THE INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

Impact of Bank Deposit on Manufacturing Sector Output: The Case of Nigeria

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Abstract:

Manufacturing sector plays an important role in the development of modern economy all over the world, whether advance or developing country. In the light of this, this study investigated the impact of bank credit on manufacturing output for the period 1981-2019. The variables were tested for stationarity. Error correction mechanism was adopted for the estimation of the model. Based on the result of the study, it was observed that credit to the manufacturing output has direct relationship with manufacturing output and it is statistically significant. Total government expenditure has direct relationship with manufacturing output, but not statistically significant. The relationship between exchange rate and corruption on output of manufacturing were Binverse and were not statistically significant. The most important variable affecting output of manufacturing sector is credit to the manufacturing. Manufacturing output in Nigeria does not significantly respond to changes in interest rate and government expenditure. The study concluded that credit to the manufacturing output is significant to the growth of manufacturing sector output in Nigeria economy. The paper recommended a better and stronger credit facility to manufacturing sector, should be promoted and sustained; there should be strong and comprehensive legal framework that will continue to aid in monitoring the performance of credit of the commercial banks. The most important variable affecting manufacturing output is credit to the manufacturing sector; effort should be made towards encouraging more credit to the manufacturing sector in Nigeria.

Keywords: Credit to the manufacturing sector, corruption, manufacturing output, and exchange rate

1. Introduction

Manufacturing sector plays an important role in the development of modern economy all over the world, whether advance or developing country. Manufacturing sector as a sub –sector of the industrial sector refers to the reproductions of goods and services through combined utilization of raw materials and other factors of productions such as, land, labour and capital or by means of production process. One of the foremost reasons for the establishment of a formal financial institution in Nigeria is to accept deposits and create credits for investment through loan that will help to provide medium and long-term financing for the promotion and development of manufacturing sector (Igbo, Simon & Irolumun, 2016). Deposit money banks play a most indispensable role when they pool together funds from the surplus economic units and rechanneled these resources to the deficit economic units. By this, bank credits play a significant and fundamental role in boosting the manufacturing sector performance through purchasing machinery required to boost production (Okere, Okere, and Nwaneto (2020).

Investment capital market is growing at a huge faster pace compared to other sectors. It is not only growing but also promoting linkages among other sectors. For contributing the GDP growth rate, manufacturing sector is playing the most significant role (Olanrewaju, Aremo, and Aiyegbusi, 2015). For Nigerian perspective, the government has articulated the policy measures to achieve the industrial growth (Sanusi, 2010).

The role credited by banks to the manufacturing sector cannot be exaggerated. This is a most important reason behind the Federal Government's Appropriation Bill to attain a high economic growth rate. Deposit money banks need to be effective for mobilization and channeling deposits. Although, many efforts have been made still the Nigerian manufacturing sector remains unappealing (Ogar, Nkamare, & Effiong., 2014). But despite all the credits to the manufacturing sector, the impact has not been felt. Manufacturing sector in Nigeria has been experiencing a stunted growth and its contribution to gross domestic product (GDP) has remained low. For instance, the manufacturing as a whole remains small, accounting for only 9.1 percent of GDP in 2018 and 9 percent of employment (World Bank, 2018).

According to Udih (2014) Bank credit is expected to impact positively on the investible sectors of the economy through improved manufacturing of goods and services. He argued that a good match between adequate bank credit and manufacturing entrepreneurship will enhance massive manufacturing output. Moreover, Nkamare and Charles (2014) asserted that inadequate bank credit has limited the extent of growth in the manufacturing sector. Consequently, many

manufacturing firms in the have continue to depend heavily on internally generated funds which have tended to limit their scope of operation. Nigerian manufacturing firms also faced challenges for productive investment (Edirisuriya, 2008). After carrying out extensive literature reviews, few studies found been conducted on this domain by using the corruption index. This has been identified as a gap.

Following the introduction above, this study is organized into five sections as follows. Section two reviews the literature. Section three focus on the methodology, the empirical results are analysed in section four. Section five concludes the study with the summary of findings, and recommendations for policy implementation. The paper proceeds to review the literature in the next section.

2. Theoretical Review

2.1. The Loan able Funds Theory of Interest Rate

This theory explains the dynamics of bank credit and the cost of the credit. As per this theory the rate of interest is the price of credit. It is getting determined by the demand and supply of loan able funds. Governments generally borrow money for the construction of public works or for capital goods. This theory shows a connection between commercial bank credits and manufacturing sector output. It fortifies the fact that borrowing for investment in the manufacturing sector is interest rate elastic. This is because it is determined by the existing rate of interest.

