money supply positively affected manufacturing index performance while company lending rate, income tax rate, inflation rate and exchange rate negatively affected the performance of the manufacturing sector implying that monetary policy is vital for the growth of the manufacturing sector in Nigeria which in turn would lead to economic growth. However, the study did not identify those factors that measure manufacturing sector performance like capacity utilization (output) or manufacturing share in GDP (input).

Tomola *et al*., (2012) employed co-integration and vector error correction model (VECM) techniques to determine the link between bank lending, economic growth and the manufacturing sector in Nigeria. The finding of the study revealed that manufacturing capacity utilization and bank lending rates significantly affect manufacturing output in Nigeria. This means that the growth of manufacturing output has not been enough to generate sizeable growth in the economy. The study has a research gap in terms of not identifying the relationship between manufacturing sector performance and economic growth in Nigeria.

Ikenna (2012) employed time-series data from 1970-2009 on an Autoregressive Distributed Lag (ARDL) – Based Test Model to test for the long and short-run impact of financial deregulation and the possibility of a credit crunch in the real sector. The results suggested that deregulating the Nigerian financial system had an adverse boomerang effect on the credits allocated to the real sectors in the long-run. In the short-run, financial liberalization was in all, insignificant and negative. Ikenna also concluded that Deposit Money Banks (DMBs) in Nigeria have strong discriminatory credit behaviour towards the real sector (agriculture and manufacturing) and the SMEs as the credit crunch is found to be present in these sectors both in the short and long-run.

3. RESEARCH METHODOLOGY

This study adopted the ex-post facto research design as the variables to be studied are secondary and may offer the researcher control over them (Arikpo & Adesola, 2017).

Annual time series data were collected for the period 1985 to 2018 from the Central Bank of Nigeria Statistical Bulletin, Volume, 29, (2018) on Economic growth measured by Gross Domestic Product Growth Rate (GDPGR) and bank credit measured by bank credit to the agricultural sector (LOAGS), bank credit to the manufacturing sector (LOMANS) and bank credit to the mining and quarrying sector (LOMAQS).

3.1 Model specification

Patrick (1966) supply leading theory was adopted for the study. The theory postulates that the extension of funds by the financial sector is key to the

expansion of business operations. The functional equation is thus:
GDPGR = f (BCR) ……. Eqn. (1)

Where:
GDPGR = Gross Domestic Product Growth Rate
BCR = Bank Credit = (LOAGS + LOMANS + LOMAQS)

GDPGR = f (LOAGS + LOMANS + LOMAQS) …… Eqn. (2)

Where
GDPGR = Gross Domestic Product Growth Rate
LOAGS = Credit to the Agricultural Sector
LOMANS = Credit to the Manufacturing sector
LOMAQS = Credit to the mining and quarrying sector

The econometric model from this functional equation is:
$GDPGR = \beta_0 + \beta_1 LOAGS + \beta_2 LOMANS + \beta_3 LOMAQS + + e_t$ …… Eqn. (3)

β_0 = Regression constant
$\beta_1 - \beta_3$ = Regression parameters/coefficients

3.2 A priori expectations

It is expected that bank credit proxied by credit to the agricultural sector (LOAGS), credit to the manufacturing sector (LOMANS) and credit to the mining and quarrying sector (LOMAQS) would have a positive effect on economic growth that is GDPGR in Nigeria.

3.3 Estimation techniques

3.3.1 Descriptive statistics

Descriptive statistics was employed to examine the structure of the time series using simple tables, graphs and percentages. This methodology enabled the study to appreciate the trend and pattern of the time series within the period of the study and showed the graphical and numerical representation of the data obtained. The numerical representation also showed the mean, maximum, minimum, skewness, kurtosis and the probability of Jarque-Berra statistics for the secondary data.

3.3.2 Unit root test

The study employed the Augmented Dickey-Fuller (ADF) unit root test to examine whether the time series were stationary since time series data usually follow a particular trend and since economic theory requires that they be subjected to differencing or de-trending procedures to avoid spurious results.

3.3.3 Autoregressive Distributed Lag (ARDL)

This study employed the Autoregressive Distributed Lag (ARDL) bounds test approach because the variables are a combination of order I (0) or I (1) with none of the series being integrated of order I (2). The ARDL (p q) model is generalized thus:
$Y_t = y_{0i} + \sum_{i-1}^{p} \partial_i y_{t-1} + \sum_{i-0}^{q} b_i x_{t-1} + \varepsilon_t$…. Eqn. (4)

Where:
Y_t = vector
X_t = Regressors
$\partial$and b = coefficient
y_{0i} = constant term
P and q = optimal lag order
ε_t = Stochastic error term

To perform the bounds test for co-integration, the conditional ARDL model was specified thus:
$\Delta GDPGR_t = a_0 + b_1 GDPGR_{1t-i} + b_2 inLOAGS_{t-i} + b_3 inLOMANS_{t-i} + b_4 inLOMAQS_{t-i} + \sum_{i=1}^{p} a_1 \Delta GDPGR_{t-1} + \sum_{i=1}^{q} a_2 \Delta inLOAGS_{t-i} + \sum_{i=1}^{q} a_3 \Delta inLOMANS_{t-i} + \sum_{i=1}^{q} a_4 \Delta inLOMAQS_{t-i} + e_{1t}$ …… Eqn. (5)

Since there was co-integration in the bound test conducted, the error correction model (ECM) representation would be specified thus:
$\Delta GDPGR_t = a_0 + \sum_{i=1}^{p} a_1 \Delta GDPGR_{t-1} + \sum_{i=1}^{q} a_2 \Delta inLOAGS_{t-i} + \sum_{i=1}^{q} a_3 \Delta inLOMANS_{t-i} + \sum_{i=1}^{q} a_4 \Delta inLOMAQS_{t-i} + \lambda ECT_{t-1} + e_{1t}$ …… Eqn. (6)

It is expedient to state that the parameters and variable retain their meanings as has been discussed above

3.4 Model Evaluation and Test of Significance

To validate the stability of the estimates generated by the ARDL technique, the cumulative sum control chart (CUSUM) test was applied. The CUSUM charts plot the cumulative sums of the deviations of the sample values from a target value. Furthermore, the study applied the Breusch-Godfrey serial correlation LM test, the normality test and the heteroskedasticity test to check whether or not the residuals of the model are interdependent. Lastly, the study employed the Wald test to assess whether or not the independent lagged variables have a joint significance on the dependent variable.

