The effect of bank credit on the performance of the manufacturing sector in Nigeria

Abstract

In Nigeria, one of the critical challenges of manufacturing firms is lack of funds which is evident in the low contribution of the sector to economic growth. This study investigates the effect of bank credit on the performance of manufacturing sector in Nigeria. Based on ex post facto research design, we formulate an econometric model where manufacturing output is the dependent variable while bank credit, interest rate and exchange rate are the explanatory variables. Annual time series data from 1981 to 2017 sourced from the Central Bank of Nigeria Statistical Bulletin and was analyzed using the dynamic ordinary least square (DOLS) technique. We find that bank credit and interest rate show a significant positive effect on manufacturing sector performance while exchange rate shows a significant negative effect on manufacturing sector performance in Nigeria. It is evident from the result that bank credit has a significant positive effect on the performance of manufacturing sector in Nigeria. It becomes imperative for the monetary authorities to introduce policy that will bring down lending rate to stimulate borrowers and make deposit rate attractive to encourage savings.

Keywords: Bank credit, Manufacturing, Interest rate, Exchange rate, Savings

JEL Classification: C32, E51, L6, N37

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1 Introduction

The manufacturing sector plays a catalytic role in economic development of a nation as it serves as an avenue for increasing the supply of economic goods and services, foreign exchange earnings and employment generation that leads to a unique consumption pattern. Furthermore, it creates investment capital at a faster rate than any other sector of the economy while promoting wider and a more effective linkage among different sectors (John & Terhemba, 2016). In terms of contribution to the gross domestic product (GDP), the manufacturing firm is dominant (Anyanwu, 2010). Manufacturing activities play important role in the economy of a nation especially in advance countries where the sector accounted for a substantial proportion of total economic activities. Manufacturing sector activities covers a broad spectrum ranging from light agro-based industries to heavy iron and steel companies (Bada, 2017).

The effectiveness of manufacturing firms is dependent on availability of resources; such as raw materials and financial credit to meet up with consumers’ demand which is the rationale behind the establishment of financial sector, which mop-up credit from the surplus unit and provide such for the use of the deficit sector of the economy (Bada, 2017). Business enterprises today use bank credit to augment their scarce financial resource and expand their operation. Thus, bank credit is necessary for the growth of business ventures (Onuora & Nwafili, 2017). Bank credit is very important to firms because it help them to protect their sales from being eroded by competitors and also to attract potential customers to buy at favorable terms. As long as there is competition in the industry, selling on credit becomes inevitable. A business that does not extend credit facilities will lose her customers to competitors. Thus, for a business to survive, she must invest in accounts receivables (Kakuru, 2001). According to Ojelabi, Taiwo & Adeniran, (2015), bank credit is described as a process of providing funds to the various sector of the economy on the basis of an agreed repayment with interest.

Nigeria has suffered from their relegation of the manufacturing sector owing to their reliance on oil. Regrettably, regardless of her enormous natural endowments, the manufacturing sector has been in a pitiable condition as the sector still accounts for a very low percentage of the gross domestic product (GDP) (Ume, Obasikene, Oleka, Nwadike & Okoyeuzu, 2017). Lack of funds has made it difficult for industries to invest in modern machines, information technology and human resources development which are critical in reducing production costs, raising productivity and improving competitiveness (Odufuye, 2017). Even when credit is available, high lending rate which sometimes go over 30%, make such credits unattractive given the fact that returns on investments in the sub-sector is
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below ten percent (10%) on the average (Nwasilike, 2006). Hashim (2012) posited that, despite series of bank reforms aimed at strengthening the ability of banks for efficient services delivery and branch networking as well as funding the real sector to boost Nigerian economy, the dynamic challenges still persist (Odufuye, 2017).

The manufacturing sector in Nigeria is faced with difficulty in accessing financial resources especially from the commercial banks that hold about 90% of the total financial sector assets. Other formidable financing challenges include concentration of bank credit to the oil and gas, politicians and general commerce sectors to the disadvantage of the core real sectors such as agriculture and manufacturing sectors. Also, banks are more disposed to financing government needs as almost 50% of their assets are tied up by government debt (Abubakar & Gani, 2013).

