ANALYSIS OF THE IMPACT OF BANK CREDIT ON THE GROWTH OF AGRICULTURAL AND MANUFACTUR ING SECTORS IN NIGERIA

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Abstract

Sustainable growth in any developing economy must not undermine the manufacturing and agricultural sectors. In the light of this, the study focused on the empirical analysis of bank credit to the growth of the agricultural and manufacturing sectors in Nigeria. Annual time series data were collected for a period of 36 years from various issues of the Central Bank of Nigeria Statistical Bulletin and Transparency International Worldwide. The series were tested for stationarity with the Augmented Dickey-Fuller unit root test, the Johansen co-integration test were employed to examine the long-run relationship among the selected variables. Error Correction Models were specified and estimated to determine the speed of adjustment in the short run. The empirical analysis revealed that all the selected indicators were stationary at first difference. The Johansen cointegration test revealed that there was a long-run relationship between bank credits, manufacturing output, agricultural output, total government expenditure on agriculture and manufacturing sector, interest rate, exchange rate, crude oil and corruption index. Based on the ECM result obtained, manufacturing credits from deposit money banks and total government expenditure on the manufacturing sector had direct and significant impact on manufacturing sector output in the short-run. Corruption index negatively relates with manufacturing sector in the short run. It was inferred from the ECM result that bank credits and other selected indicators were able to explain 70.85% of the systematic variations in manufacturing output in the short-run. In the short-run also, agricultural credit from deposit money banks and total government expenditure on agriculture had direct and significant impact on agricultural output in Nigeria. Corruption index was also found to have negative impact on agricultural output in the short run 89.38% of the systematic variations of agricultural output was explained by bank credit and other selected variables. It was recommended that the government should employ Central Bank of Nigeria's regulatory instruments in increasing bank credit to the manufacturing and agricultural sectors and since interest rate was under the control of monetary authority in Nigeria, efforts must be made to ensure interest rate stability in order to improve the Nigerian manufacturing, and agricultural sectors.

Keywords:Manufacturing output, Agricultural output,Real Gross Domestic Product,Credit to Private Sector and Total Government Expenditure.

Introduction

There has been a lot of concern over the poor performance of the agricultural and manufacturing sector in Nigeria especially in recent times. Despite the several efforts of government to induce growth in these sectors, there has not been any significant growth recorded in these sectors. According to Anyanwu (2003) manufacturing and agricultural sectors play catalytic role in a modern economy and have many dynamic benefits crucial for economic transformation. In a typical advanced country, the

manufacturing and agricultural sectors are the leading sectors in many respects. These two sectors are avenue for increasing productivity related to import replacement and export expansion, creating foreign exchange earning capacity, raising employment and per capita income which causes unique consumption patterns. Furthermore, he noted that manufacturing and agriculture sectors create investment capital at a faster rate than any other sector of the economy while promoting wider and more effective linkages among different sectors. Ariyo (2005) explains that before independence, agricultural products dominated Nigerian economy and accounted for the major share of its foreign exchange earnings. Initially, inadequate capital investment permitted only modest expansion of manufacturing activities. Early efforts in manufacturing sector were oriented towards the adoption of an import substitution strategy in which light industry and assembly related manufacturing ventures were embarked upon by the formal trading companies up to about 1970. The prime mover in manufacturing activities was the private sector which established some agro-based light manufacturing units such as vegetable oil extraction plants, tobacco processing, textiles, beverages and petroleum products.

According to Ogar, Nkamare and Charles (2014) the Nigerian manufacturing sector before the third development plan of 1975-1980 was dominated by assemblage manufacturing, but it later shifted to heavy industries from the period of the Third National Development Plan. They further asserted that the Nigeria government intervened in order to establish core industrial plants to provide basic inputs for the downstream industries. The import substitution industrialization strategy virtually came to a halt in the late 1970s and early 1980s when the Liberal import policy expanded the imports of finished goods to the detriment of domestic production. Oluwafemi, Akinloand and Elumilade (2014) studied the impact of bank credit on output growth in the manufacturing and agricultural sub sectors of the economy over the period 1980-2010. Using the error correction modeling technique, the results showed that bank credit has significant impact on manufacturing output growth both in the short run and long run. According to Udih (2014) bank credit impact positively on the investible sectors of the economy through improved agricultural production of goods and services. He opined that sufficient financing of agricultural projects will not only promote food security, but also enhance the entrepreneurship performance of young investors. Concluding that, this is borne out of the expectation that a good match between adequate bank credit and agricultural entrepreneurship will ensure massive agricultural productivity. The role of bank credits in the growth of manufacturing and agricultural sectors cannot be overemphasized. This objective is not achievable without significant levels of resources from the financial sector being mobilized and deployed to finance business expansion and growth. Banks have to be effective intermediaries for mobilizing and channeling deposits to the productive sectors of the economy especially the manufacturing and agricultural sectors. Inspite of its continuous policy strategies to attract credits to the manufacturing and agricultural sectors, most Nigerian manufacturing and agricultural enterprises have remained unattractive for bank credits. For instance, as indicated in Central Bank of Nigeria (CBN) reports, almost throughout the regulatory era, commercial banks' loans and advances to the manufacturing sector deviated persistently from prescribed minima. Among the several challenges facing the manufacturing sector, accessibility to bank credit is prominent among them. Several studies in this area including Ogar, Nkamare and Charles (2014) assert that inadequate bank credit has limited the extent of growth in the manufacturing sector. Consequently, many manufacturing firms in Nigeria have continued to rely heavily on internally generated funds which have tended to limit their scope of operations. The major problem facing the Nigerian manufacturing sector is inadequate finance for investments.