4 RESULTS AND DISCUSSIONS

4.1 Data presentation

Table 1: Trend performance of the effect of Banks credit

YEAR	GDPGR	LOAGS	LOMANS	LOMAQS
	Per cent	₦'Billion	₦'Billion	₦'Billion
1985	8.52	32.08	561.48	300.69
1986	1.89	131.56	560.23	300.73
1987	0.17	130.96	559.75	300.69
1988	6.23	130.32	558.63	300.71
1989	6.66	129.92	558.04	300.66
1990	11.63	129.17	556.82	300.57
1991	-0.55	128.38	553.79	300.39
1992	2.19	126.41	549.3	300.17
1993	1.57	122.64	541.59	299.51
1994	0.26	115.63	529.88	NA
1995	1.87	108.11	506.62	288.86
1996	4.05	100.13	492.47	285.88
1997	2.89	105.45	481.88	280.32
1998	2.49	106.21	467.97	278.09
1999	0.52	102.34	448.95	276.25
2000	5.52	92.36	423.41	268.64
2001	6.67	77.54	357.82	230.46
2002	14.6	73.54	331.23	230.76
2003	9.5	71.29	270.39	204.96
2004	10.44	65.65	232.59	169.88
2005	7.01	84.83	212.67	128.4
2006	6.73	83.99	118.91	49.46
2007	7.32	16.19	77.13	189.78
2008	7.19	27.04	368.09	546.01
2009	8.35	2.31	428.75	889.79
2010	9.54	4.98	422.93	877.17
2011	5.31	121.81	488.51	994.37
2012	4.21	182.97	503.63	1470.56
2013	5.49	210.31	614.98	1854.93
2014	6.22	345.52	1082.74	282.72
2015	2.79	315.92	1171.49	289.22
2016	-1.58	392.55	1651.03	279.65
2017	0.82	369.69	1666.04	285.89
2018	1.93	423.28	1553.39	289.05

Source: CBN Statistical Bulletin, Vol., 29, 2018

Table 1 showed that the growth rate of GDP moved from 8.52 per cent in 1985 to 0.17 per cent in 1987 but then increased to 6.66 per cent and 11.63 per cent in 1989 and 1990 respectively. This was followed immediately by a contraction of 0.55 per cent in 1991 but then, an increase from 1.57 per cent in 1993 to 4.05 per cent in 1996. From 2.89 per cent in 1997, GDP growth rate increased to 5.52 per cent, 6.67 per cent in 2000 and 2001 and reached its maximum at 14.6 per cent in 2002. By 2004 the GDP growth rate had decreased to 10.44 per cent and then to 7.19 per cent in 2008. By 2011, the GDP growth rate had declined to 5.31 per cent from 8.35 per cent in 2009. From a further decrease of 4.21 per cent in 2012, GDP growth rate nosedived to a negative figure of 1.58 per cent in 2016 but then increased from 0.82 per cent in 2017 to 1.93 per cent in 2018.

A careful review of table 2 showed that bank credit to the agricultural sector from ₦ 32.08 billion in 1985, increased to ₦ 131.56 billion in 1986 but decreased gradually to ₦ 126.41 billion in 1992. In 1994, bank credit to the agricultural sector had reached ₦ 115.63 billion, and then ₦ 108.11 billion and ₦ 100.13 billion in 1995 and 1996 respectively. This was followed by an increase to ₦ 102.34 billion from ₦ 106.21 billion in 1999 from 1998. Credits to the agricultural sector experienced a plunged from ₦ 92.36 billion in the year 2000, to ₦ 71.29 billion in 2003, to ₦ 16.19 billion in 2007 and then to ₦ 4.98 billion in 2010. From ₦ 121.81 billion in 2011, bank credit to the agricultural sector increased to ₦ 210.31 billion in 2013, then to ₦ 315.92 billion in 2015, then to ₦ 369.69 billion in 2017 and then to ₦ 423.28 billion in 2018.

Bank credit to the manufacturing sector from ₦ 561.48 billion in 1985, decreased gradually to ₦ 559.75 billion in 1987, ₦ 558.04 billion in 1989, ₦ 553.79 billion in 1991 and then ₦ 541.59 billion in 1993. Bank credit to manufacturing sector further decreased from 506.62 in 1995 to ₦ 270.39 billion in 2003, ₦ 232.59 billion in 2004, ₦ 212.67 billion in 2005, ₦ 118.91 billion in 2006, and then ₦ 77.13 billion in 2007. Bank credit to the manufacturing sector experienced sustained increased from ₦ 368.09 billion in the year 2008, to ₦ 488.51 billion in 2011 and ₦ 614.98 billion in 2013. Following these was increased access to manufacturing loans by the sector operators as it is evidenced by an increase from ₦ 1082.49 billion in 2014, to ₦ 1666.04 billion in 2017 but then a slight decrease to ₦ 1553.39 billion in 2018.

Bank credit to the mining and quarrying sector, from Table 2 showed that credit to the tune of ₦ 300.69 billion in 1985 was granted to the operators. This increased slightly to ₦ 300.71 billion in 1988 but reduced to ₦ 299.51 billion in 1993 from ₦ 300.17 billion in 1992. From ₦ 288.86 billion in 1995, bank credit to the mining and quarrying sector reduced to ₦ 280.32 billion, ₦ 268.64 billion, ₦ 230.76 billion, ₦ 128.4 billion and then reached its all-time lowest at ₦ 49.46 billion in 1997, 2000, 2002, 2005 and 2006 respectively. Bank credit to the mining and quarrying sector increased from ₦ 189.78 billion in 2007 to ₦ 877.17 billion in 2010, ₦ 1470.56 billion in 2002 and ₦ 1854.93 billion, it all-time highest in 2013 and then lopsided to ₦ 282.72 billion in 2014, and then to ₦ 279.65 billion in 2016 and increased a little to ₦ 289.05 billion in 2018.