Against analytical background, studies abound in developed and developing countries linking bank credit to the performance manufacturing sector. In the Africa region and Nigeria in particular, existing studies were mainly qualitative in nature using primary data. The few available studies that utilized secondary data employed ordinary least squares (OLS) estimation technique amidst other more advance technique such as cointegration and auto regressive distributed lag (ARDL) techniques. Also, Nigeria-specific studies in their attempt to determine the implication of interest on manufacturing sector performance have used various measures of interest rate such as the monetary policy rate (MPR) and Commercial Bank interest rate ignoring weighted average lending and deposit of Commercial Banks computed from the monthly interest rate returns using the net loans and advances and total depositors funds as weights. The measure avoids the discrimination between the interest charge on borrower and the interest offered to the depositors peculiar to other measures. Based on this premise, this study therefore investigates the effect of bank credit on manufacturing firms in Nigeria using the weighted average lending and deposit of commercial banks as proxy for interest rate.

The broad objective of this study is to examine the effect of bank credit on the performance of manufacturing firms in Nigeria. The specific objectives of the study are to: investigate the effect of commercial banks’ credit on the performance of manufacturing sector in Nigeria, and analyze the effect of interest rate and exchange rate on the performance of manufacturing firms in Nigeria. This investigation will provide an insight for government regulatory framework aimed at ensuring adequate availability of credit facilities to manufacturing firms and in the realization of the growth potential in the sector. The entrepreneur will benefit immensely from the study outcome as the result will provide an insight to the potentials in the establishment and operation of manufacturing business in terms of income
and employment generation. To the academia and researchers, the findings of the study will contribute to the available literature on the current scenario of manufacturing firms in Nigeria and bank credit.

2 Literature Review

2.1 Conceptualization

Bank is an institution whose operations consist in granting loans and receiving deposit from the public. Ekezie (2007) defined a bank as an institution which accepts deposit from the public and in turn grants loans by creating credit. Credit is the extension of money from the lender to the borrower. According to CBN (2011), the amount of loans and advances given by the banking sector to economic agents constitute bank credit. Credit is a means of obtaining resources at a certain period of time with an obligation to repay in a subsequent period in accordance with the terms and conditions of the loan obtained. In the view of Ekezie (2007), banks are legally required to keep a fixed percentage of their deposits in cash and then, lend or invest the remaining amount. It is the amount lent that actually leads to the credit creation process. In financing, three types of credit are usually required by small manufacturing firms. They include: short term credit a type of loan is used to finance yearly operation until the product or proceeds from the industry are sold, medium term credit a loan that is for more than one year maturity period but not exceeding three to five years and long term credit a type of loan is necessary for acquisition of major industrial machines, improvement in industrial equipment, building and land: on the other end, to manufacture is to convert factors of production comprising of land, labour, capital and entrepreneur into economic goods and services. Okon and Osesie, (2017) defined manufacturing as the production of merchandise for use or sale using labour, machines, tools, chemical and biological processing or formulation. The term may refer to a range of human activity from handicraft to high tech, but is most commonly applied to industrial production, in which raw materials are transformed into finished goods on a large scale (Adofu, Taiga & Tijani, 2015).

2.2 Theoretical Underpinning

According to the loanable funds theory, the demand curve for investment funds slopes downward showing that less funds are borrowed at a higher rate and more at a lower rate of interest. The loan pricing theory stated that banks cannot always set high interest rates, e.g. trying to earn maximum interest income (Stiglitz & Weiss, 1981). If banks set interest rates too high, they may induce adverse selection problems because high-risk borrowers are willing to accept these high rates. Once these borrowers receive the loans, they may develop moral hazard behaviour or so called borrower moral hazard since they are likely to take on highly risky projects or
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The signalling theory states that borrowing firms should provide more collateral so that they can signal to the banks that they are less risky type borrowers and then they are charged lower interest rates. Borrowers who give less collateral for their financing indicate higher levels of risk. Firms giving higher collateral, therefore, will be charged low interest rates while those that offer low collaterals will be charged higher interest rates (Chodechai, 2004).

2.3 Previous Empirical Studies

In the Nigeria context, several studies abound on the nexus between manufacturing and bank credit. For instance, Odufuye (2017) investigates the impact of bank credit on Nigerian economy growth for the period of 24 years (i.e. 1992-2015). Based on ordinary least square (OLS) estimation technique, the study found that bank credit has a significant impact on gross domestic product for the period under review. In another study, Ume, Obasikene, Oleka, Nwadike and Okoyeuzu (2017) examined the relative impact of bank credit on the manufacturing sector in Nigeria in 1986-2013. Based on autoregressive distributed lag (ARDL) bound cointegration test approach and error correction representations found that every explanatory variable and their following lags as significant functions of volume of output of the manufacturing sector at 5% except exchange rate and its lags. In a similar vein, Olanrewaju, Aremo and Aiyegbusi (2015) investigated empirically the effect of banking sector reforms on the output of manufacturing sector in the Nigerian economy between 1970 and 2011 using cointegration analysis and error correction mechanism (ECM). The empirical results showed that the effects of bank assets, lending rate, exchange rate and real rate of interest on manufacturing output were positively significant but with very low impact. On the other hand, the financial deepening and interest rate spread negatively and significantly impacted on the output growth of manufacturing sector in Nigeria.

