An Analysis of the Impact of Sectoral Allocation of Deposit Money Bank's Credit on Manufacturing Sector Performance in Nigeria

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Abstract

This paper used descriptive statistics, Phillips-Perron unit root test, cointegration test and error correction mechanism to explore impact Deposit Money Bank (DMBs) credit on manufacturing sector performance in Nigeria between 1981 and 2019. The unit root test results show that all the variables are stationary at first difference. It was observed from the Johansen cointegration test that the variables have long run relationship. This provides the pre-condition for fitting the error correction model. The parsimonious ECM results revealed deposit money banks' credit to the manufacturing sector impacted positively on the performance of manufacturing sector. This implies that increase in deposit money banks' credit stimulated output in the sector. It further observed from the results that iinterest rate was significant in explaining changes in the performance of the manufacturing sector output. This confirms the critical role of cost of funds in investment decision and the performance of the economy at large. Inflation rate was also significant in explaining changes in the performance of the manufacturing sector. Given the findings, the study recommended that there should be increase in banks' funding to the manufacturing sector businesses to boost production and economic growth in the country.

Keywords: Bank credit, manufacturing sector, Deposit Money Bank, Interest rate and inflation

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I.   Introduction

In the global ecosystem, the banking sector plays a very pivotal role as the key mobilizer of financial resources and the apportionment the resources through its intermediates function, thereby helping to accelerate global economic growth and development. Soyibo & Adekanye (1992) note that capital mobilization on one hand from the surplus economic units in the form of savings and its efficient appropriation on the other hand to the deficit units of an economy to stimulate investments and furthermore upscale macroeconomic aggregates. At the forefront of the financial intermediation role of the banking sector, the deposit money banks have been an extremely habitual channel of financial intermediation in both developed and emerging economies. It is ubiquitous that the effective and efficient operationalization of any economy is strongly linked to the strength and stability of her banking industry. In the last three decades or more economists and financial experts, the world over has fervently argued in support of the amplification of capital formations in both advanced and transition economies (Lucas, 1990). This is because the accumulation of capital from the surplus units through the banking subsector and the onwards appropriation of capital to the various real sectors of an economy namely agriculture, industrial, construction and the services sectors provide these sectors with loanable funds for further enlargement, diversification of investments and job creation. However, the real sector of any economy, Nigeria inclusive is the fundamental fulcrum through which growth and economic development are crystalized (Lucas, 1990). Furthermore, the endogenous theory of economic growth fittingly posits that growth in an economy is a function of the huge capital accumulations through savings and its subsequent reinvestment.

The Nigerian financial sector remains sacrosanct as one of the most invaluable sector and has played a pivotal role in the mobilization of financial resources from the surplus economic units through its intermediate function and the allocation of the same to the financial deficit arm of her economy. To galvanize economic growth and development, the federal government working through its central monetary authority (CBN) has over the years initiated various policies, programs and other monetary persuasive drives targeted at making sure that the money deposit banks and other development focus or specializes financial institutions are statutorily mandated to issue out a specified percentage of their overall loanable funds to the real sector of the economy at a stated cost of borrowing. Such initiative of the government geared towards supporting the growth of the real sector of the economy includes the agriculture loan guarantee scheme, the agriculture and cooperative bank, Nigerian industrial development bank and the Nigerian bank for commerce and industry to mention but a few.

Contemporarily, given the critical nature of the real sector as the stronghold of any economy, Nigeria inclusive, the sector indispensability as the lifeblood of any nation is adjudged from its function as the major energizer and propellant of economic growth and development, through the creation of goods and services in the production value chain. Besides, the real sector has provided and would continuously provide employment opportunities to the teeming army of the unemployed. As a rejoinder to the indisputable role of the real sector to the Nigerian economic emancipation, the Central Bank of Nigeria in September, 30th 2019 earmark a whopping three hundred billion naira codenamed Real Sector Support Facility (RSSF). The RSSF as it were at inception is meant to be a financial shock-absorber aimed at supporting the expansion of existing large firms as well as providing financial succour to new startups at an interest rate of 9 per cent. This study is aimed at examining the impact of credit appropriation to the real sector by the Nigerian financial system vis-à-vis the Nigerian manufacturing sector performance.

II. Literature Review

2.1 Theoretical Framework

The supply-led finance hypothesis promulgated by Patrick (1966), envisage the significant role finance plays as a catalyst for economic growth and development of nations globally. He posited that supply led finance or finance induced growth and development is the capacity of financial resources or capital formation to create, support and expand productive economic activities. The theory is of the view that to facilitate the growth and development of the real sector of an economy; the financial sector must first and foremost be developed to serve as the building block for the evolution of the real sectors of the economy. It further argued that the presence of financial institutions aid to galvanize capital accumulation from the surplus economic units for onwards allocation to entrepreneurs' and other deficits units of the economy Arikpo & Adebesi (2017)

Furthermore, the financial liberalization theory propounded by Mckinnon (1973) and Shaw (1973) criticizes government overbearing influence, regulation and interference in the effective and smooth operation of the banking sector. The proponent of the hypothesis posits that the government undue interference in the optimal operation of the financial industry should be whittled down or be removed in its entirety. It further accredited the lackluster performance of the banking industry to government regulation, fixing of interest rate and the setting up of credit limits that the banks can grant. However, the Deposit money banks (DMBs) and other development financial institutions are by nature profit-maximizing entity, conversely, when the government encumbrance demotivate and interject with the industry cardinal operational target of profit maximization, these banks become ineffective and inefficient thereby affecting the overall economy. From the foregoing, the theory is of the view that the financial sector of any nation should be deregulated and allowed to function within the barometer of the invisible hand market template of demand and supply.