4.1.2 Data analyses

Descriptive statistics

Table 2: Descriptive statistics of the variables in the study

	LLOAGS	LLOMANS	LLOMAQS	GDPGR
Mean	4.529739	6.184324	5.768127	5.096667
Median	4.683149	6.221842	5.666600	5.490000
Maximum	6.048034	7.418205	7.525602	14.60000
Minimum	0.837248	4.345492	3.901164	-1.580000
Std. Dev.	1.115846	0.645165	0.677079	3.778760
Skewness	-1.584578	-0.441314	0.494293	0.352282
Kurtosis	6.053840	4.404260	4.901029	2.670434
Jarque-Bera	26.63305	3.782595	6.312921	0.831909
Probability	0.000002	0.150876	0.042576	0.659710
Sum	149.4814	204.0827	190.3482	168.1900
Sum Sq. Dev.	39.84362	13.31960	14.66993	456.9289
Observations	33	33	33	33

Source: Researchers' E-views 10 Computation, 2020

Table 2 showed the mean values of LLOAGS, LLOMANS, LLOMAQS and GDPGR were respectively 4.529, 6.184, 5.768, and 5.097 with their corresponding standard deviations of 1.116, 0.645, 0.677 and 3.778 ranging respectively from minimum 0.837 to maximum 6.048, 4.345 to 7.418, 3.901 to 7.525 and -1.580 to 14.600.

It is worthy of note that the measurement of skewness indicates not only the amount of skewness but also the direction of the data distribution. A close examination of the skewness of the data set as shown in table 3 revealed that while LLOMAQS and GDPGR were positively skewed (right-skewed distribution), meaning that their means are also to the right of the peak, with skewness values of 0.494 and 0.352 respectively; LLOAGS and LLOMANS were negatively skewed (left-skewed distribution), meaning that their means were also to the left of the peak, with skewness value of -1.584 and -0.441 respectively. Kurtosis measured the peakedness or flatness of the data relative to the normal distribution. The coefficient of the kurtosis of all the variables except GDPGR was greater than 3.00 relative to the normal, meaning that the distribution produces larger and more extreme outliers than does the normal distribution. This is evidenced by the kurtosis values of 6.053, 4.404 and 4.901 for LLOAGS, LLOMANS and LLOMAQS. It could equally be seen that the kurtosis value of GDPGR of 2.670 was less than 3.00 relative to the normal. This implied that the distribution produces lower and less extreme outliers than does the normal distribution.

The Jarque-Bera (JB) test measured the difference of the skewness and kurtosis of the series with those from the normal distribution. The JB values of 3.782 and 0.831 for LLOMANS and GDPGR respectively with their respective p-values of 15.08 per cent and 65.974 per cent showed that the data for these variables were normally distributed. However, the JB values of 26.633 and 6.312 for LLOAGS and LLOMAQS respectively with their respective p-values of 0.00 per cent and 4.25 per cent showed that the data for these variables were not normally distributed.

4.1.2.3 Unit Root Test

The test for stationarity was conducted to examine whether there was the presence of unit root in the data set collected for this study. This test was

achieved through the Augmented Dickey-Fuller approach, hereafter referred to as ADF.

Table 3: Augmented Dickey-Fuller (ADF) Unit Root Test

Variables	ADF Test Statistics		Order of integration
	Level	1st Difference	
GDPGR	-3.238556		I (0)
LLOAGS	-2.181062	-5.783924	1(1)
LLOMANS	-0.957718	-5.297435	I (1)
LLOMAQS	-2.139218	-4.788685	1(1)
Test critical values at level: 1% = -3.646342, 5% = -2.954021, 10% = -2.615817 Test critical values at 1st Diff: 1% = -3.679322, 5% = -2.967767, 10% = -2.22989			

Source: Researchers' E-views 10 Computation, 2020.

Table 3 showed that banks credit to the study sectors (agricultural sector, manufacturing, mining & quarrying) had unit root at levels but after differencing one time, they became stationary. This was so as the test statistics at levels, taking their absolute values of 2.181, 0.957 and 2.139 were less than their critical values of 2.954 at 5 per cent. However, after differencing one time, the test statistics, taking their absolute values of 5.783, 5.297 and 4.788 became greater than their critical values of 2.967 at 5 per cent level. Also, the GDP growth rate had no unit root at levels as its test statistics, taking its absolute value of 3.238 was greater than its critical value of 2.954 at 5 per cent level. Since the variables were integrated of different orders, in other words, since the variable was of both order I (1) and I (0), it was indicative that the appropriate estimation model was Autoregressive Distributive Lag (ARDL) technique, this, therefore, informed the adoption of the ARDL approach.

4.1.2.4 VAR lag order selection criteria

To select the optimal lag length for this study, the VAR lag order selection criteria were applied. The result was presented in Table 4 below. From the table, all criteria show that lag four was the most suitable lag length for this study. Since all of the criteria favoured lag four, it meant that lag four was the optimal lag length for this study.

Table 4: VAR lag order selection criteria

Endogenous variables: GDPGR LLOAGS LLOMANS LLOMAQS						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-151.5121	NA	2.973186	12.44097	12.63599	12.49506
1	-113.8551	60.25131	0.537277	10.70841	11.68351	10.97886
2	-81.68092	41.18292	0.164977	9.414473	11.16965	9.901286
3	-28.48448	51.06858	0.011539	6.438759	8.974020	7.141932
4	21.98783	32.30228*	0.001537*	3.680974*	6.996316*	4.600509*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: Researchers' E-views 10 Computation, 2020

4.1.2.5 Long-run ARDL cointegration analysis

Since the variables were integrated of order I(1) and I(0), the study proceeded to assess the estimates of the parameters using the ARDL bound testing approach. The long-run estimate of the parameters is presented in Table 7 below:

Table 5: Long-run ARDL estimates

Dependent Variable: D(GDPGR)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-80.28987	46.74691	-1.717544	0.1844
D(GDPGR(-1))	-0.790760	0.624530	-1.266167	0.2948
D(GDPGR(-2))	-0.390666	0.453647	-0.861169	0.4525
D(GDPGR(-3))	-0.240449	0.356887	-0.673740	0.5487
D(GDPGR(-4))	-0.692338	0.389031	-1.779648	0.1732
D(LLOAGS(-1))	36.95053	5.820008	6.348879	0.0079
D(LLOAGS(-2))	24.44694	5.430651	4.501659	0.0205

Dependent Variable: D(GDPGR)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(LLOAGS(-3))	37.46669	9.514684	3.937776	0.0292
D(LLOAGS(-4))	5.642089	1.951518	2.891128	0.0630
D(LLOMANS(-1))	-66.38407	12.41535	-5.346935	0.0128
D(LLOMANS(-2))	-64.42290	13.20542	-4.878518	0.0165
D(LLOMANS(-3))	-96.72345	20.61910	-4.690964	0.0183
D(LLOMANS(-4))	17.24050	15.40274	1.119313	0.3445
D(LLOMAQS(-1))	-5.612104	5.793372	-0.968711	0.4041
D(LLOMAQS(-2))	-16.88970	4.601093	-3.670802	0.0350
D(LLOMAQS(-3))	-11.97349	4.537096	-2.639021	0.0777
D(LLOMAQS(-4))	7.081631	7.018159	1.009044	0.3873
GDPGR(-1)	-0.664632	0.611304	-1.087235	0.3565
LLOAGS(-1)	-83.97881	16.14152	-5.202656	0.0138
LLOMANS(-1)	109.3465	24.45699	4.470972	0.0208
LLOMAQS(-1)	-35.64282	13.94685	-2.555619	0.0835
R-squared	0.978667			
Adjusted R-squared	0.836451			
F-statistic	6.881523	Durbin-Watson stat		2.533539
Prob(F-statistic)	0.068524			

Source: Researchers' E-views 10 Computation, 2020

Table 5 was the ARDL long-run estimates of the effect of bank credit on economic growth in Nigeria. This result was analysed using two dimensions namely, the signs and magnitude. Considering the signs of the parameters of the estimates, the parameter of the GDPGR in the first to fourth lagged period were negative. This was evidenced by their coefficient values of 0.7907, 0.3906, 0.2404 and 0.6923 implying that a one per cent increase in GDPGR in the first, second, third and fourth lagged periods led to 79.07 per cent, 39.06 per cent, 24.04 per cent and 69.23 per cent increase in GDP growth rate in Nigeria. The signs of the parameters of the estimates of the lag of credit to the agricultural sector for the four periods were positive. This is evidenced by their coefficient values of 36.95 per cent, 24.44 per cent, 37.47 per cent and 5.64 per cent which implies that a one per cent increase in credit to the agricultural sector in the past four periods led to a positive effect on the growth of the Nigerian economy.

Again, the immediate first three periods lag of credit to the manufacturing sector had negative effect on economic growth in Nigeria, implying that one per cent increases in the immediate past three periods' aggregate credit to the manufacturing sector led to about 66.38 per cent, 64.42 per cent and 96.72 per cent decreases in the growth of the Nigerian economy in the current period. In the fourth lagged period, however, credit to the manufacturing sector had a positive effect on the growth of the Nigeria economy. By implication, a one per cent increase in the fourth lagged period of credit to the manufacturing sector led to about 17.24 per cent increase in the current period economic growth rate in Nigeria.

Lastly, the immediate past, second and third lagged periods of credit to mining and quarrying sector had negative effects on the current period economic growth rate, implying that a one per cent increase in the immediate past period, second period and third lagged periods of credit to the mining and quarrying sector led to about 5.61 per cent, 16.88 per cent and 11.97 per cent decreases respectively in the growth of the Nigerian economy. In the fourth lagged period, however, credit to mining and quarrying sector had a positive effect on economic growth in Nigeria which implies a one per cent increase in the fourth period lagged credit to mining and quarrying sector led to a 7.08 per cent increase in the current period economic growth rate in Nigeria.

From the result, the R^2 adjusted value of 0.9787 showed that about 97.87 per cent of the changes in the GDPGR had been explained by banks credit to the study variables (agricultural, manufacturing and mining and quarrying sectors in the long-run. Furthermore, the F-statistics value 6.88 with its corresponding p-value of 6.8 per cent showed that the model was not statistically significant at 5 per cent.

To test for the significance of long-run estimates, the study applied the Wald statistics. Extract of the result is as presented in Table 8 below:

Table 6: Wald test of long-run estimates

Wald Test:			
Equation: Untitled			
Test Statistic	Value	Df	Probability
F-statistic	16.31855	(4, 3)	0.0224
Chi-square	65.27421	4	0.0000
Null Hypothesis: C(18)=C(19)=C(20)=C(21)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(18)		-0.664632	0.611304
C(19)		-83.97881	16.14152
C(20)		109.3465	24.45699
C(21)		-35.64282	13.94685
Restrictions are linear in coefficients.			

Source: Researchers' E-views 10 Computation, 2020

The value of the above F-statistics of 16.318 and its corresponding probability of 2.24 per cent showed that the null hypothesis for the long-run interactions of banks credit to the study variables (agricultural, manufacturing, mining and quarrying sectors and economic growth is rejected. This implied that banks credit to the sectors under study had a causal relationship with GDPGR in the long-run. In other words, there is a long-run causality running from bank credit to economic growth in Nigeria.

4.1.3 Long-run test for reliability and stability of the estimates

In order to test whether or not the long-run estimates of the results were reliable and stable, the study applied the Breusch-Godfrey serial correlation LM test, the normality test, the heteroskedasticity test and the CUSUM test. The results of the test are presented below:

Table 7: Long-run Breusch-Godfrey Serial Correlation LM Test:

F-statistic	523.8224	Prob. F(2,1)	0.0309
Obs*R-squared	23.97711	Prob. Chi-Square(2)	0.0000

Source: Researchers' E-views 10 Computation, 2020

From this result, the prob chi-square (2) is less than 5 per cent as it stands at 0.00 per cent. Thus the null hypothesis of no serial correlation is rejected implying that the model is not free from serial correlation.