In developing countries, several studies also abound linking manufacturing sector with bank credit. For instance, Muchiri, Shukla and Kibachia (2017) analyze the choice of credit facilities on the financial performance of SMEs in Rwanda using a sample size of 100 SMEs. Descriptive statistics and Correlation (using the Karl Pearson’s coefficient of correlation) used showed that external borrowings are considered to be the cheapest source of financing because of the tax benefits; SMEs access to external sources of funding depends largely on the development of financial markets, and bank loans and overdrafts are the most widespread debt financing methods for SMEs. In another study, Muchingami, Monametsi and Paradza (2017) examine the impact of bank lending on manufacturing sector performance in Zimbabwe from 2009-2015. Based on ordinary least squares (OLS) regression, the study established a positive
relationship between commercial bank loans and volume of manufacturing index. In a similar vein, Mukasa, Simpasa and Salami (2016) investigate the nature, extent, and impacts of credit constraints in Ethiopia’s agriculture. Using a direct elicitation approach on a panel of 5,308 smallholder farmers, we find that expanding farmers’ access to financial information, increasing the number of branch offices of banks and microfinance institutions in the country and particularly in rural areas, and easing financial transaction costs might increase farmers’ access to credit and significantly alleviate their credit constraints.

Evidence from developed countries also abound. Parvesh and Afroze (2016) examines whether specific bank performance factors particularly loan, asset quality, management efficiency, liquidity and sensitivity have an impact on capital adequacy requirements among private sector banks of India. Based on secondary data from the annual reports of relevant banks for a period of 5 years (2008-2012) the regression results have revealed that the Indian private sector banks maintain a higher level of capital requirement than prescribed by Reserve Bank of India. Finally in the study it is also found that Indian private sector banks have excessive funds to meet their obligation and have opportunity to give more advances to public by protecting owner’s stake.

In another study, Çekrezi (2016) explore the factors that mostly affect financial performance of commercial banks which operate in Albania. The study population consisted of 16 commercial banks with domestic and foreign capital, during the period 2010-2013 with a total of 48 data. The investigation uses cross sectional time series data which are collected from the Balance Sheet Annual Reports. Based on literature review, performance is defined in different ways but this study seeks to establish the underlying factors responsible on determine the return on assets (ROA) of the sample selected. Similarly, Tarawneh, Bashar, Khalaf and Assaf (2017) investigated the impact of noninterest income on the performance of 13 banks in Jordan during the period 2000-2015. The impact of size of bank, loans, capital adequacy and overhead expenses on banks performance found to have a significant impact on banks performance. In more details, overhead expenses decrease bank performance, while capital adequacy, loans and size increase it. In addition, non-interest income increases equity capital adequacy and this in turn affects the profitability positively.

3 Methodology
This study follows ex post facto research design. The design was so selected because it is suitable when the interest is to examine how an independent variable, affect the dependent variable over a time period before the study is conducted. This study is a country specific research and it focuses attention specifically on the Nigerian economy as such, the population of
the study is all manufacturing firms in Nigeria since aggregate data on Nigerian manufacturing sector and financial sector are used in the analysis.

3.1 Model Specification
Drawing evidence Barro (1990) growth models where growth variables were dependent on the vector of financial sector credit variables denoted by $g_1$ and $g_2$. That is:

$$y_t = f(k_t, g_t) = Ak^{\alpha}g_1^{-\alpha}$$  \hspace{1cm} (1)

$$y_t = f(k_t, g_1, g_2) = \left[\alpha k^{-\rho} + \beta g_1^{-\rho} + \gamma g_2^{-\rho}\right]^{-\frac{1}{\rho}}$$  \hspace{1cm} (2)

This study adapted the model used in the study of Larrain (2006) having made some few modifications by incorporating interest rate and exchange rate into the model. The dependent variable is manufacturing output while bank credit is the private credit by deposit money banks, interest rate and exchange rate. The functional relationship among these variables is stated as follows:

$$MANGDP_t = f(BCR_t, INTR_t, EXR_t)$$  \hspace{1cm} (3)

Expressing equation (2) in linear form, we have:

$$MANGDP_t = \beta_0 + \beta_1 BCR_t + \beta_2 INTR_t + \beta_3 EXR_t + U$$  \hspace{1cm} (4)

Where MANGDP = manufacturing sector gross domestic products, BCR = bank credits, INTR = interest rate, EXR = real exchange rate, $U = $ stochastic error term.