Obilor (2013) reported that commercial banks obviously have no keen interest in agricultural financing. In order to encourage the banks, the government established the Agricultural Credit Guarantee Scheme (ACGS) to provide guarantees against inherent risk in agricultural lending. This measure could not achieve the intended objectives because agriculture being both labour and capital intensive venture requires huge capital outlay (Nwankwo, 2013). Very few studies have simultaneously considered the effects of bank loan on the manufacturing and agricultural sectors. Among these few studies is that by Oluwafemi,Akinlo and Elumilade (2014) and Oluwafemi *et al.* (2014). None of the previous studies considered the causal relationship between the commercial bank credit, agricultural sector and the manufacturing sector output simultaneously and this constitutes a research gap. This study also employs two estimation techniques; Error Correction Mechanism (ECM) and Granger Causality Test.In other to meet the objectives of the study, the current study extended the scope of the study from 1981 to 2017 with the inclusion of credit to manufacturing sector from deposit money bank (CRMS), prime lending interest rate (PLIR), exchange rate (EXCR), total government expenditure (TGEX), corruption index (CRID), crude oil (COIL), Manufacturing Output (MOUT) and Agricultural Output (AOUT) to examine the impact of banks credit on manufacturing and Agricultural sectors in Nigeria.

The Neo-Classical Growth Theory

The Neo-classical Model of Growth was first devised by Robert Solow. The model believes that a sustained increase in capital investment increases the growth rate of output temporarily. This is because the ratio of capital to labour goes up (there is more capital available for each worker to use) but the marginal product of additional units of capital is assumed to decline and the economy eventually moves back to long-term growth path, with real GDP growing at the same rate as the workforce plus a factor to reflect improving "productivity". A "steady-state growth path" is reached when output, capital and labour are all growing at the same rate, so output per worker and capital per worker are constant. The Neo-Classical economists believe that to raise an economy's long term trend rate of growth requires an increase in the labour supply and an improvement in the productivity of labour and capital. Differences in the rate of technological change are said to explain much of the variation in economic growth between developed countries. The neo-classical model treats productivity improvements as an exogenous variable meaning that productivity is assumed to be independent of capital investment (IMF, 2001). According to Nnanna et al. (2004), based on Solow's analysis of the American data from 1909 to 1949, he observed that 87.5% of economic growth within the period was attributed to technological change and 12.5% to the increased use of capital. The result of the growth model was that financial institutions had only minor influence on the rate of investment in physical capital and the changes in investment are viewed as having only minor effects on economic growth.

Empirical Literature

Some empirical literature on Bank Credit and the Manufacturing Sector includes Ebele and Lorember (2016) studied on the effect of commercial bank credit on the manufacturing sector output in Nigeria from 1980 to 2015 using Cochrane-Orcutt procedure. Five variables, manufacturing sector output, inflation rate, interest rate, loans and advances and broad money supply were used for the study. The variables were tested for unit root using the Augmented Dickey Fuller approach and were found to be stationary at levels. The study found that, inflation rate and interest rate have negative effect on manufacturing sector output while loans and

advances and broad money supply have positive effects. Oluwafemi, Enisan and Elumilade (2014) examined the impact of bank credit on output growth in the manufacturing and agricultural sub sectors of the economy over the period 1980-2010. Using the error correction estimation technique, the results show that bank credit has significant impact on manufacturing output growth both in the short run and long run but not on the agricultural sub sector. Inflation and exchange rate depreciation have negative effects on manufacturing output growth in both short run and long run. The study by Eatzaz and Malik (2009) for 35 developing countries analyzed the role of financial sectors development on economic growth. The study using GMM approach reported that domestic credit to the private sector led to increase per worker output and thus increased economic growth in the long run. Their finding was consistent with the findings of Levine (2004) and Franklin (2004). Ogar*et'al* (2014) carried out a study on how commercial banks credit influence manufacturing sector in Nigeria. The objective of the study was to investigate the impact of commercial banks loans on manufacturing sector and to establish the relationship between interest rate and manufacturing sector performance. Secondary sources of data were employed using Central Bank of Nigeria Statistical Bulletin. Ordinary Least Squares technique was used to determine the relationship between the dependent variable and independent variables. The findings revealed that commercial banks credit had a positive relationship with manufacturing sector.Ebi and Emmanuel (2014) investigated the impact of commercial bank credit on Nigerian industrial subsectors between 1972 and 2012 using the Error Correction (ECM) technique. They found that commercial banks' credit impacted positively and significantly on the manufacturing sub-sector in Nigeria. Interest rate was not an important determinant of industrial sector and industrial sub-sectors outputs, exchange rate is a negative and significant determinant of industrial sector's outputs in Nigeria. These results pointed to the conclusion that, increased bank credits to industrial sector is desirable indispensible in stimulating industrial sector growth in Nigeria. Dey and Flaherty (2005) using two-stage regression model examined the impact of bank credit and stock market liquidity on GDP growth. The results showed among other things that bank credit had significant effect on GDP growth for a number of countries. The study by Leitão (2010) of European Union Countries and Brazil, Russian, India and China (BRIC) over the period, 1980-2006 showed that domestic credit positively impacted economic growth.