Table 8: Long-run Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.446987	Prob. F(20,3)	0.8847
Obs*R-squared	17.96972	Prob. Chi-Square(20)	0.5894
Scaled explained SS	0.713813	Prob. Chi-Square(20)	1.0000

Source: Researchers' E-views 10 Computation, 2020

From Table 8 above, the observed R^2 value of 17.969 with its corresponding prob. Chi-square value of 58.94 per cent, more than five per cent, implied that the model is free from heteroskedasticity.

Long-run Normality test

The study conducted a normality test using the histogram normality test. The Jarque-Bera statistics is the basis for determining whether the residuals of the model were normally distributed or otherwise. The decision rule is that the probability of the Jarque-Bera statistics should be more than 5 per cent for the residuals of the model to be normally distributed. The results of the normality test are shown in the figures below;

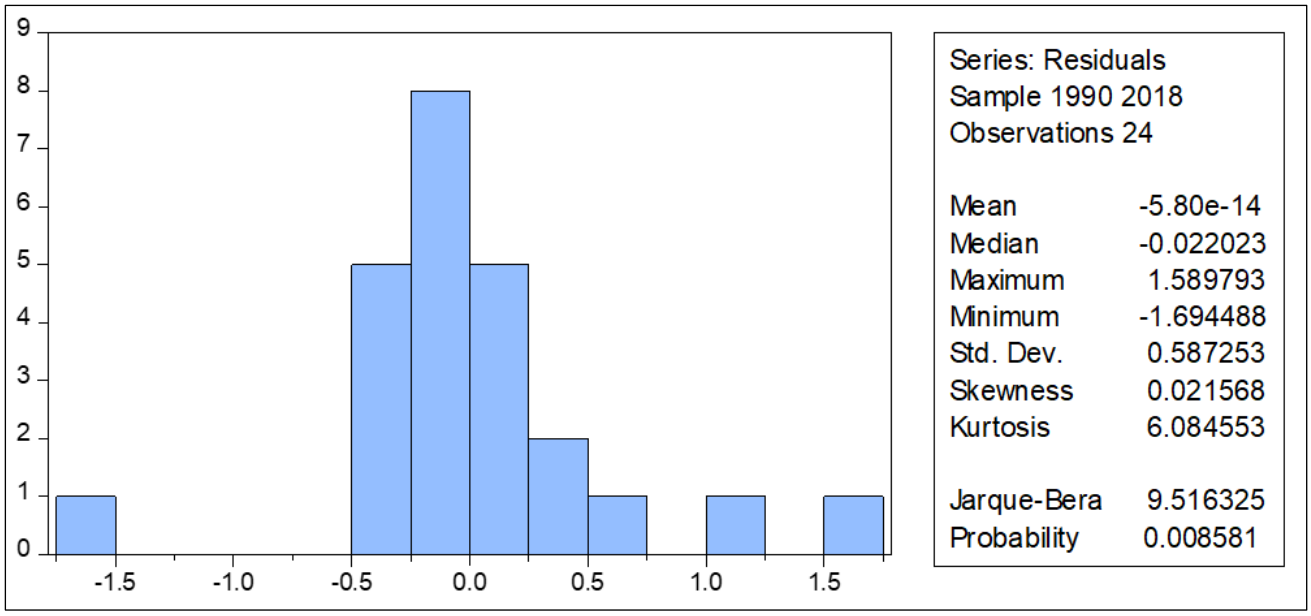

Figure 2: Long-run Normality test
Source: Researchers' E-views 10 Computation, 2020

The Jarque Bera statistics of 9.516 with its corresponding probability of 0.85 per cent, less than 5 per cent, meant that the residuals of the model were not normally distributed.

Long-run CUSUM test for stability of estimates

The study also tested for the stability of the estimates by using the CUSUM test. The result as presented below shows the blue line lay in between the two red lines which implies that the estimates of the model were stable and reliable.

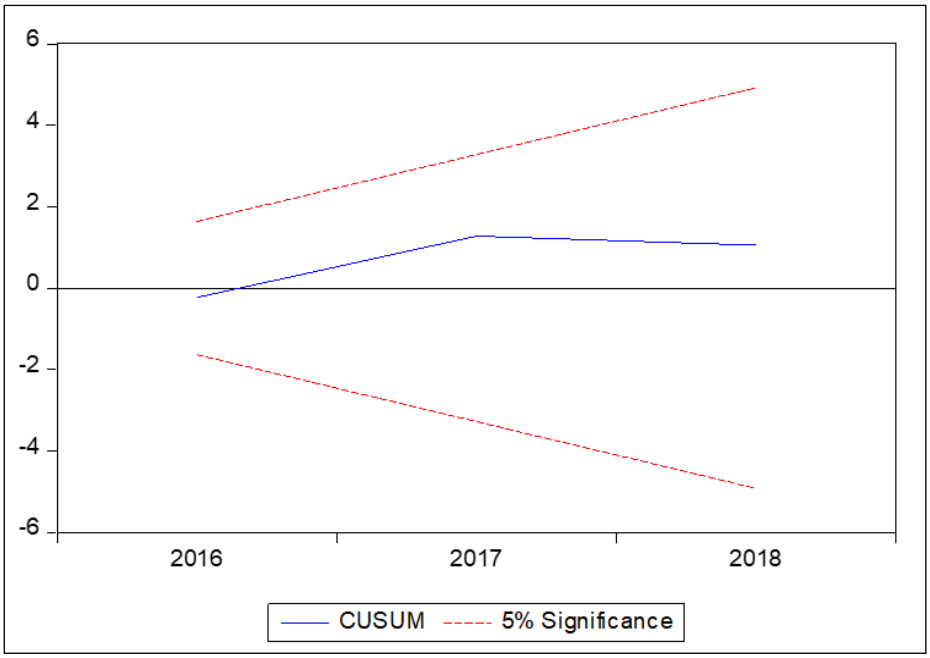

Figure 3: CUSUM Test for Stability analysis of the long-run model
Source: Researchers' E-views 10 Computation, 2020

