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Ogunmuyiwa, Michael Segun; Okuneye, Babatunde A.; Amaefule, Joseph N.

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Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/econis-archiv/>

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Bank Credit and Growth of the Manufacturing Sector Nexus in Nigeria: An ARDL Approach

Michael S. Ogunmuyiwa¹, Babatunde A. Okuneye², Joseph N. Amaefule³

Abstract: Bank loans and credits play a significant role in the development of the manufacturing sector of any country. Most manufacturing concerns in developing countries with particular reference to Nigeria heavily depend on bank loans to nurture their businesses to the next level. Sequel to this, the paper examines the impact of bank credit on growth of the manufacturing sector in Nigeria. Time series data from the return to democratic rule in 1999 to 2014 were fitted into the regression model using econometric techniques particularly the Augmented Dickey-Fuller (ADF) test and the Autoregressive Distributed Lag (ARDL) model. Empirical findings show that bank credit to the private sector has a positive impact on the manufacturing sector. Albeit, a significant impact was found between bank credit and manufacturing sector's growth, the policy implication of this finding is that bank credits drive manufacturing output in Nigeria. Hence, monetary policy instruments should still be targeted towards allocating more credits to the private sector in order to fully achieve the desired objectives of boosting the output of the sector as well as providing a lead way for the attainment of the desired economic growth and development.

Keywords: Bank Credits; Autoregressive Distributed Lag; Manufacturing output

Jel Classification: E23; E58; G21

1. Introduction

The growth of the economy be it developed, emerging market or developing economies depend largely on the adequate funding of the manufacturing sector. More importantly, developing economies like Nigeria needs adequate and regular supply of industrial loans to business concerns either small enterprises, medium or large scale firms in order to usher in the desired growth and development the country desires. Credits to industrial sector are bank loans and advances provided by the financial institutions to the industrial sector in order to enhance industrial productivity which by implication leads to economic development. Bank credit which is considered to be a blood stream of an economy bridges the gap between the borrower and the lender, particularly in a developing economy like Nigeria. In Nigeria, credit management constitutes a sensitive variable being managed by the monetary authorities under the supervision of the Central Bank of Nigeria (CBN) (Tawose, 2012).

Manufacturing sector in Nigeria has a vast potential for economic development due to abundant labour force coupled with the agrarian nature of the Nigerian economy (Adebiyi, 2011). However, the absorptive capacity for labour expected from the manufacturing and other spillover effects have not yielded the desired results. The import substitution industrialization and other incentives to attract foreign entrepreneurs have failed and this has resulted to infantry manufacturing sector of the economy. This gives way for export promotion industrialization particularly in the early 1970s as Nigeria recorded windfall gains from crude oil sales.

¹ Department of Business Administration, Olabisi Onabanjo University, Nigeria, Corresponding author: msogunmuyiwa@gmail.com.

² Department of Economics, Olabisi Onabanjo University, Nigeria, E-mail: okuneyebabatunde@gmail.com.

³ Department of Education, Babcock University, Nigeria, E-mail: josephamaefule@gmail.com.

In spite of the continuous policy strategies to attract credits to the manufacturing sector, most Nigerian manufacturing enterprises have remained unattractive for bank credits. For instance, as indicated in Central Bank of Nigerian (CBN) reports, almost throughout the regulatory era, commercial banks' loans and advances to the manufacturing sector deviated persistently from 1999-2014. Furthermore, the enhanced financial intermediation in the economy following the financial reforms of the 1990s notwithstanding, credits to manufacturing as a proportion of total banking credits has not improved significantly averaging 15.7 percent between 1990 and 1994 and 25.8% between 1995 and 2000. Consequently, many manufacturing firms in the country have continued to rely heavily on internally generated funds, which have tended to limit their scope of operation.

Also, the manufacturing sector did not record an impressive performance in the local sourcing of raw materials despite various incentives given by the government with the attendant increase in foreign exchange receipts as time progresses (Akinmulegun and Oluwole, 2014).