2.2. Empirical Literature Review

Among many studies some relevant studies are listed below:

Okere, Okere, and Nwaneto (2020) investigated the effects of bank credits on the manufacturing sector output in Nigeria from 1981-2018. The data for their study were sourced from Central Bank of Nigeria (CBN) statistical bulletin. Their study adopted the Auto-Regressive Distributed Lag boundco-integration test approach and error correction. Their study revealed that bank credits exhibited an optimistic and significant relationship with the presentation of manufacturing sector in Nigeria. Their study therefore recommends that policies geared towards deepening the financial sector and enhancing the healthy and soundness of banks should be vigorously pursued.

In a related study, Muchingami, Monamets and Paradza (2017) examined the impact of bank lending on manufacturing sector performance in Zimbabwe 2009-2015 using ordinary least squares (OLS) regression model. The study established a positive relationship between commercial bank loans and volume of manufacturing index. Similarly, Otubu (2019) examined the impact of bank credits on the manufacturing sector in Nigeria from 1980 to 2015. The econometrics methods of ordinary least squares, co-integration, error correction model and granger causality test were used as the main analytical tools. From the estimated error correction model, the study found that bank credits to the manufacturing sector had a positive impact on the manufacturing sector output. In addition, the granger causality result reveals that there is causal relationship between bank credits and manufacturing sector output in Nigeria.

Taking it further, Osmond, Egbulonu, and Emerenini (2016) examined the impact of monetary policy variables on the manufacturing sector of Nigeria from 1981 -2012. Their study used the Error Correction Mechanism (ECM). From their finding, monetary policy has a positive and significant impact on manufacturing sector in Nigeria. Ismalia (2014) highlighted importance of relationship between manufacturing sector output some monetary variables. Ebele and lorembor (2016) conducted a study on the impact of bank credit in Nigeria from 1980 – 2015 and shows negative impact on manufacturing sector output by inflation and interest. This study also shows positive effect on manufacturing output by broad money supply.

Ume, Obasikene, Oleka, Nwadike and Okoyeuzu (2017) examined the relative impact of Bank credit on the manufacturing sector in Nigeria' 1986-2013. The study adopts the autoregressive dispersed lag (ARDL) bound addition test approach and error correction demonstration and found out that there is significant between bank credit and developed sector in Nigeria.

Also, Andabai and Eze, (2018) examined a causality between bank credit and manufacturing sector growth in Nigeria for the period of 1990-2016. Secondary data were used and sourced, and conducted the granger causality test. In their findings there was causality between bank credit to the manufacturing sector.

In addition, Mesagan, Olunkwa and Yusuf (2018) focused on financial sector growth and manufacturing performance in Nigeria over the period of 1981 to 2015. Error Correction Model was adopted and their study observed that credit to the manufacturing sector and broad money supply has positive and significant effect on capacity utilization and manufacturing output, but has negative effect on value added of the manufacturing sector in the short run.

Similarly, Gbadebo, Adekunle, Muritala and Fadeyi (2017) investigated the effects of bank's intermediation role on industrial output in developing economies from 1981 to 2011. Error correction model test was employed and finding revealed an inelastic relationship between bank credits and industrial output in the long-run. In a related study, Sogules and Nkoro (2016) studied the impact of bank credits on performance of manufacturing sector using annual time series data from 1970-2013. Use co-integration and error alteration instrument for the investigation the study exposed that a long run association exists between bank credits and developed sector output. Given the error correction instrument outcome, the study exposed that bank credits exhibited negative significant crash on the presentation of developed sector in Nigeria. Linked in giving out these credits to the developed Sector and also its adverse effect on developed output when misappropriate.

Oluwafemi, Anthony and Elumilade (2014) using the Error Correction Model (ECM) carried a study on the impact of commercial bank credit on Nigeria industrial subsectors. The timespan was between 1922 and 2012. In line with their study, Saygin and Evren (2014) investigated the impact of bank credit on output growth in the manufacturing sector of the

economy from 1980 -2010. They used error correction mechanism in their estimation. From their result bank credit has positive and significant impact on manufacturing output in both short and long run. Ogar et al (2014) investigated the influence of commercial bank credit on manufacturing sector output in Nigeria. Their estimation technique used was the multiple regression. Their result shows that commercial bank credit has significant relationship on manufacturing sector.