Short-run dynamic analysis

Since there was evidence of cointegration in the bound test, the study proceeded to assess the short-run dynamics of the estimates of the parameters using the ARDL approach. Table 11 presents the results thus:

Table 9: Short-run dynamics

Dependent Variable: D(GDPGR)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.556534	1.035886	0.537254	0.6104
D(GDPGR(-1))	0.696957	0.768129	0.907343	0.3992
D(GDPGR(-2))	0.835845	0.543206	1.538727	0.1748
D(GDPGR(-3))	0.426163	0.510154	0.835361	0.4355
D(GDPGR(-4))	0.040442	0.545466	0.074143	0.9433
D(LLOAGS(-1))	5.672782	7.449096	0.761540	0.4752
D(LLOAGS(-2))	2.575522	4.124005	0.624520	0.5553
D(LLOAGS(-3))	0.039387	2.658638	0.014815	0.9887
D(LLOAGS(-4))	2.096259	3.990067	0.525369	0.6182
D(LLOMANS(-1))	-3.618076	5.048964	-0.716598	0.5006
D(LLOMANS(-2))	1.587689	5.284912	0.300419	0.7740
D(LLOMANS(-3))	1.289093	7.946216	0.162227	0.8765
D(LLOMANS(-4))	-10.15026	18.29557	-0.554793	0.5991
D(LLOMAQS(-1))	2.078418	5.178333	0.401368	0.7021
D(LLOMAQS(-2))	1.552527	2.379674	0.652411	0.5383
D(LLOMAQS(-3))	-2.328446	2.645956	-0.880002	0.4127
D(LLOMAQS(-4))	-3.668174	4.916370	-0.746114	0.4838
ECM(-1)	-1.685091	0.885466	-1.903055	0.1057
R-squared	0.697253			
Adjusted R-squared	-0.160532			
F-statistic	0.812853	Durbin-Watson stat		1.757629
Prob(F-statistic)	0.660697			

Source: Researchers' E-views 10 Computation, 2020

This result was analysed using two dimensions namely, the signs and magnitude. Considering the signs of the parameters of the estimates, the parameter of the GDPGR in the first to fourth lagged periods were positive. This is evidenced by their coefficient values of 0.6969, 0.8358, 0.4261 and 0.0404 which implies that a one per cent increase in GDPGR in the first, second, third and fourth lagged periods led to 69.69 per cent, 83.58 per cent, 42.61 per cent and 4.04 per cent in GDP growth rate in Nigeria in the short run. The signs of the parameters of the estimates of the lag of credit to the agricultural sector for the four periods were positive. This is evidenced by their coefficient values of 5.67 per cent, 2.57 per cent, 3.93 per cent and 2.09 per cent which implies that a one per cent increase in credit to the agricultural sector in the past four periods led to a positive effect on the growth of the Nigerian economy in the short-run.

Again, the immediate first and fourth periods lag of credit to the manufacturing sector had a negative effect on economic growth in Nigeria, implying that one per cent increases in the first and fourth periods credit to the manufacturing sector led to about 3.61 per cent, and 10.15 per cent decreases in the growth of the Nigerian economy in the current period within the short-run. In the second and third lagged period however, credit to the manufacturing sector had a positive effect on the growth of the Nigeria economy. By implication, a one per cent increase in the second and third lagged periods of credit to the manufacturing sector led to about 1.59 per cent and 1.29 per cent increase respectively in the current period short-run economic growth rate in Nigeria.

Lastly, the immediate past third and fourth lagged periods of credit to mining and quarrying sector had negative effects on the current period economic growth rate in the short-run, implying that one per cent increases in the third and fourth periods of credit to the mining and quarrying sector led to about 2.32 per cent and 3.67 per cent respectively decreases in the growth of the Nigerian economy in the current period. In the first and second lagged periods, however credit to mining and quarrying sector had positive effects on the short-run growth of the Nigeria economy. By implication, a one per cent increase in the first and second lagged period credit to mining and quarrying sector led to a 2.07 per cent and 1.55 per cent increase in the current period short-run economic growth rate in Nigeria. The error correction term had a negative coefficient of -1.685 as expected but was insignificant giving its t-statistic value of -1.903 with its corresponding p-value of 10.57 per cent, greater than 5 per cent. Giving this result, it followed that the error term did not adjust from short-run disequilibrium to long-run equilibrium.

From the result, the R^2 value of 0.6973 showed that about 69.73 per cent of the changes in the GDPGR had been explained by banks credit to the economic growth variables under study (agriculture, manufacturing and mining and quarrying sectors in the short-run. Furthermore, the F-statistics value of 0.8128

with its corresponding p-value of 66.06 per cent showed that the model is not statistically significant at 5 per cent.

To test for the joint significance of the short-run estimates, the study applied the Wald statistics. Extract of the result is as presented in Table 4.11 below:

4.1.3.3 Wald test of long-run estimates

Table 10: Wald test of long-run estimates

Variable	Null hypothesis	F-statistics	P-value	Decision
LLOAGS	C (6)=C(7)=C(8)=C(9)=0	0.400992	0.8022	Accept H_0
LLOMANS	C(10)=C(11)=C(12)=C(13)=0	0.174509	0.9435	Accept H_0
LLOMAQS	C(14)=C(15)=C(16)=C(17)=0	0.578195	0.6899	Accept H_0

Source: Extract from Appendix six, 2020

From the above table, it could be seen that the null hypotheses for all the variables, i.e. Bank credit to the agricultural sector, manufacturing sector and mining and quarrying sector are accepted. This is because their respective F-statistics values of 0.4009, 0.1745 and 0.5782 and their corresponding probabilities of 80.22 per cent, 90.35 per cent and 68.99 per cent are more than 5 per cent required for significance. This implies thus that bank credit to the agricultural sector, bank credit to the manufacturing sector and bank credit to mining and quarrying sector were statistically insignificant for measuring short-run economic growth in Nigeria.