In recent times, some firms in the manufacturing industry in Nigeria have been characterized by declining productivity rate which is caused largely by inadequate electricity supply, smuggling of foreign products into the country, trade liberalization, globalization, high exchange rate, and low government expenditure (Afam, 2012). Therefore, the slow performance of manufacturing sector in Nigeria is mainly due to massive importation of finished goods, inadequate financial support and other exogenous variables which have resulted in the reduction in capacity utilization and output of the manufacturing sector of the economy (Tomola et al., 2012).

According to Charles (2012), the major problem facing the Nigerian manufacturing sector is inadequate financial resources for investment and this can be attributed to the low level of income from national savings. From 1960 when Nigeria gained independence to the present democratic dispensation, commercial banks in Nigeria have been playing important roles in the development process of the economy. As noted by Anyanwu, (2007), the banks in collaboration with other financial institutions and intermediaries have been mobilizing the scarce domestic resources for rapid socio- economic and industrial transformation of the country. In spite of the contributions of manufacturing sector to Nigeria's gross domestic product, previous studies have not really addressed the connections between the direction of credits from the financial sector in an atmosphere of uncertainty and in the midst of fluctuating lending and exchange rates and the growth of the manufacturing sector in Nigeria. This is a major lacuna in literature and this study hopes to fill this gap. Thus, the objective of this paper is to investigate the relationship between bank credits and growth of the manufacturing sector in Nigeria. The rest of the paper is split into three (3) sections. Section two houses the literature review while section three is on the sources of data, methodology and empirical results. Section four centres on discussion of findings and concluding remarks.

2. Conceptual and Empirical Review

2.1. The Concept of Bank Credit

Credit is the extension of money from the lender to the borrower. Ajayi (2000) notes 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 (2003), the amount of loans and advances given by the banking sector to economic agents constitute bank credit. Credit is often accompanied with some collateral that helps to ensure the

repayment of the loan in the event of default. 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. The Concept of Manufacturing Output

Manufacturing firms are catalysts for industrial and economic development. They also play active roles in international trade and foreign exchange earnings. As such, most countries encourage investments in industries. In this study manufacturing industries and Small and Medium Scale Enterprises will be used interchangeably since Nigeria's manufacturing sub-sector consists of wide range of industrial activities which include large, medium and small scale manufacturing enterprises. Given the prominent role played by the manufacturing industry in nation building, several studies have actually assessed the performance of the sector in the light of the various policies and programmes adopted to stimulate the growth of the sector (Ebi & Emmanuel, 2014).

The Nigerian manufacturing sector has expanded quite considerably since the 1960s. However, the sector is yet to make significant impact on the structure of the economy by way of contribution to the GDP, provision of employment, foreign exchange earnings, and promotion of effective linkages among the various sectors of the economy. The sector is still dominated by consumer goods, light industries and sole proprietorship type of establishments. The production of capital or intermediate goods is still relatively negligible. The major manufactured goods that are produced are beverages, textiles, wood and furniture, cement and cement products, chemicals, plastics, footwear, tobacco and petroleum products.

The foregoing pattern of the manufacturing sector emerged from Nigeria's industrialization strategy which relied primarily on import substitution approach with the cardinal goal of manufacturing certain finished goods locally which were hitherto imported (Ojo, 1975). Thus, the thrust of industrial policy included protectionist measures (imposition of tariffs and import licensing) to protect local industries and to support new ones; heavy reliance on the importation of raw materials and capital goods; and providing a package of industrial incentives.

Aremu and Adeyemi (2011) examine the role of Small and Medium Scale Enterprises (SMEs) as a survival strategy for employment generation in Nigeria. The study observed that the SME sector is the main driving force behind job creation, poverty reduction, wealth creation, income distribution and reduction in income disparities in Nigeria and that most of the government interventions failed to create a much needed transformation due to poor coordination and monitoring and policy inconsistencies. The wide spread of the SMEs in Nigeria and the multiplier effects on the rest of the economy enable them to be the engine of economic progress.