2.3. Model Specification for YMAN Model

The theoretical frame work for this paper is based on the financial intermediation theory which says that banks are merely financial intermediaries, not different from other non-bank financial institution, they gather deposit and lend these out. Some variables used in this model were taken from the literature. The specification was hinged on the work of Okere, Okere, and Nwaneto (2020), which is presented as follows:

$$MSO = f(CMS, BMS, INF, INT) \text{ -----3.1}$$

Where, MOS = Manufacturing Sector Output, CMS = Credit to Manufacturing Sector, FSD= Financial Deepening, INT = Bank Interest Rate, INF= Inflation Rate.

This study modifies the specification of Okere, Okere, and Nwaneto (2020) by removing Financial Deepening, Inflation Rate and included exchange rate and corruption index variables in the specification. The corruption index is the gap this study intends to cover. This study specification is as follows:

$$YMAN = f(CRMAN, TGE, INTR, EXR, CORR) \text{ -----3.2}$$

Where, YMAN =Manufacturing Output

CRMAN= Credit to Manufacturing Sector

TGE =Total Government Expenditure

INTR = Interest Rate

EXR = Exchange rate

CORR =Corruption Index

The above functional form equation (3.2) can be stated in operational form.

$$YMAN = b_0 + b_1 CRMAN + b_2 TGE + b_3 INTR + b_4 EXR + b_5 CORR + \mu \text{ -----3.3}$$

b_0 is the constant factor, and b_1, b_2, b_3, b_4, b_5 are the coefficients of manufacturing variables.

μ is the stochastic error term. Based on economic theory, the expected sign or presumptive sign of the parameter estimates are $b_1 > 0$, $b_2 > 0$, $b_3 < 0$, $b_4 < 0$, $b_5 < 0$

Credit to the manufacturing (CRMAN) is supposed to have a direct relationship with output manufacturing (YMAN) on a priori ground. Economics theory says that increase in credit to the manufacturing sector will increase in manufacturing output.

Total government expenditure (TGE) is expected to have a direct relationship with output of manufacturing (YMAN).

An increase in total government expenditure will increase manufacturing output. Interest rate (INTR) is supposed to have an inverse relationship with output manufacturing (YMAN) on a theoretical ground. An increase in interest rate, will increase the cost of borrowing fund to the manufacturing sector. This will reduce investment in the manufacturing sector and manufacturing output. Exchange rate (EXR) is supposed to have an inverse relationship with output manufacturing (YMAN) on a priori ground. An increase in exchange rate, will increase the cost of borrowing fund to the manufacturing sector. This will reduce investment in the manufacturing sector and subsequently reduce the level of manufacturing output. Corruption index (CORR) is expected to have an inverse relationship with output manufacturing (YMAN) on a theoretical ground. This is justified that an increase in corruption reduces economic activities in the manufacturing sector and thereby reducing manufacturing output.

The ADF test informs that any dynamic specification of the model in the level of their series is likely to be inappropriate and may be plaque by problems of spurious regression (Gujarati, 2007).

To test for unit root; we assume that: $\phi_p(B) = (1 - B)\phi_{p-1}(B) \text{ -----3.4}$

Where;

$\phi_{p-1}(B) = 1 - \phi B - \dots - \phi_{p-1} B^{p-1}$ has unit roots lying outside the unit circle.

$$\phi_{p-1}(B)(1 - B)Y_t = \theta_0 + a_t$$

$$\phi_{p-1}(B)\Delta Y_t = \theta_0 + a_t$$

$$\Delta Y_t - \sum_{j=1}^{p-1} \phi_j \Delta Y_{t-j} = \theta_0 + a_t \text{ -----3.5}$$

Hence, testing for a unit root is equivalent to testing $\phi = 1$ in the following model;

$$Y_t = \phi Y_{t-1} + \sum_{j=1}^{p-1} \phi_j \Delta Y_{t-j} + \theta_0 + a_t \text{ -----3.6}$$

$$\text{Or; } \Delta Y_t = (\varphi - 1)Y_{t-1} + \sum_{j=1}^{p-1} \varphi_j \Delta Y_{t-j} + \theta_0 + a_t ; (\varphi - 1) = \delta \quad \text{-----3.7}$$

ADF test equation then becomes:

$$\Delta Y_t = \delta Y_{t-1} + \sum_{j=1}^{p-1} \varphi_j \Delta Y_{t-j} + \theta_0 + a_t \quad \text{-----3.8}$$