Tomola, Adebisi and Olawale (2012) examined bank lending, economic growth and the performance of the manufacturing sector in Nigeria. Time series data covering a period of 36years (1973-2009) were employed and tested with the co-integration and Vector Error Correction (VECM) techniques. The findings of the study showed that manufacturing capacity utilization and bank lending rates significantly affect manufacturing output in Nigeria. However, the relationship between manufacturing output and economic growth could not be established in the country. Imoughele and Ismaila (2014) investigated the relationship between manufacturing sector output and some monetary variables such as bank credit, interest rate, broad money,

external reserve and inflation rate. They concluded that there is a long run relationship between manufacturing sector output and monetary policy variables. Osmond, Egbulonu and Emerenini (2015) carried out a study on the impact of monetary policy variables on manufacturing in Nigeria from 1981 to 2012. The study made use of the Johansen co-integration test to establish longrun equilibrium relationship between the explained and the explanatory variables. The Error Correction Model (ECM) was employed to estimate the model. The analysis showed that monetary policy has a significant impact on the manufacturing sector in Nigeria. The study by Onuorah (2013) for the period 1980-2012 examined the impact of bank credit on economic growth. The results from co-integration VAR and Causality showed that various measures of bank credit namely total production bank credit and total general commerce bank credit had significant positive effect on economic growth in Nigeria over the study period. In the same way, study by Alieroet *al*. (2013) over the period 1974-2010 examined the impact of bank credit on economic growth. The result from Autoregressive distributed lag bound approach showed that private sector had significant positive effect on economic growth in Nigeria. Looking at some empirical literature on Bank Credit and the Agricultural Sector,Sunny (2013) investigated the Impact of commercial banks' credit on Agricultural Sector Development in Nigeria. The results revealed that Agricultural Credit Guarantee Scheme Fund and Government fund allocation to agriculture produced significant and positive effect on agricultural productivity.

Abbas, Jiang, Jam, and Shahbaz (2016) analyzed the Impact of formal credit on agricultural output in Pakistan. The study made use of secondary data which span from 1996 to 2015. Augmented Dickey Fuller (ADF) test was applied to check the stationarity of the data. The Johansen Co-integration test (Trace Statistic) was used to find out whether there exists a long run relationship between formal credit and agricultural output. The method of Ordinary Least Squares (OLS) was used to estimate the relationship between formal credit and agricultural output. The empirical regression results indicate that the explanatory variable (formal credit) was statistically significant with coefficient of 0.8604. This means 1% increase in credit would increase the agricultural output by 0.86%. It is clear that impact of formal credit on agricultural output has positive and significant effects. Udih (2014) investigated banks credit and agricultural development. The study used primary and secondary sources of information that were extracted from five (5) banks and ten (10) agricultural enterprises in Delta State. A simple random sampling technique through the lottery method was adopted to select the samples. The data were analysed using percentage, mean and Standard Deviation. Pearson product moment correlation was used to test the hypotheses. The research findings include: that banks' credits and advances to agricultural entrepreneurs promotes agricultural development and productivity, and that regulated banks' credits to the agricultural entrepreneurs has little impact on the entrepreneurship performance, and thus, suggested that adequate bank credits should be granted to small scale agricultural farmers to increase productivity :and their farms land should be used as collateral instead of the usual banks loan security to promote entrepreneurship performance. Kareem, Bakare, Raheem, Olagumela, Alawode and Ademoyewa (2013) examined the factors influencing agricultural output in Nigeria. The study sought to determine the factors influencing agricultural production in Nigeria, and also

determine the causality between agricultural output and macro-economic variables. The study adopted regression analysis, descriptive statistics and the Granger causality tests on macroeconomic variables (i.e. Food import value, Interest rate, commercial bank loans on agriculture, GDP growth rate and foreign direct investment) to find the relationship between the different variables chosen. The result shows fluctuations in the trend of variables considered (i.e. Interest rate, Commercial banks loans to Agriculture, GDP growth rate and foreign direct investment) for the period under review. The results further showed that foreign direct investment: commercial banks loan, interest rate and food import value have positive relationship with agricultural output. Agunuwa, Inaya and Proso (2015) carried out a study to examine the impact of commercial banks' credits on agricultural productivity in Nigeria. The statistical tool of analysis was the Ordinary Least Squares (OLS). However, the variables were subjected to the Unit Root Test to ensure stationarity before the application of the OLS. The t-calculated of commercial banks credit had a value of 6.28 which was greater than the t-critical of 1.96. This was an indication of positive and significant relationship between commercial banks' credit and agricultural productivity. The t-calculated of interest rate on commercial banks credit has a value of -9.38 as against 1.96 t critical. This was an indication of a negative relationship between interest rate and agricultural productivity. While the t-calculated of government spending, as a complimentary variable, has a value of 3.42 as against the 1.96 of t-critical. This as the case of hypothesis one, is also indication of significant positive relationship between government spending and agricultural productivity in Nigeria.

Obilor (2013) examined the impact of Agricultural Credit Scheme Fund, agricultural product prices, government fund allocation and commercial banks' credit to agricultural sector on agricultural productivity. The result revealed that Agricultural Credit Guarantee Scheme Fund and Government fund allocation to agriculture produced a significant positive effect on agricultural productivity, while the other variables produced a significant negative effect. Nwankwo (2013) examined agricultural financing in Nigeria and its implication on the growth of Nigerian economy using Ordinary Least Square method and quantitative research design. The study revealed that there is a significant relationship between agricultural financing and the growth of Nigerian economy and that the level of loan repayment rate over the years has indeed negatively impacted significantly on the growth of Nigerian economy.Ogbanje,Yahaya and Kolawole (2012) examined the effect of commercial banks loan on the agricultural sector in Nigeria from 1981 to 2007. Growth in agricultural sector was expressed in terms of agricultural Gross Domestic Product (GDP). Secondary data for the study were obtained from the Central Bank of Nigeria. The findings revealed that commercial banks loan to the agricultural sector increased substantially over the period of study. The Ordinary Least Square Method, with lagged dependent variable, revealed that commercial banks' loan positively affected agricultural GDP at 0.01 level of probability. Hence, commercial banks' loan has contributed significantly to agricultural development in Nigeria. Enyim, Ewno and Okoro (2013) examined banking sector credit and performance of the agricultural sector in Nigeria. The study applied econometric tests such as unit root, cointegration and its implied error correction estimation and Gange causality test, in which changes in AGDP was regressed on commercial bank credit to agriculture. The result of the analysis shows that the commercial bank credit has a positive impact on agriculture sector.Oyeyemi and Awujola (2014) examined the impact of some determinants of economic growth on the Gross Domestic Products (GDP) using multiple regression methodology.