2.3. Empirical Review in Developed and Developing Economies

Empirical evidence on the impact of bank credit on economic growth has been mixed and remained a debated subject. Dey and Flasherty (2005) use a two-stage regression model to examine the impact of bank credit and stock market liquidity on GDP growth. They found that bank credit and stock market liquidity are not consistent determinant of GDP growth. Banking development was found to be a significant determinant of GDP growth, while turnover is not. Cappletio et al (2010) in their study of European Area found that in contrast to recent findings for US, the supply of credit, both in volumes and in terms of standards applied on loans to enterprises have significant effects on real economic activity. Hence, a change in loan growth has a positive and significant effect on GDP.

In a study carried out by Muhsin and Eric (2006) on Turkish economy, it was revealed that when bank credit, private sector credit or domestic ratio are alternatively used as proxies for financial development, causality runs from economic growth to financial development. Their conclusion was that growth seems to lead to financial sector development.

Obadan (2003) analyzes the finance-growth nexus using a fixed-effect panel and model and a balanced panel data from 25 transition countries during the periods of 1993-2000. His results shows that (1) the interest rate margin was significantly and negatively related to economic growth (2) a rise in credit did not seem to accelerate economic growth. Based on the findings, he concludes that the increase in credit has not always been sustainable and in some cases it may have led to decline in growth rate.

The widely acclaimed progress of the Chinese economy over the last 20 years has been achieved on the basis of significant successful growth of its manufacturing sector. During this period, China's manufacturing industry has experienced a major transition, as shown by the shift in exports from primary products to electronics and machinery. In contrast to state-owned enterprises (SOEs), private firms and joint ventures have thrived in China and have become the major forces of the country's export zones (Du, Lu, & Tao, 2012). Chang et al (2010) use branch panel data to examine bank fund reallocation and economic growth in China and found a positive association between bank deposit and growth. Vazakidis and Adamopoulos (2009) employ a Vector Error Correction Model (VECM) to investigate the relationship between credit market development and economic growth for Italy for the period of 1965-2007 taking into account the effect of inflation rate on credit market development. The empirical results indicate that economic growth has a positive effect on credit market development while inflation rate had a negative effect.

Using a Vector Auto-regression (VAR) approach, Shan and Jianhong (2006) examine the impact of financial development on economic growth in China. They found that financial development comes as the second force (after the contribution from labour input) in leading economic growth in China. Their study supports the view in literature that financial development and economic growth exhibit a two-way causality and hence is against the so-called "finance-led growth" hypothesis.

By employing a panel data set covering 29 Chinese provinces over the period of 1990-2001, Liang (2007) employs the Generalized Method of Moment (GMM) technique to empirically examine the relationship between banking sector development and economic growth for the case of China. Empirical results show that, without an effective and well developed legal system, banking sector development only partially contributed to China's economic growth.

Mishra et al (2009) examine the direction of causality that runs between credit market development and economic growth in India for the period 1980 -2008. In the VAR framework the application of Granger Causality Test provided the evidence in support of the fact that credit market development spurs economic growth. The empirical investigation indicated positive effect of economic growth on credit market development of the country.

Mukhopadhyay and Pradhan (2010) recently examine the causal relationship between financial development and economic growth of 7 Asian developing countries (Thailand, Indonesia, Malaysia, the Philippines, China, India and Singapore) during the last 30years using multivariate VAR model. The study concludes that no general consensus can be made about the finance- growth relationship in the context of developing countries. Using microeconomic data on the Kenyan manufacturing sector, Tawose (2012) study finds that conditional on survival, the firms that use credit grow faster than those not using it. There is also evidence that small firms grow faster than large ones, confirming the convergence hypothesis. These results are robust to alternative estimation procedures controlling for both endogeneity and selection bias.