3.2 Sources of Data and Estimation Technique
The study makes used of annual time series data collected from various issues of the Central Bank of Nigeria Statistical Bulletin, and National Bureau of Statistics for the period 1981-2017. The choice of the time frame is informed by data availability and the need to provide a broader scope for the analysis of the effect of banks credit on performance of manufacturing firms. The scope intends to capture periods of major institutional, economic and financial policies geared towards the corrections of structural imbalances in Nigeria such as bank consolidation and recapitalization. In the measurement of variables, interest rate was measured by weighted average lending and deposit of commercial banks, exchange rate was measure by Naira to US dollar official cross exchange rates, bank credit was proxy by credit to private sector while manufacturing sector performance was proxy by manufacturing sector gross domestic product (GDP). The study used the classical linear regression model involving the dynamic ordinary least square (DOLS) method which account for the possibility of cointegrating relationship in the model in a way that provide a test to determine whether or not there is a significant long-run relationship among the variables as an improvement to the ordinary least square estimation technique.

4 Results
The analysis and interpretation of result is presented in this section

4.1 Descriptive Analysis
4.1.1 Trend Analysis
The trend of manufacturing sector performance in Nigeria as stated in the first objective is presented using the line graph in Figure 1.
The trend analysis of manufacturing sector performance as shown in Figure 1 shows that the rise in manufacturing sector performance between 1981 and 1982 was short-lived as it immediately fall between 1982 and 1984. From 1984 to 1998 there was slight growth in manufacturing sector performance but a rapid growth in manufacturing sector was later experienced between 1998 and 2013 were manufacturing sector was at its peak ever in Nigeria and it has thereafter continue to fall from 2014 to 2016, However, the direction has change from a decline to parallel level from 2016 to 2017.

The trend analysis as shown in Figure 2 revealed that bank credit profile in Nigeria from 1981 to 2001 was nearly zero an indication that bank credit during the period was very low. This might have resulted from the fact that the Nigeria financial system during the period was still at puberty stage of development and private business activities was not widespread. However, from 2002 to 2017 domestic credit soars-up.

4.1.2 Descriptive Analysis
The result of the Jarque-Bera test of normality for the descriptive evaluation of the data and establishing the nature of the distribution of the data is presented in Table 1.
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<table>
<thead>
<tr>
<th>Table 1</th>
<th>Descriptive statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANGDP</td>
<td>BCR</td>
</tr>
<tr>
<td>Mean</td>
<td>2615.072</td>
</tr>
<tr>
<td>Median</td>
<td>1738.610</td>
</tr>
<tr>
<td>Maximum</td>
<td>6684.220</td>
</tr>
<tr>
<td>Minimum</td>
<td>1018.910</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>1707.070</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.410600</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>3.565349</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>12.76314</td>
</tr>
<tr>
<td>Probability</td>
<td>0.001692</td>
</tr>
<tr>
<td>Sum</td>
<td>96757.68</td>
</tr>
<tr>
<td>Sum Sq. Dev.</td>
<td>1.05E+08</td>
</tr>
<tr>
<td>Observations</td>
<td>37</td>
</tr>
</tbody>
</table>

**Source:** Authors’ computation, 2019

The result of the descriptive analysis shows that except for interest rate and exchange rate, all the other variables are positively skewed since their means are greater than their medians and are not symmetrical because their skewness coefficient is less than one. The positive values of the kurtosis of all the variables established the fact that the variables are leptokurtic in nature. The values of the Jarque-Bera statistic show that except for exchange rate all other variables are normally distributed since the p-values are statistically significance at 5% level of significant. Hence, the result shows that while manufacturing sector performance, bank credit and interest rate are normally distributed, exchange rate is not.

### 4.1.3 Correlation matrix

The result of the multicollinearity tests using correlation matrix to detect whether the variables are multicorrelated is presented in Table 2.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Correlation Analysis Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANGDP</td>
<td>BCR</td>
</tr>
<tr>
<td>MANGDP</td>
<td>1.000000</td>
</tr>
<tr>
<td>BCR</td>
<td>0.919331</td>
</tr>
<tr>
<td>INTR</td>
<td>-0.162789</td>
</tr>
<tr>
<td>EXR</td>
<td>0.811859</td>
</tr>
</tbody>
</table>

**Source:** Authors’ computation, 2019

To check the presence of multicollinearity or otherwise in the model, the correlation coefficient benchmark of 0.95 suggested by Iyoha (2004) was used. The results of the correlation analysis as presented in Table 2 shows that the correlation coefficients for the relationship among the variables are below the 0.95 benchmark, indicating the absence of the problem of multicollinearity among the independent variables. The result also shows that the relationship between manufacturing sector performance and bank credit, manufacturing sector performance and exchange rate are positive while the relationship between manufacturing sector performance and interest rate was negative.