These determinates include interest rate, inflation rate, oil revenue, federal government expenditure, money supply, foreign private investment and foreign exchange rate. The study reveals that money supply, oil revenue, federal government expenditure and foreign private investment had significant impact on economic growth while inflation rate, interest rate and foreign exchange rates adopted so far by the government does not have significant impact on economic growth (GDP). The study recommended that the productive capacity should be improved by government through direct investment in the real sectors of the economy and government expenditure should be expanded on productive ventures since its impact on economic growth is positive. Mohan (2006) examined the overall growth of agriculture and the role of institutional credit. The overall supply of credit to agriculture as a percentage of total disbursement of credit is going down, he argued that this should not be a cause for worry as the share of formal credit as a part of the agricultural GDP is growing. This establishes that while credit is increasing, it has not really made an impact on value of output figures which points out the limitations of credit. In another study, Golait (2007) attempted to analyze the issues in agricultural credit in Nigeria. The analysis revealed that the credit delivery to the agriculture sector continues to be inadequate. It appeared that the banking system is still hesitant on various grounds to purvey credit to small and marginal farmers. It was suggested that concerted efforts were required to augment the flow of credit to agriculture, alongside exploring new innovations in product design and methods of delivery, through better use of technology and related processes. Facilitating credit through processors, input dealers, NGOs, etc., that were vertically integrated with the farmers, including through contract farming, for providing them critical inputs or processing their produce, could increase the credit flow to agriculture significantly. In general, it is difficult to establish a causal relationship between agriculture credit and production due to the existence of critical endogeneity problem.

Nasiru (2010) proved in his research article on the topic Micro credits and Agricultural Productivity in Ogun State, Nigeria ‖ that micro credit enabled farmers to buy the inputs they needed to increase their agricultural productivity. However, the sum of credit obtained by the farmers in the study area did not contribute positively to level of output. This was as a result of non-judicious utilization, or diversion of credits obtained to other uses apart from the intended farm enterprises. Siddiqi *et'al* (2004) reported that flow of credit to farmers had increased demand for inputs to increase crop production. The elasticity of amount of credit, Number of tractors, irrigation, use of chemical fertilizer and pesticides and so on with respect to the dependent variable agricultural income on per acre cultivated as well as per cropped acre basis indicated that credit (production credit) and tube wells impacted positively and significantly. Number of tractors and use of fertilizers also contributed positively but insignificantly. It was because of inappropriate use of fertilizer and tractors. Chachar (2007) found that credit is the need of both subsistence and economic land holders for production and development. About 95% of farmers have less than 25 acres of land. Mostly in rural areas, where the institutional finance is neglected. The small farmers are hesitating to access credit facilities from formal institutions due to complicated and lengthy procedure. They prefer to purchase the input on double prices payable after the marketing of their produce.Ahmad *et al* (2006) analyzed the impact of advancing in-kind credit in the form of fertilizer and seed to smallholder farmers in the Ethiopian. They found that in kind input credit of fertilizer and seed increased crop output reasonably. Iqbal *et' al* (2003) suggested that the formal financial institution should be encouraged to expand agriculture loans for farming sector especially small poor farmers. The study also indicated that the institutions should expend the loan for consumption

farmers in case of emergencies (flood and drought etc). In addition to a crop insurance, other schemes should also be introduced to provide protection to farmers against pests, drought, heavy rains and flood) on payment of minimum premium. Muhammad and Farzand (2012) studied the Impact of Agricultural Credit on Agricultural Productivity in Dera Ismail Khan District. The study made use of secondary data which span the period 1990 and 2008. The data were analyzed using linear regression model on the Cobb-Douglass type production function. Credit disbursed for seed along with fertilizers and pesticides, irrigation and tractors were found strongly correlated to agricultural gross domestic product with values 0.87, 0.58 and 0.42 respectively. Above 80% impact was of credit on agricultural gross domestic product with F = 10.752 significant at 0%. Only credit for seeds, fertilizers etc had greater role in this collective impact. At the end it was concluded that availability of credit increased agricultural production.