2.4. Empirical Review on Bank Credits and the Growth of Manufacturing Industry in Nigeria

A number of empirical studies have been carried out to assess the impact of bank credit and economic development in Nigeria. Onuorah (2013) examines the impact of bank credit on economic growth for the period 1980-2012. 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, the study by Yakubu and Affoi (2014), over the period 1974-2010 examines the impact of bank credit on economic growth. The result from Autoregressive distributed lag bound testing approach shows that private sector had significant positive effect on economic growth in Nigeria. In contrast, few studies have documented negative effect of credit on economic growth. These studies include Hassan et al (2011) and the study by Mushin and Eric (2006) which shows that the effect runs from economic growth to financial development and not otherwise.

Asikhia (2009) examines the attitude of the business owners to microfinance banks so as to uncover areas of necessary modification in the policy before it becomes moribund like SMEEIS (Small and Medium Scale Enterprise Equitable Investment Scheme). Primary data was employed for the study and analyzed using factor analysis, correlation, regression and simple percentage analysis. The study observes that every action of the business owners are gauged by the expectations conceived before commencement of banking relationship. It is these expectations and not the present relationship that determines their future decision. The study recommends that the effectiveness of microfinance banks business management skills as a development strategy is contingent in delivering both financial and business counseling to the operators.

Ogujiuba et al (2004) examine credit availability to small and medium scale enterprises in Nigeria. The study adopts a conceptual analytical framework that employed theoretical and statistical comparative cross-sectional data to analyze the SMIEIS (Small and Medium Industries Equity Investment Scheme) program in Nigeria vis-à-vis capital base of banks in ascertaining whether it offers an effective means of solving the problem of funding small and medium scale businesses in Nigeria and its attendant implication for financial stability in the system. The analysis of the study confirms that government need to urgently address the problem of financial intermediaries cum stability in the system as a national priority and build institutions that would drive the reform process. Sanusi (2003) posits that the role of small and medium-scale enterprises as a catalyst for economic growth and development has been well documented in the economic literature and recognized in most countries. The study stresses that in most of the newly industrialized nations; more than 95 percent of all industrial enterprises belong to the SME sector and that the sector accounted for bulk of the labor force. From the above, it was evident that lots of studies have examined the importance of SMEs in both developed, developing economies and the Nigerian economy in particular.

3. Methodology and Empirical Results

3.1. Sources of Data

The data were sourced from the publications of Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS). However, the empirical implementation of the model makes use of Autoregressive Distributive Lag (ARDL) econometric technique on time series data covering a period of fifteen (15) years. The study period is from 1999 to 2014.

3.2. Model Specification

The theoretical underpinning for this study is the Neo-classical Growth Model production function. The model is expressed as:

$$Y=Af(K,L)$$

1

Where Y is the Gross Domestic Product (GDP), K is the stock of capital, L is the amount of unskilled labour and A is exogenously determined level of technology. A change in the exogenous variable (A) will cause a shift in the production function.

No doubt, the effect of bank credit is felt through the manufacturing industry and finally to the economy. The fluctuation in the manufacturing sector is a function of commercial bank credits to the sector. Arising from the above, this study posits a functional and behavioural relationship between bank credit and manufacturing output as shown below. The functional relationship is stated thus:

$$MGDP=f(BC) \quad 2$$

$$\text{In behavioural terms, the relationship is stated thus: } MGDP= \beta_0 + \beta_1 BC + \mu \quad 3$$

Where:

RMGDP = Real Manufacture Gross Domestic Product (RMGDP) which is the contribution of the manufacturing sector to the GDP, BC = Bank Credits measured as the amount of bank credit allocated to private sector as a share of GDP. β_0 = Intercept and β_1 = Coefficient of the independent variable or the slope, μ = Stochastic error term denoting other explanatory variables which are not specified in the model. The dependent variable is the rate of manufacturing contribution to the GDP, while the main explanatory variable is the growth rate of the bank credit to the private sector. In a-priori terms, $\partial RGDP / \partial BC > 0$. The expected result from this research is that the co-efficient of bank credit is predicted to be positively associated with Manufacturing Gross Domestic Product.