### 4.1.3 Empirical Result

In order to determine the effect of bank credit on manufacturing sector performance, the result of dynamic ordinary least squares (DOLS) is presented in Table 3.
### Table 3: Dynamic Ordinary Least Squares (DOLS) Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG(BCR)</td>
<td>0.398640</td>
<td>0.046599</td>
<td>8.554776</td>
<td>0.0000</td>
</tr>
<tr>
<td>INTR</td>
<td>0.034189</td>
<td>0.013904</td>
<td>2.458921</td>
<td>0.0195</td>
</tr>
<tr>
<td>LOG(EXR)</td>
<td>-0.309144</td>
<td>0.065671</td>
<td>-4.707482</td>
<td>0.0000</td>
</tr>
<tr>
<td>C</td>
<td>5.916533</td>
<td>0.242632</td>
<td>24.38483</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Source: Authors’ computation, 2019

The result as presented in table 3 indicates that bank credit \( \beta = 0.398640, t = -8.554776 & p < 0.05 \) and interest rate \( \beta = 0.034189, t = 2.458921 & p < 0.05 \) exerts a significant positive effect on the performance of manufacturing sector in Nigeria. Exchange rate \( \beta = -0.309144, t = 4.707482 & p < 0.05 \) shows a significant negative effect on the performance of manufacturing sector in Nigeria. In line with a priori expectation the effect of bank credit and exchange rate on performance of manufacturing sector in Nigeria was positive, that is a unit increase in bank credit bring about 40% increase in performance of manufacturing sector in Nigeria while a unit increase in exchange rate will bring about 31% decrease in performance of manufacturing sector in Nigeria. Against a priori expectation the effect of interest rate on performance of manufacturing sector in Nigeria was positive, that is a unit increase in interest rate on the average brings about 3% increase in performance of manufacturing sector in Nigeria.

### 5 Discussion, Conclusion and Recommendations

The study found out that bank credit \( \beta = 0.398640, t = 8.554776 & p < 0.05 \) and interest rate \( \beta = 0.034189, t = 2.458921 & p < 0.05 \) exerts a significant positive effect on the performance of manufacturing sector in Nigeria. Exchange rate \( \beta = -0.309144, t = -4.707482 & p < 0.05 \) shows a significant negative effect on the performance of manufacturing sector in Nigeria. The findings in this study supported the result of Emecheta & Ibe (2014) on the impact of bank credit on economic growth in Nigeria applying the reduced form of vector autoregressive technique using time series data from 1960 to 2011. The major finding in the study is that there is a significant positive relationship between bank credit to the private sector, broad money and economic growth. It is also in line with Okoni & Nathan (2014) on the impacts of commercial bank credit on Nigeria industrial subsectors between 1972 and 2012. The results of estimation indicate the following: commercial bank credits impact positively and significantly on the manufacturing sub-sector in Nigeria, commercial bank credits to mining and quarry is a positive and significant determinant of the current year Mining and Quarry output in Nigeria, previous year bank credits to real estate and construction is a positive determinant of the current year real estate and construction output, bank credits to manufacturing, mining and quarry as well as bank credits to real estate and construction correlated positively with aggregate industrial output with bank credits to real estate and construction having greater and a significant impact on industrial output. Interest rate was not an important determinant of industrial sector.
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and industrial sub-sectors outputs, exchange rate is a negative and significant determinant of industrial sector’s outputs in Nigeria. Their results point to the conclusion that, increase bank credits to industrial sector is indispensable in stimulating industrial sector growth in Nigeria.

From the result, it can be concluded that, bank credit has a significant positive effect on the performance of manufacturing sector in Nigeria. Among the inference that can be deduced from the result are that, despite the low level of credit available to manufacturing firms in Nigeria in comparison with international standard, the level of bank credit has proved to be productive. This is based on the significant positive impact that bank credit exert on the performance of manufacturing firms in Nigeria.

Based on the above stated findings from the investigation carried out, the study makes the following recommendations. There is a need to pursue financial sector development in a way that will promote savings and bank credit through a policy framework that enhance financial intermediation role of banks. Effort should be put in place by monetary authorities to address the wide gap between lending rate and deposit rate, to encourage and build savings habit of the people in order to accumulate loanable funds for investment.

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