Abedullah (2009) concluded from the findings of his study that easy and cheap credit is the quickest way for boosting agricultural production. He also asserted that the use of modern agricultural technology increased the demand for credit and resulted in increase in agricultural yield of small farmers. Siebel (2000) reported that is a seasonal activity. The agricultural credit institutions should increase the credit supply during the sowing season. The study suggested that agricultural credit should provide for only agricultural purpose, especially for crop production. Ansari (2001) stated that agricultural productivity could be increased through the introduction and promotion of innovative agricultural technology. Farmers are looking towards financial sources for taking loans on easy terms and conditions so as to increase their agricultural productivity. Awotide, Abdoulaye, Alene, and Manyong (2015) studied that impact of Access to credit on agricultural productivity: with evidence from smallholder cassava farmers in Nigeria. The study made use of Endogenous Switching Regression Model (ESRM)). The first stage of the ESRM reveals that total livestock unit and areas, where the institutional finance is neglected. The small farmers are hesitating to access credit facilities from formal institutions due to complicated and lengthy procedure. They prefer to purchase the input on double prices payable after the marketing of their produce.Ahmad *et al* (2006) analyzed the impact of advancing in-kind credit in the form of fertilizer and seed to smallholder farmers in the Ethiopian. They found that in kind input credit of fertilizer and seed increased crop output reasonably. Iqbal *et' al* (2003) suggested that the formal financial institution should be encouraged to expand agriculture loans for farming sector especially small poor farmers. The study also indicated that the institutions should expend the loan for consumption farmers in case of emergencies (flood and drought etc). In addition to a crop insurance, other schemes should also be introduced to provide protection to farmers against pests, drought, heavy rains and flood) on payment of minimum premium. Muhammad and Farzand (2012) studied the Impact of Agricultural Credit on Agricultural Productivity in Dera Ismail Khan District. The study made use of secondary data which span the period 1990 and 2008. The data were analyzed using linear regression model on the Cobb-Douglass type production function. Credit disbursed for seed along with fertilizers and pesticides, irrigation and tractors were found strongly correlated to agricultural gross domestic product with values 0.87, 0.58 and 0.42 respectively. Above 80% impact was of credit on agricultural gross domestic product with F = 10.752 significant at 0%. Only credit for seeds, fertilizers etc had greater role in this collective impact. At the end it was concluded that availability of credit increased agricultural production.

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and sustainable technology can be made available to farmers to increase farm profits. Sharma (2014) analyzed the impact of agricultural credit from commercial bank on agricultural growth by using the time series data of Nepalese economy covering the period 2002-2012. This study found that agricultural credit positively and significantly impacted on agricultural output of Nepal. However, the use of fertilizer and improved seeds has not shown any significant impact on agricultural GDP. He recommends the extension and deepening of financial service system in the rural area and facilitating the agricultural lending. Rahman *et.al.* (2014) emphasized agricultural credit as a major determinant of farm productivity. Their study utilized logistic regression method on the 300 samples from Bawhalpur, Pakistan. With the positive association between credit and agricultural productivity, they concluded that timely provision of appropriate amount of loan to farmers is helpful for the enhancement of agricultural productivity as it enables them to purchase high yielding variety seeds, fertilizers and pesticides.

Theoretical Framework

The Neo-Classical Growth Theory

Theoretically, the relationship between credit and growth is established by an assessment of the transmission mechanism through which credit promotes economic activity. According to Amoo, Eboreime, Adamu and Belonwu (2017) the neoclassical growth model provides a basis to illustrate the impact of credit interventions on economic activities through the augmentation of saving which in turn, translates to an enhancement in gross domestic investment and capital accumulation.An endogenous model of economic growth appears to be the most suitable theoretical framework for this study. The model suggests that endogenous factors such as government policies, political stability, market distortions, human capital etc., can significantly affect economic growth. It is a widely used growth model to provide a systematic investigation of the government policies and programmes.Based on a different class of theoretical models, Papaioannou (2007) argue that financial development affects growth by reducing inequality through the process of human capital accumulation. In addition, it provides a mechanism to assess how various factors such as institutional quality, government policies, infrastructure, endowments and finance affect the growth process of an economy. Adopting this line of argument with respect to credit, it is plausible to hypothesize that credit will promote growth in a good policy environment. Additionally, we hypothesize that when the local conditions are right, credit will be more growth enhancing. To test these propositions, the following equations are specified. Following the exposition of Papaioannou (2007) the neoclassical aggregate production function is specified as:

$$y = \propto () 1 - \propto$$

(3.1)

Equation (3.1) expresses output in year (t) as a function of aggregate capital stock K_t; labour force, L (adjusted for human capital m; and technological level, A; which enters the equation in a Hicks-neutralway Share of capital and quality adjusted labour is measured by $\propto$ and 1- $\propto$ respectively. In its intensive form (per worker terms), the production function is represented as;

$=\propto 1-\propto$ (3.2)

Taking the derivative of (3.2) with respect to time;

□/=□/+(1-∝)□/+□/ (3.3)

$(1-\propto)$ □/ captures the role of human capital development through education, and the third, □/captures the role of total factor productivity which measures the degree of efficiency with which inputs are combined in the production process. However, it should be noted that this framework includes all factors not related to education and physical capital investment since technical change is measured in the form of the Solow residual and this framework should be seen as an analytical tool through which the sources of growth through finance (credit) and other inputs is understood. In the above framework, credit does not impact on growth directly but through the main sources of economic growth. It is plausible to assume that increased credit purveyance would enhance investment in the manufacturing sector which in turn would accelerate the pace of capital accumulation and economic growth.

Model Specifications

For this study, the model of Agunuwa, Inaya and Proso (2015) was adapted. Agunuwa, Inaya and Proso (2015) carried out a study to examine the impact of commercial banks' credits on agricultural productivity in Nigeria, and specified their model as shown below:

$$AGP = b_0 + b_1CBCA + b_2INTR + b_3GSA + u_t \quad (3.4)$$

Where: AGP means Agricultural Productivity; CBCA represents Commercial banks' credit to the agricultural sector; INTR connotes Interest rate on Commercial banks' credit to agriculture; GSA stands for Government spending on the agricultural sector and Ut signifies Error term.