4.3.4 Test for reliability and stability of the short-run estimates

To test whether or not the short-run estimates of the results were reliable and stable, the study applied the Breusch-Godfrey serial correlation LM test, the normality test, the heteroskedasticity test and the CUSUM test. Extracts of the results of these tests are presented below:

4.3.4.1 Short-run Breusch-Godfrey Serial Correlation LM Test

Table 11: Short-run Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.092317	Prob. F(2,4)	0.9137
Obs*R-squared	1.058926	Prob. Chi-Square(2)	0.5889

Source: Researchers' E-views 10 Computation, 2020

From this result, the prob chi-square (2) is greater than 5 per cent. From the result of 58.89 per cent, the null hypothesis that there is no serial correlation is accepted. This thus implies that the model is free from serial correlation.

4.3.4.2 Short-run heteroskedasticity Test: Breusch-Pagan-Godfrey

Table 12: Short-run heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.148120	Prob. F(17,6)	0.9991
Obs*R-squared	7.094700	Prob. Chi-Square(17)	0.9823
Scaled explained SS	1.242291	Prob. Chi-Square(17)	1.0000

Source: Researchers' E-views 10 Computation, 2020

From Table 12 above, the observed R^2 value of 7.09 with its corresponding prob. Chi-square value of 98.23 per cent. This is more than five per cent implying that the model is free from heteroskedasticity.

4.3.4.3 Short-run normality test

The study conducted a normality test on the short-run estimates using the histogram normality test. The Jarque-Bera statistics is the basis for determining whether the residuals of the model are normally distributed or otherwise. The decision rule is that the probability of the Jarque-Bera statistics should be more than 5 per cent for the residuals of the model to be normally distributed. The result of the normality test is shown in the figure below:

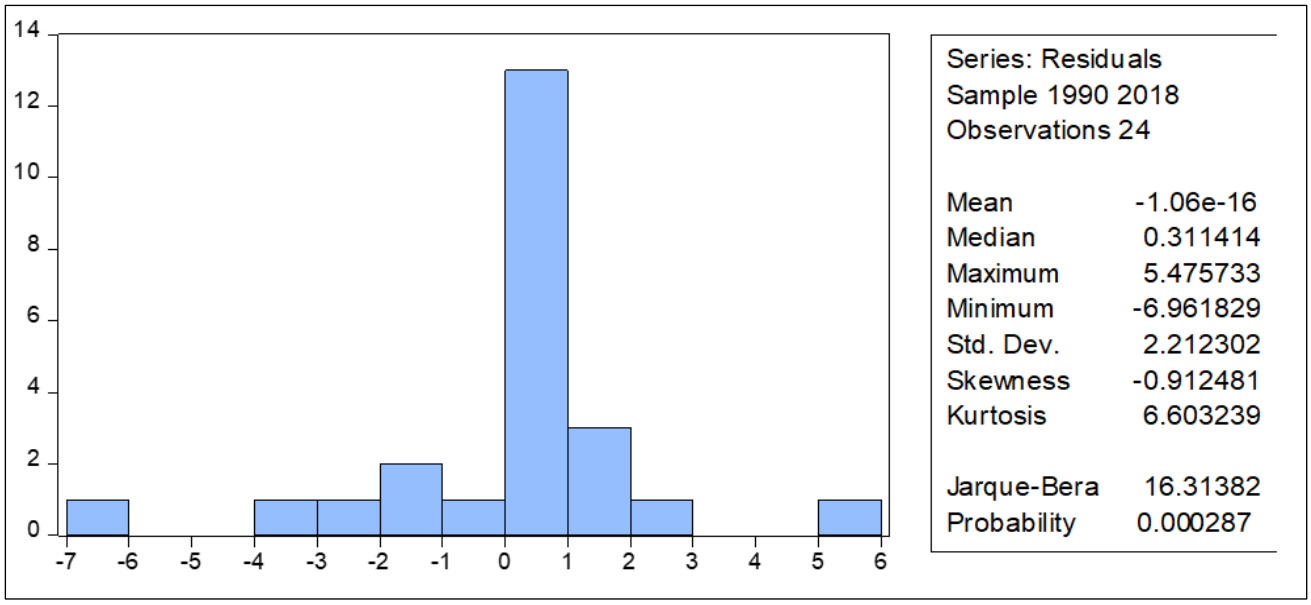

Figure 4: Short-run normality test
Source: Researchers' E-views 10 Computation, 2020

The Jarque Bera statistics of 16.313 with its corresponding probability of 0.028 per cent which is less than 5 per cent means that the residuals of the model are not normally distributed.

4.3.4.4 Short-run CUSUM test for stability of estimates

The study also tested for the stability of the estimates by using the CUSUM test, the result is presented below: From the below result, it can be seen that the blue line lies in between the two red lines. This meant that the estimates of our model are stable and reliable.