The method of data analysis is the Vector Error Correction Model. The regression equation for the Vector Error Correction Model is stated as follows:

$$\Delta Y_t = \alpha_1 + p_1 e_{t-1} + \sum_{i=0}^n \beta_i \Delta Y_{t-i} + \sum_{i=0}^n \delta_i \Delta X_{t-i} + \sum_{i=0}^n \gamma_i Z_{t-i} \quad \text{.....3.9}$$

$$\Delta X_t = \alpha_2 + p_2 e_{t-1} + \sum_{i=0}^n \beta_i \Delta Y_{t-i} + \sum_{i=0}^n \delta_i \Delta X_{t-i} + \sum_{i=0}^n \gamma_i Z_{t-i} \quad \text{.....3.10}$$

In VECM, the co-integration rank shows the number of co-integrating vectors. A negative and significant coefficient of the ECM (i.e., e_{t-1} in the above equation) indicates that any short-term fluctuations between the independent variables and the dependent variables will give rise to a stable long-run relationship between the variables. VECM is to evaluate the short-run properties of the co-integrated series.

4. Data Presentation and Analysis

This aspect of the research paper deals with the analysis of result. To investigate the impact of credit to the manufacturing sector, Manufacturing output model was formulated. The estimation technique is the Error Correction Mechanism. This study is based on a period of thirty-seven years spanning from 1981-2019. This research study made use of secondary data obtained from the Central Bank of Nigeria (CBN), Statistical Bulletin 2019.

4.1. Unit Root Test

The unit root test for the manufacturing model result, is based on the Augmented Dickey-Fuller (ADF) as presented in Table 1. According to the results, none of the variables in the study could gain stationarity at levels given that the ADF test statistic(s) is lesser than the critical value. Thus, all variables became stationary after first differencing, all ADF test statistics were greater than their critical value.

Variable	At level		At First Difference		Order of Integration
	Adf Statistics	Critical Value	Adf Statistics	Critical Value	
YMAN	0.682254	-3.6576	-4.174621	-3.6661*	1(1)
CRMAN	-2.784596	-4.2826	-5.943557	-4.2949*	1(1)
TGE	-2.267449	-4.2826	-5.003530	-4.2949*	1(1)
INTR	1.267099	-3.6959	-3.878785	-3.7204*	1(1)
EXR	-0.920787	-4.3382	-4.998351	-4.3738*	1(1)
CORR	-2.784596	-4.2826	-4.507798	-4.2949*	1(1)

Table 1: Stationary (Unit Root) Test Results

Nb: *, **, *** Imply 1%, 5% and 10% Levels of Statistical Significance Respectively

4.2. Co-integration Test Result

Cointegration with unrestricted intercepts and no trends in the VAR					
Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix					

18 observations from 1996 to 2019. Order of VAR=1.					
List of variables included in the cointegrating vector:					
BCPS	TDB	INTR	EXR	INF	
List of eigenvalues in descending order:					
.96956	.89882	.29360	.25755	.024439	

Null	Alternative	Statistic	95% Critical Value	90% Critical Value	
r = 0	r = 1	62.8578	33.6400	31.0200	
r <= 1	r = 2	41.2349	27.4200	24.9900	
r <= 2	r = 3	6.2564	21.1200	19.0200	
r <= 3	r = 4	5.3604	14.8800	12.9800	
r <= 4	r = 5	.48231	8.0700	6.5000	

Table 2: Co-Integrating Vector Output on Manufacturing Model

Table 2 shows the co-integration test results for credit to manufacturing output. The result is based on Maximal Eigen value tests, which indicate 2 co-integrating relationship or vector at the 5% level of significance. To determine co-integrating test, the paper compare the Maximal Eigen value tests statistics to the critical value in order to determine the

number of co-integrating equations. If the Maximal Eigen value tests statistics is greater than the critical value there is co-integrating equation. For example, at rank 1 the Maximal Eigen value tests statistics is 51.6375 greater than the critical value 39.8300 and at rank 2, the Maximal Eigen value tests statistics is 37.7144 greater than the critical value 33.6400. Thus, the Maximal Eigen value tests statistics indicates 2 co-integrating relationship or vector at the 5% level of significance. The study proceeds to the short-run estimation.