The model of Agunuwa, Inaya, and Proso (2015) is modified to suit the objective of the study. The modifications made on the adapted model is the inclusion of Manufacturing credit from deposit money banks, exchange rate, Crude oil production, Bank fraud proxied by Corruption Index as part of the explanatory variables, and the dependent variable was changed from Agricultural productivity to manufacturing and Agricultural sectors output. The agricultural and manufacturing productivity is measured by standard on the efficiency of the agricultural and manufacturing sectors output to the economy. The agricultural output is measured by the size of the product coming from the sector. The modified model for the study is given as equations 3.5 and 3.7 respectively

$$AOUT = f(ACDMB, TGEA, OIL, EXR, INTR, COR) \quad (3.5)$$

The operational form of equation 3.5 is given thus:

$$AOUT = b_0 + b_1ACDMB + b_2TGEA + b_3OIL + b_4EXR\ b_5INTR + b_6COR + U_t \quad (3.6)$$

(Apriori expectation b_1, b_2 and $b_4>0$ while b_3, b_5 and $b_6<0$)

The functional form of the model relating to the Manufacturing sector is given thus:

$$MOUT = f(MCDMB, TGEM, OIL, EXR, INTR, COR) \quad (3.7)$$

The operational form of equation 3.7 is stated thus:

$$MOUT = a_0 + a_1MCDMB + a_2TGEM + a_3OIL + a_4EXR + a_5INTR + a_6COR + U_t \quad (3.8)$$

(Apriori expectation a_1, a_2 and $a_4>0$ while a_3, a_5 and $a_6<0$)

Where: AOUT = Agricultural Output, MOUT = Manufacturing Output, ACDMB = Agricultural credit from deposit money banks, MCDMB = Manufacturing credit from deposit money banks, TGEA = Total government expenditure on agriculture, TGEM = Total government expenditure on manufacturing, OIL = Crude oil, EXR = Exchange rate, INTR = Interest rate on lending, COR = Bank fraud proxied by Corruption Index, b_0 and a_0 = Intercept or slope, $b_1 - b_6$ and $a_1 - a_6$ are coefficients of the independent variables, U_t = stochastic or error term.

Analysis of Data and Discussion of Regression Results

Unit Root

Test

The stationarity status of the selected macroeconomic indicators were examined using the Augmented–Dickey Fuller test statistics. The results which are displayed in Table 4.1 below shows that all the selected variables (Agricultural Output (AOUT), Manufacturing Output (MOUT), Agricultural credit from deposit money banks (ACDMB), Manufacturing credit from deposit money banks (MCDMB), Interest rate on lending (INTR), Exchange rate (EXR), Total government expenditure on agriculture (TGEA), Total government expenditure on Manufacturing (TGEM), Crude oil (OIL), Bank fraud proxied by Corruption Index (COR) were stationary at first difference. In other words, AOUT, MOUT, ACDMB, MCDMB, TGEA, TGEM, INTR, EXR, OIL and COR were found to be stationary at I(1).

Table 4.1: Unit Root Test Results

Variable	Level	First Difference	Order of Integration
LogAOUT	- 1.6312	- 3.7733 *	1(1)
LogMOUT	- 0.0647	- 4.5047 *	1(1)
LogACDMB	- 0.9548	- 6.6300 *	1(1)
LogMCDMB	- 0.2890	- 4.4162 *	1(1)
LogTGEA	- 0.8062	- 6.2520 *	1(1)
LogTGEM	- 1.0913	- 6.4043 *	1(1)
EXR	- 0.3311	- 5.1961 *	1(1)
INTR	- 2.1767	- 6.5625 *	1(1)
OIL	0.6528	- 5.9594 *	1(1)
COR	- 1.1462	- 7.4487 *	1(1)
5%CV	- 2.9511	- 2.9540	

Source: Author's compilation with information from stationarity test results
Note: * significant at 5% level

Cointegration Test using the Johansen Methodology

The results of the Unrestricted Cointegration Rank tests for the models are presented in Table 4.2a and 4.2b. Starting with the null hypothesis that there are no cointegrating vector in the model. The results showed that there exists at least three (3) cointegrating equations respectively as both the Trace and Max-Eigen statistics rejected the null against the alternative at 5 per cent level of significance which shows that there is a unique longrun relationship between Agricultural credit from deposit money banks, Manufacturing credit from deposit money banks, Interest rate on lending, Exchange rate, Total government expenditure on agriculture, Total government expenditure on Manufacturing, Crude oil, Corruption Index, Agricultural Output and Manufacturing Output in Nigeria.

Table 4.2a: Unrestricted Cointegration Rank Test result for the mode l

Hypothesised No. of CE(s)	Trace Stat.	Critical Value (0.05)	Prob **	Hypothesised No. of CE(s)	Max-Eigen Stat.	Critical Value (0.05)	Prob **
None *	1273.154	125.6154	0 .0000	None *	1143.693	46.23142	0.0000
At most 1 *	129.4616	95.75366	0.0000	At most 1 *	51.92631	40.07757	0.0015
At most 2 *	77.53528	69.81889	0.0106	At most 2 *	34.88588	33.87687	0.0378
At most 3	42.64940	47.85613	0.1413	At most 3	21.39902	27.58434	0.2528
At most 4	21.25038	29.79707	0.3422	At most 4	13.86894	21.13162	0.3759
At most 5	7.381441	15.49471	0.5337	At most 5	6.527774	14.26460	0.5464
At most 6	0.853667	3.841466	0.3555	At most 6	0.853667	3.841466	0.3555

Source: Author's compilation with information from unrestricted cointegration rank results.