3.3. Empirical Results

3.3.1. Trend Analysis of Bank Credit and the Growth of Manufacturing Industry in Nigeria

The figures below show the trend of bank credits and the manufacturing industry growth in Nigeria within the periods 1999-2014. The raw data was converted to percentage and below are the series plot of the explanatory variables and the explained variable.

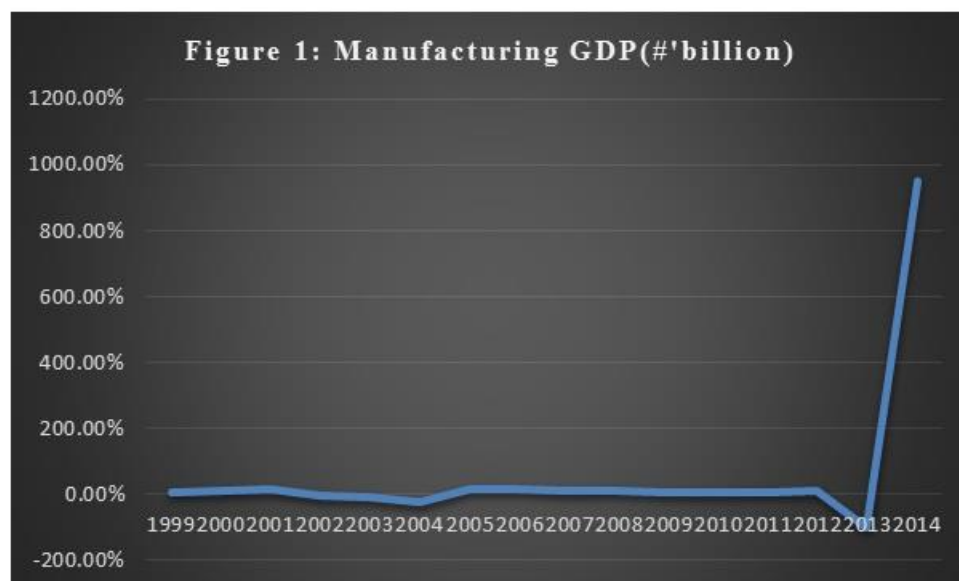


Figure 1. Trend Graph of Manufacturing GDP

The trend analysis in figure 1 shows that there has been an upward movement in manufacturing industry's contribution to the GDP. Specifically, there was a continuous decline in the industry output from 2002 to 2004. After a relative improvement in 2005 to 2008, though not without a fluctuation in the trend and this distortion continued up to 2013, thereafter it improved tremendously.