ECM for variable LYMAN estimated by OLS based on cointegrating VAR(2)			
Dependent variable is dLYMAN			
37 observations used for estimation from 1981 to 2019			

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	4520456	1251401	3.7330[.005]
dLCRMAN1	1.7722	.33720	4.9293[.004]
dLTGE1	.31891	.11018	2.8944[.008]
dLEXR1	-.0016191	.017300	-.093589[.926]
dCORR1	-.5933E-3	.0014072	-.42163[.677]
dINTR1	-.5741E-3	.0014641	-.39211[.698]
ecm1(-1)	-.395333	.884993.9	4.4671[.002]

R-Squared	.86653	R-Bar-Squared	.77226
S.E. of Regression	884074.4	F-stat.F(7, 9)	9.2126[.002]
DW-statistic	1.9784	System Log-likelihood	-678.2470

Table 3: Short Run Dynamics: Vector Error Correction

From Table 3 above is the short run dynamics result, the coefficient of the credit to the manufacturing output (CRMAN) is positively sign, it has direct relationship with output of manufacturing which is in line with the apriori expectation of this paper which says increase in credit to the manufacturing sector will increase output of manufacturing. From the pro value of .004 shows that credit to the manufacturing output is statistically significant.

The variable Total Government Expenditure (TGE) is also having direct relationship with output of manufacturing. This is in consonant with the apriori expectation of this paper which says increase in government expenditure increases manufacturing output. Total Government Expenditure is not statistically significant as shown from the pro value, it means that government expenditure has impact on output of manufacturing, but the impact is not significant.

Moreover, Exchange rate (EXR) has a negative sign which, indicate that the relationship between exchange rate and output of manufacturing is inverse, meaning that an increase in exchange rate will decrease output of manufacturing. This is in line with the theoretical expectation of the study. The value of the coefficient is negative, indicating that a percentage increase in exchange rate led to decrease in output of manufacturing, but it is not statistically significant. Furthermore, the variable corruption (CORR) is consistent with the apriori expectation of this paper which says increase in corruption has inverse relationship with output of manufacturing meaning that increase in corruption will reduce output of manufacturing. From the coefficient it is negatively sign, like government expenditure on manufacturing output, it is not statistically significant as shown from the pro value, it shows that corruption has impact on output of manufacturing, but the impact is not significant.

The coefficients of error correction terms for the manufacturing model had the right sign and is significant at 1% levels as indicated by the pro value of .002. The usefulness of the error correction models produces better short-run forecasts and hence provide the short-run dynamics essential to obtain long-run equilibrium. This implies that disequilibrium in the system is adjusted back to equilibrium at a speed of 40 per cent.

The coefficient of determination (R^2) value is .86653, this implies that 87 per cent of the total variation in total manufacturing output (YMAN) is explained by changes in the explanatory variables. Subsequently, 13 per cent is unexplained due to error term. The adjusted coefficient of determination (R^2) Value of .77226 implies that 23 per cent of the total variation in total manufacturing output (YMAN) is explained by changes in the explanatory variables when the coefficient of determination is adjusted for degree of freedom. This implies that 5 per cent is unexplained due to error term. Durbin Watson Statistic of 1.9784 indicates that there is absence of serial autocorrelation. The F – test with a value of 9.2126 with a pro value .002 suggests that the variables are significant factors to be considered in changing the level of the total manufacturing output (YMAN). The negative sign of the Error Correction Mechanism in the equation suggests that the speed of adjustment between the short-run dynamic and the long-run relationship is satisfactory.

5. Conclusion

This study investigated the impact of bank credit on output of manufacturing. The main focus has been based on the output of manufacturing sector in Nigerian economy for the period 1981-2019. Based on the findings of the study, it was observed that credit to the manufacturing output has direct relationship with output of manufacturing and it is statistically significant. Total government expenditure has direct relationship with output of manufacturing, but not statistically significant. The relationship between exchange rate and output of manufacturing is inverse and it is not statistically significant. Corruption index has inverse relationship with output of manufacturing meaning that increase in corruption reduce output of manufacturing, but it was not statistically significant. The most important variable affecting output of manufacturing if credit to the manufacturing, manufacturing output in Nigeria does not significantly respond to

changes in interest rate and government expenditure. The study concluded that credit to the manufacturing output is significant to the growth of manufacturing sector output in Nigeria economy.

6. Recommendations

In view of the findings of this research work, the following recommendations are stated below:

A better and stronger credit facility to manufacturing sector should be promoted and sustained; there should be strong and comprehensive legal framework that will continue to aid in monitoring the performance of credit of the commercial banks. There should be a collective contribution of different sectors towards manufacturing output in harmony for a common goal. Example of such sector is agricultural sector. The main important variable affecting manufacturing output is credit to the manufacturing sector; effort should be made towards encouraging more credit to the manufacturing sector in Nigeria.

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