Note: i. Both Trace and Max-Eigenvalue tests indicate 3 cointegrating equations at the 0.05 level respectively, ii. * denotes rejection of the hypothesis at the 0.05 level and iii. ** Mackinnon-Haug-Michelis (1999) p-values

Table 4.2b: Unrestricte d Cointegration Rank Test result for the model

Hypothesised No. of CE(s)	Trace Stat.	Critical Value (0.05)	Prob **	Hypothesised No. of CE(s)	Max-Eigen Stat	Critical Value (0.05)	Prob **
None *	1272.710	125.6154	0.0000	None *	1166.567	46.23142	0.0000
At most 1 *	106.1433	95.75366	0.0080	At most 1 *	40.69149	35.07757	0.0038
At most 2 *	70.45180	69.81889	0.0445	At most 2 *	33.85530	30.87687	0.0058
At most 3	37.59650	47.85613	0.3199	At most 3	20.69128	27.58434	0.2953
At most 4	16.90521	29.79707	0.6470	At most 4	10.84765	21.13162	0.6625
At most 5	6.057560	15.49471	0.6887	At most 5	5.497156	14.26460	0.6782
At most 6	0.560405	3.841466	0.4541	At most 6	0.560405	3.841466	0.4541

Source: Author's compilation with information from unrestricted cointegration rank results.

Note: i. Both Trace and Max-Eigenvalue tests indicate 3 cointegrating equations at the 0.05 level respectively, ii. * denotes rejection of the hypothesis at the 0.05 level and iii. ** Mackinnon-Haug-Michelis (1999) p-values

4.3 Error Correction Representation (Short-run)

The results of the error correction representation of the two models are reported in Table 4.3.

Dependent Variable: D(AOUT) for Model I					**Dependent Variable: D(MOUT) for Model I I**				
Regressor	Coefficient	Std. Error	t-Statistic	Prob.	Regressor	Coefficient	Std. Error	t-Statistic	Prob.
C	0.1285 *	0.040 3	3.192 5	0.0037	C	0.0003	0.0365	0.0076	0.9940
D(ACDMB)	0.3700 *	0.087 7	4.217 2	0.0002	D(MCDMB)	0.7908 *	0.1691	4.6756	0.0002
D(OIL)	-0.1841 *	0.067 6	-2.724 2	0.0114	D(OIL)	0.6943 *	0.1236	5.6172	0.0000
D(TGEA)	0.1193 *	0.056 5	2.109 8	0.0439	D(TGEM)	0.0158	0.0387	0.4070	0.6888
D(COR)	-0.0161	0.009 6	-1.677 9	0.1053	D(COR)	-0.0021 *	0.0008	-2.4604	0.0231
EXR	0.0047 *	0.001 4	3.280 3	0.0028	EXR	-0.0015	0.0056	-0.2701	0.7902
INTR	0.0032	0.007 4	0.426 5	0.6732	INTR	0.0046	0.0052	0.8950	0.3826
ECM(-1)	-0.4275*	0.150 4	-2.842 4	0.0086	ECM(-1)	-0.4046 *	0.1627	-2.4866	0.0418

Source: Author's compilation with information from ECM results.

Results from the empirical analysis of model I in table 4.3 above, indicates that all the exogenous variables (Agricultural credit from deposit money banks (ACDMB), Crude oil (OIL), Total government expenditure on agriculture (TGEA) and exchange rate (EXR) are statistically significant in explaining Agricultural output (AOUT) in Nigeria except Interest rate on lending (INTR) and corruption index (COR). Thus, a 1 per cent increase in agricultural credit from deposit money banks, total government expenditure on agriculture, exchange rate and interest rate raised Agricultural output positively by 0.3700, 0.1193, 0.0047 and 0.0032 per cent respectively while a unit change in crude oil and corruption index reduced agricultural output negatively by 0.1841 and 0.0161 per cent respectively.Also from Table 4.3 above, the empirical analysis of model II indicates that manufacturing credit from deposit money banks (MCDMB) and Crude oil (OIL) are statistically significant in explaining Manufacturing output (MOUT) in Nigeria while other exogenous

variables (Total government expenditure on manufacturing (TGEM), Exchange rate (EXR), Interest rate on lending (INTR) and Corruption index (COR) are not. Thus, a unit change in manufacturing credit from deposit money banks, crude oil, total government expenditure on manufacturing and interest rate raised manufacturing output positively in Nigeria by 0.7908, 0.6943, 0.0158 and 0.0046 per cent respectively while a unit change in corruption index and exchange rate reduced manufacturing output negatively by 0.0021 and 0.0015 per cent respectively.

Finally, the error correction mechanism ecm (-) of -0.4275 and -0.4046 are statistically significant and have the appropriate sign respectively. They both suggest however, that there is a slow adjustment process on the growth of agricultural and manufacturing sectors in Nigeria since the speed of adjustment to longrun equilibrium is 42.8 and 40.5 per cent respectively. It is also a confirmation that agricultural credit from deposit money banks, crude oil, total government expenditure on agriculture, total government expenditure on manufacturing, exchange rate, interest rate on lending, corruption index, agricultural output and manufacturing output in Nigeria are cointegrated.

Diagnostic Test

To confirm the robustness of the model, a diagnostic test was performed as shown in Table 4.

Table 4: Key Regression and Diagnostic Statistics for Model I & II

	Model I	Model I I		Model I	Model I I
R - squared	0.893766	0.704 845	Mean dependent va r	0.207324	0.172768
Adjusted R -squared	0.832430	0.650062	S.D. dependent var.	0.163608	0.122702
S.E. of regression	0.142970	0.078562	Akaike info criterion	-0.850040	-2.002208
Sum squared residual	0.531450	0.11109 5	Schwarz criterion	-0.490897	-1.615101
Log likelihood	22.45069	34.02870	Hannan-Quinn criter	-0.727562	-1.890735
Durbin -Watson stat.	1.806291	2.020475	F-statistic	10.31253	6.140699
Prob.(F- statistic)	0.003514	0.000894			

Source: Author Regression Output.