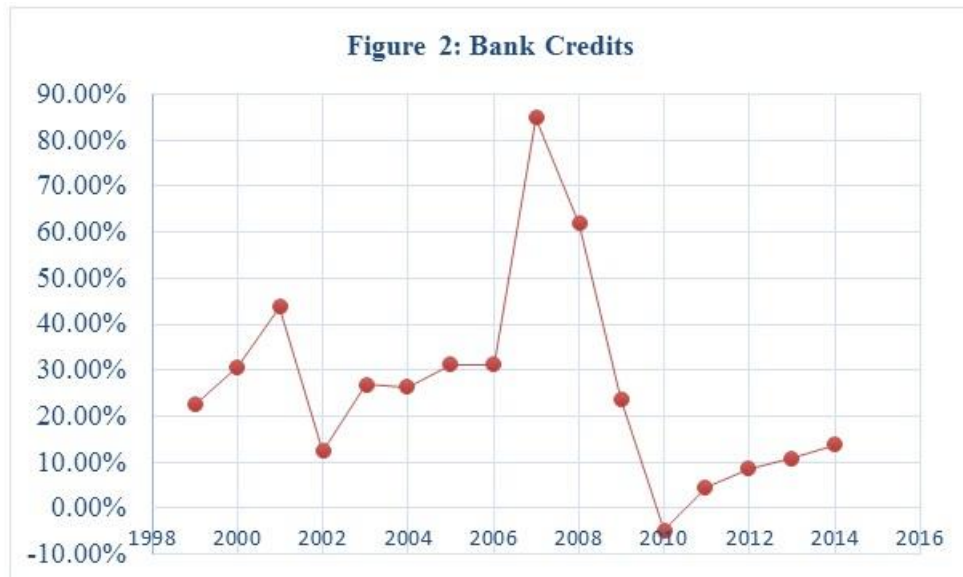


Figure 2. Trend Graph of Bank Credit in percent

Figure 2 shows the trend in bank credits, which by indication shows that there have been a lot of fluctuations on bank credits to the private sector. Bank credits increases from 22.51% in 1999 to 43.62% in 2001. It declined to 12.31 in 2002 and subsequently increased from 26.86% in 2003 to 84.75% in 2007. From 2007, it declined up till 2010 before rising again in 2011 through 2014.

3.3.2. Augmented Dickey-Fuller (ADF) Test

Augmented Dickey-Fuller (ADF) test, developed by Dickey and Fuller (1981), was used to test the level of stationarity behaviour of the macroeconomic times series data. This is very necessary because often times most of the macroeconomic time series exhibit non-stationarity behaviour in their present form. Hence, to guide against spurious and misleading regression results, this study takes caution by checking the properties of the variables via the Augmented Dickey-Fuller (ADF) test. The result is presented in table 1 below.

Table 1. Unit Root Test on Variables with Intercept (1999-2014)

		Test Critical values				
Variables	Level	1 st Difference	Status	1%	5%	10%
RGDPM	-0.967990	-3.844164*	I(1)	-2.740613	-1.968430	-1.604392
BC	-1.627183***	-2.078570	I(0)	-2.771926	-1.974028	-1.602922

Source: Authors' Computation, 2016. *, **, *** are 1, 5, and 10 percent levels of significance

The ADF test in Table 1 reveals that manufacturing GDP was found to be I(1) series, while bank credit is I(0). Since the level of integration differs among the variables, the use of Johansen co-integration technique to determine their long run equilibrium becomes inappropriate. Thus, the study employs the Autoregressive Distributive Lag (ARDL) approach to determine the relationship between the variables.

3.3.3. Autoregressive Distributive lag

Based on the fact that the time series are not of the same order it is therefore pertinent to employ the use of Autoregressive Distributive Lag (ARDL). Co-integration is concerned with the analysis of long-run relations between variables integrated of the same order i.e. series made stationary at the same order of differencing (Olanrewaju et al., 2012). This raises another short fall in analyzing and establishing long run relationships, thus the co-integration test is not applicable in cases of variables that are integrated of different orders. However, a distributed-lag model is a dynamic model in which the effect of a regressor X on Y occurs over time rather than at once and to overcome this challenge, we first subject the series to ARDL Bounds Test to ascertain whether a long run relationship exist before proceeding to establish the short run relationship.

Table 2. ARDL Bounds Test (1999-2014)

Null Hypothesis: No Long Run Relationship exists.

(0) Bounds	(1) Bounds	Significance	F-statistics
4.04	4.78	10%	30.01961
4.94	5.73	5%	
5.77	6.68	2.5%	
6.84	7.84	1%	

Source: Authors computation, 2016. *, ** and *** are 1, 5 and 10 percent levels of significance respectively. E-views 9 output

From the ADL Bounds Test in table (2), it shows that the F-statistics is more than the lower and upper bound limits, therefore there is long run co-integration among the variables. This implies that collectively or jointly the independent variables are significant. Therefore, the study needs to proceed to short run relationship of the variables.