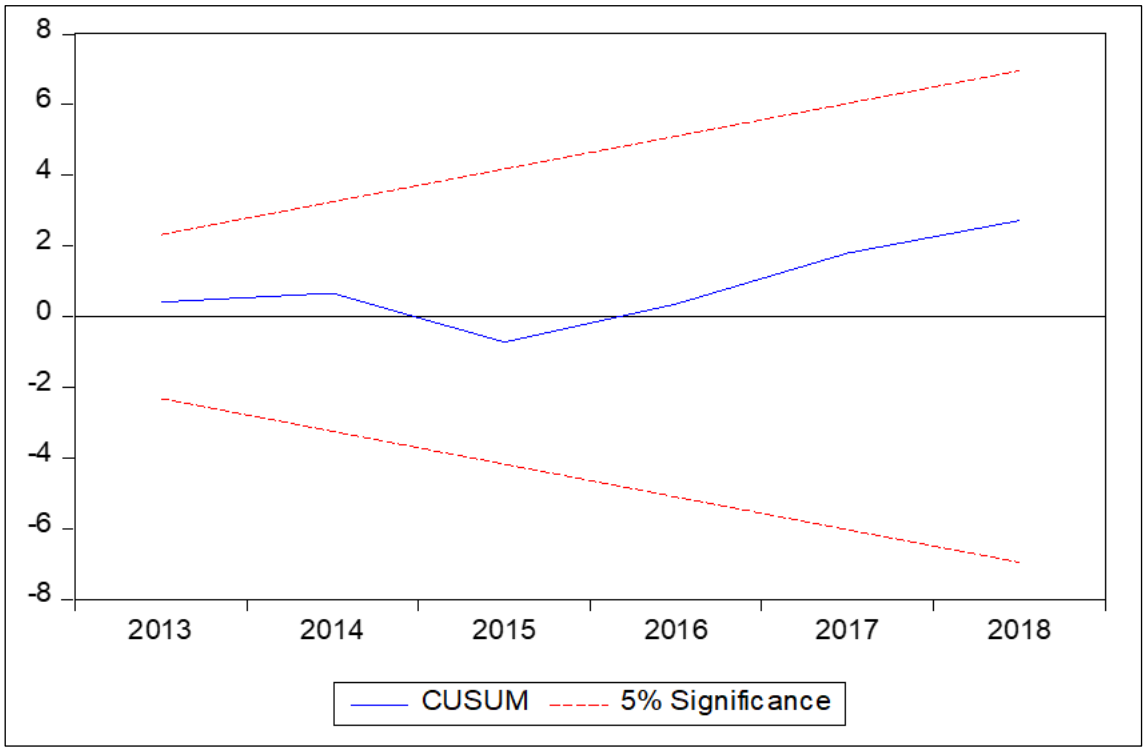

Figure 5: Short-run CUSUM test for stability of estimates
Source: Researchers' E-views 10 Computation, 2020

4.4 Test of Hypotheses

4.4.1 Hypothesis one

H_O: Bank credit to the agricultural sector does not have any significant effect on the growth of the Nigerian economy;

H_1: Bank credit to the agricultural sector has a significant effect on the growth of the Nigerian economy.

Decision Rule

Accept H_0: if calculated F-statistics value < Pesaran upper bound critical value

Reject H_0: if calculated F-statistics value > Pesaran upper bound critical value.

From the regression result,

Calculated F-statistics value = 0.4009

Pesaran upper bound critical value = 4.01

Since the calculated F-statistics value of 0.4009 is less than the Pesaran upper bound critical value of 4.01 at 5 per cent significance level, the study accepts the null hypothesis and rejects the alternative hypothesis implying that aggregate bank credit to the agricultural sector does not have any significant effect on the growth of the Nigerian economy.

4.4.2 Hypothesis two

H_O: Bank credit to the manufacturing sector does not have any significant effect on the growth of the Nigerian economy;

H_1: Bank credit to the manufacturing sector has a significant effect on the growth of the Nigerian economy

Decision Rule

Accept H_0: if calculated F-statistics value < Pesaran upper bound critical value

Reject H_0: if calculated F-statistics value > Pesaran upper bound critical value.

From the regression result,

Calculated F-statistics value = 0.174

Pesaran upper bound critical value = 4.01

Since the calculated F-statistics value of 0.174 is less than the Pesaran upper bound critical value of 4.01 at 5 per cent level of significance, the study accepts the null hypothesis and rejects the alternative hypothesis implying that bank credit to the manufacturing sector does not have any significant effect on the growth of the Nigerian economy.

4.4.3 Hypothesis three

H_O: Bank credit to the mining and quarrying sector does not have any significant effect on the growth of the Nigerian economy

H_1: Bank credit to the mining and querying has a significant effect on the growth of the Nigerian economy.

Decision Rule

Accept H_0: if calculated F-statistics value < Pesaran upper bound critical value

Reject H_0: if calculated F-statistics value > Pesaran upper bound critical value.

From the regression result,

Calculated F-statistics value = 0.578

Pesaran upper bound critical value = 4.01

Since the calculated F-statistics value of 0.578 is less than Pesaran upper bound critical value of 4.01 at 5 per cent level of significance, the study accepts the null hypothesis and rejects the alternative hypothesis which implies that bank credit to the mining and quarrying sector does not have any significant effect on the growth of the Nigerian economy.

5. CONCLUSION AND RECOMMENDATION

Credit is an important link in monetary transmission as it finances production, consumption and capital formation which in turn affect economic growth. Especially in developing countries like Nigeria, it creates resources needed for economic growth. The central bank of Nigeria has adopted many links and programs to increase economic growth through the use of bank credit. However, the relationship and impacts of these credits to various sector such as agriculture, manufacturing and mining/quarry has not yet been assessed properly in the Nigeria context.

Applying regression approach, the study found that:

There is an insignificant short-run and a significant long-run effect of banks credit to the agricultural sector, manufacturing sector and mining and quarry sector on the growth of the Nigerian economy;

From the findings of this study, we can therefore infer that

i. Bank credit has a significant long-run effect on the growth of the Nigerian economy.
ii. Availability of funds to the productive sectors of Nigeria results in the expansion of the operating capacity of businesses which translate into economic growth in the long-run.
iii. Bank credit to different sectors in Nigeria had not significantly affected the growth of the Nigerian economy. As short-term nature of bank loans and the attendant high-interest requirement on the loans reduced the loan effect on the productivity of businesses in Nigeria and by extension the economic growth.

We will like to recommend as follows:

(i) An agency should be established were all commercial farmers should be registered with responsibilities to interface with banks to ensuring that loans not exceeding certain benchmarks are free from collateral requirements, interest rate charges and loan administration bottlenecks are streamlined to

encourage commercial farming and thereby foster economic growth in Nigeria.

(ii) Policies targeted at reducing the interest rates charged on bank credit to the manufacturing sector in Nigeria should be implemented by the CBN through the conscious subsidy of all bank credit to the manufacturing sector. This is required to trigger productivity and enhance short term economic growth.

(iii) The empirical results imply that policy makers should focus attention on long run policies to promote economic growth such as development of modern banking sector, efficient financial market and infrastructures so as to increase private and public sector credits which are instrumental in promoting growth in the long run.

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