The coefficient of determination R^2 of 89.4 and 70.5 per cent respectively indicates that the total variation of Agricultural and Manufacturing outputs are jointly explained by Agricultural credit from deposit money banks, Manufacturing credit from deposit money banks, Interest rate on lending, Exchange rate, Total government expenditure on agriculture, Total government expenditure on Manufacturing, Crude oil and Corruption Index. The Akaike information criterion, Schwarz criterion and Hannan-Quinn criterion show that the two models are correctly specified. Durbin-Watson statistic of 1.806291 and 2.020475 from the two models implies absence of autocorrelation among the explanatory variables.

Stability Test

Stability test was conducted using cumulative sum (CUSUM) of recursive residuals as shown in figures 4.1. The existence of parameter instability is established if the cumulative sum of the residual goes outside the area between the critical straight bounded upper and lower lines.

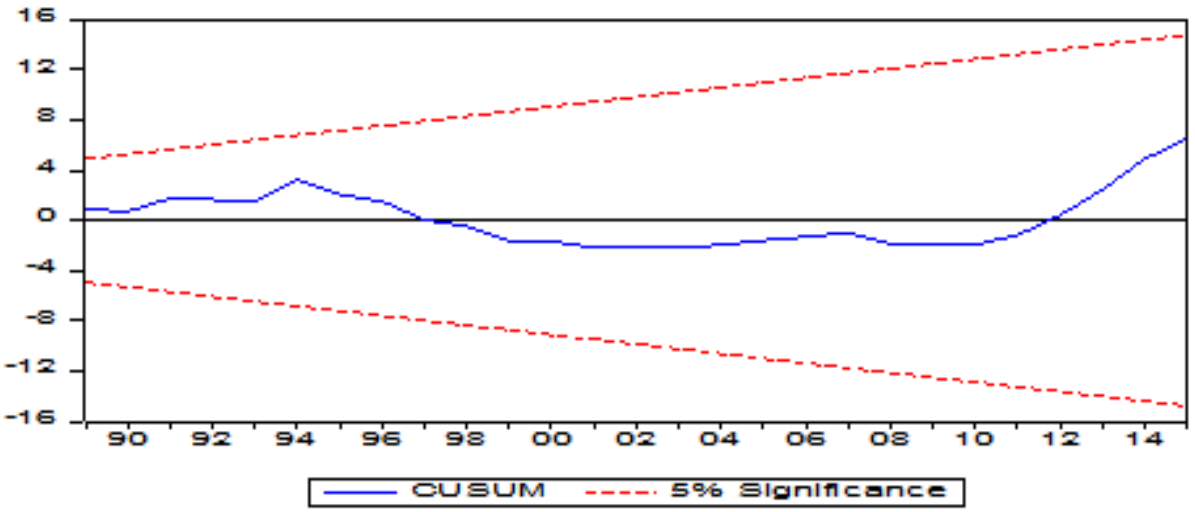

Fig.4.1: Plot of Cumulative Sum of Recursive Residuals

From figure 4.1, it was observed that the model at 5 per cent level of significance CUSUM was stable over time because the observed bound lied between the upper and lower limits. In conclusion, at 5 per cent critical value, cumulative sum of recursive residual is good enough to explain the stability of the data overtime.

Concluding Remarks

The empirical findings of this study shows that bank credits have a significant and direct impact on the agricultural and manufacturing sector in Nigeria. Hence, it is concluded that manufacturing credits from deposit money bank in Nigeria significantly and positively influence manufacturing output in Nigeria. Manufacturing output in Nigeria does not significantly respond to changes in interest rate. Hence, it is concluded that manufacturing output responds significantly to bank credits regardless of the rate of interest. Corruption constrains manufacturing output in Nigeria.Agricultural credits from deposit money bank have direct and significant impact on the agricultural sector in Nigeria both in the long-run and short-run. Hence, the proportion of bank credits directed to the agricultural sector constitutes a significant aspect of the investment in the sector. Furthermore, corruption significantly reduces agricultural and manufacturing output in Nigeria. Based on the conclusion, the following recommendations are made:

a. The Nigerian government has to increase bank credits to the agricultural and manufacturing sectors in Nigeria. Regulatory instruments such as moral suasion must be used to increase the proportion of bank credits that goes to the agricultural and manufacturing sectors. The increase in bank credits to these sectors is bound to stimulate an increase in output which will subsequently expand the sectors.

b. Deposit money banks should supply credits on simple and flexible conditions to investors in the manufacturing and agricultural sectors in Nigeria. Simplicity and flexibility will encourage investors to demand for loanable funds and this will subsequently increase the net capital formation in the agricultural and manufacturing sectors.

c. The government should allow a single digit interest rate for credits that go to the manufacturing and

agricultural sectors in Nigeria. This will reduce the cost of securing loanable funds and encourage investors to invest more in the agricultural and manufacturing sectors in Nigeria.

d. The monetary authority should put in place adequate policies towards deepening of the financial sector and reducing the cost of credit. Such policies should, however, be accompanied with other complementary strategies that enhance productivity and consequently growth of key sectors of economy such as manufacturing and the agricultural sectors.

e. The Central bank of Nigeria should adopt direct credit control, where preferred sectors like agriculture and manufacturing should be favoured in terms of granting deposit money banks credit facility.

f. Better and stronger credit culture should be promoted and sustained. There should be strong and comprehensive legal framework that will aid in monitoring the performance of credit to private sector and recovering debts owed to deposit Money banks.

g. Government should ensure that its expenditure on the manufacturing and agricultural sectors is properly monitored through the application of fiscal transparency and responsibility and due process in order to avoid leakages in the system.

h. Finally, since interest rate is under the control of monetary authority in Nigeria, efforts must be made to ensure interest rate stability in order to improve the Nigerian manufacturing, and agriculture sectors.

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