Table 3. Short run Error Correction Model Result using ARDL Approach (1999-2014)

Dependent Variable: MGDGP

Selected Model: ARDL (14)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
MGDP(-1)	0.299080	0.134907	2.216929***	0.0774
BC	0.017097	0.035383	0.483185	0.6494
BC(-1)	0.077790	0.071432	1.088997	0.3258
BC(-2)	-0.223694	0.082367	-2.715816**	0.0420
BC(-3)	0.370805	0.072351	5.125050*	0.0037
BC(-4)	-0.284607	0.037836	-7.522161*	0.0007
C	276918.2	82025.08	3.376019	0.0198
ECM(-1)	-0.700920	0.134907	-5.195563*	0.0035
R ² = 0.94764 Adjusted R ² = 0.884266 F-statistics = 15.00760 Prob (f-statistics) = 0.004631 DW statistics= 2.921029				

Source: Authors computation, 2016. *, ** and *** are 1, 5 and 10 percent levels of significance respectively. E-views 9 output

The ARDL regression regresses both the dependent and explanatory variables using automatic lag selection method. The model selection criteria made use of the Akaike Information Criterion to select a parsimonious model of ARDL (1, 4). The result of table 3 shows that there are positive effects of the lags of the MGDG, Bank Credits, and the lags of bank credits on the MGDG except BC(-2) and BC(-4). The static variable of bank credit reveals a positive relationship between MGDG which implies that an increase in the level of bank credits will lead to a corresponding improvement in the manufacturing sector output, all things being equal. It also reveals that there is a positive effect of the first lag and third lag of bank credits on the manufacturing output and a negative effect of second lag and fourth lag of bank credits on manufacturing output in Nigeria. The t-statistics shows that from the result, the second lag (BC(-2)), third lag (BC(-3)) and fourth lag (BC(-4)) of bank credits are significant at 5, 1 and 1 percent respectively, while the lag of manufacturing GDP was found to be significant at the 10 percent level. From this result, it could be deduced that manufacturing output and bank credits in the previous periods affects manufacturing output in Nigeria, although, lags in bank credits are more significant in explaining movements in manufacturing output than in the current period.

In the above result, the error correction model is used to determine the short run relationship between variables. The threshold for the ECM is that its coefficient must be less than one (1) i.e negative and it must be significant. These three properties were met in this result because the coefficient of the ECM was - 0.700920 which was negative and less than one and using probability value of the ECM, the study affirms that it is highly significant with $p = 0.0035$.

The overall coefficient of determination R^2 , which is the explanatory power of the model, 0.884266, that is the adjusted $R^2 = 0.884266$. This implies that 88.4 percent variations in the manufacturing output are explained by the lagged MGDG, bank credits and the lagged bank credits. The remaining 11.6 percent change is explained by the stochastic error term (μ). The F-statistics shows that the overall model is significant and is reliable with a value of 15.00760 and a p-value of 0.004631 The Durbin-Watson value of 2.92 reveals that the model is not entirely free from the problem of positive serial correlation.

4. Discussion of Findings and Concluding Remarks

This research work is actually based on bank credits and the growth of the manufacturing sector in Nigeria. Using the credits to the private sector to measure bank credit and manufacturing GDP to measure the growth of manufacturing industry output, the Autoregressive Distributed Lag results show that there is a positive long run relationship between manufacturing output and bank credit and this outcome is in line with the a-priori expectation of the model. Invariably, it implies that an increase in the bank credits will improve the growth of the manufacturing output all things being equal. This is in line with Levine (2002) findings where he establishes that bank credits in Europe are not only correlated with economic growth but is also the cause of long-term growth. The findings of this study conform to earlier studies by Mushin and Eric (2006), Vazakidis and Adamopoulous (2009).

In conclusion, one fact that has been established in this study so far is that bank credits to the manufacturing sector of the economy left much to be desired. The banks need to do more via increased credits to the sector to effectively stem up output of manufacturing sector of the economy. The major implication of the positive relationship between bank credit and the manufacturing output is that the government needs to direct its financial institutions and agencies as well as the commercial banks to increase lending to the private sector with particular reference to the Micro, Small and Medium Enterprises (MSME's). This is the only way through which the much desired goal of increase in productivity via diversification of the economy can be achieved. In line with the above, further studies can be directed towards the evaluation of the impact of financial credits on MSME's performance in Nigeria.

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