2.2 Empirical Literature

To empirically substantiate the causal relationship between bank credit and manufacturing sector growth in Nigeria from 1990 to 2016, Andabai & Eze (2018) utilized secondary data obtained from the Central Bank of Nigeria Statistical Bulletin. The dependent variable, manufacturing sector growth was used as a proxy for manufacturing sector output; whereas, broad money supply, credit to the private sector, interest rate and inflation rate as the explanatory variables. The Vector Error Correction Model revealed that bank credit had no short-run equilibrium significant relationship with manufacturing sector growth in Nigeria. The causality test indicated that bank credit had no causal relationship with manufacturing sector growth in Nigeria. The study concluded that bank credit had not significantly contributed to manufacturing sector growth in Nigeria hence, recommending that for the economy to grow, the manufacturing sector should be encouraged in form of concessional and reduced interest rate.

Empirically researching on how interest rate influenced the manufacturing sector performance in Nigeria from 1981 to 2016, Ogar, Eja & Gbenga (2018) employed time series secondary data sourced from the Central Bank of Nigeria (CBN) statistical bulletin and applied vector error correction mechanism for data analysis. The results confirmed a negative but significant relationship between the lending rate and manufacturing output in Nigeria. A positive but insignificant relationship between the deposit rate and the manufacturing sector output was observed. Short-run association between the variables was equally recorded. It was thus recommended that the government through the Central Bank of Nigeria should develop policies to reduce the wide interest rate spread among commercial banks in Nigeria.

The impact of foreign exchange and interest rates variations on Nigeria's manufacturing output was investigated by Nwokoro (2017) for the period 1983 to 2014). The error correction modeling procedure was employed to know the influence of foreign exchange rate, interest rate, capacity utilization, government expenditure on the manufacturing sector, investment in industrial production on manufacturing output in Nigeria. All the regressors appeared in their right signs according to a priori expectation being that foreign exchange rate and interest rates have a negative but significant relationship with manufacturing output. Our

current exchange rate policy should be reviewed to cub the international currency depreciation we are facing and monetary and fiscal policies should target reducing the interest rate on loans to the manufacturing sector.

Nwandu (2016) examined the effect of rising interest rate on the performance of the Nigerian manufacturing sector. Data for the study spans 1981 to 2015. The models were analyzed using the ordinary least squares. Findings from the study showed that the rising interest rate in Nigeria has a negative effect on the contribution of the manufacturing sector to GDP as well as on the average capacity utilization of the Nigerian manufacturing sector. This implies that the rising interest rate in Nigeria impedes the activities and the performances of the Nigerian manufacturing sector. Thus, the study recommended that interest rate be managed for enhanced economic growth.

This study examined the impact of monetary policy variables on manufacturing in Nigeria from 1981 to 2012. Okonkwo, Godslove & Mmaduabuchi (2015) used the error correction mechanism to estimate how monetary policy measures such as interest rate, inflation, credit to the private sector and broad money supply influenced industry contribution to national income (GDP). The study revealed that money supply and credit to the private sector exerted tremendous influence on manufacturing in Nigeria.

Saunder & Schmacher (2000) show in their empirical study over the period of 1989-1995 that implicit interest rate has a significant and positive on net interest rates and current and savings accounts tended to disappear. As a consequence of deregulation, banks have increased the cost of services provision they charge to customers. Ogunleye (2007) stated that along the trade cycle, the rise and fall in the interest rate during boom and slump respectively does not determine investment but expectation. He stated further that funds for investment may be allocated by rationing and this is evident in the Nigerian banking industry where the Central Bank of Nigeria (CBN) would give directive on the sector of the economy to which much of commercial banks loans and advances must go.

Adebanjo *et al.* (2019) conducted the impact of exchange rates on the performance of the manufacturing sector in Nigeria, using the independent variables of exchange rates, inflation rates, capacity utilization rate, the manufacturing sector's foreign direct investments and imports over the period 1990 to 2014. Error correction model was used for analysis. The empirical results of the study showed that the exchange rate has a negative significant relationship, long-run relationship and causal relationship with the performance of the sector. It was also ascertained from the results that inflation rates and capacity utilization rates have a positive significant relationship with the performance of the sector, while exchange rates, imports and manufacturing foreign direct investment have a negative significant relationship with the performance of the Nigerian manufacturing sector.

Tams-Alasia, Olokoyo, Okoye and Ejemeyovwi (2018) examined the impact of exchange rate deregulation on manufacturing output performance in Nigeria over the period 1980 to 2016. The error correction mechanism was used for the analysis. The empirical findings revealed that the exchange rate has a non-significant positive long-run effect on manufacturing industry output. However, the unidirectional causal impact of exchange rate on manufacturing output was established using the pairwise granger causality test. The study concluded that the monetary authorities should aim at stabilizing the exchange rate through the use of appropriate monetary policy tools as well as support export diversification programmes to enhance foreign exchange inflow. Having studied the impact of exchange rate fluctuation on the performance of manufacturing firms in Nigeria, using firms' profitability as a proxy for performance within the periods 1986 to 2016, Ugwu (2017) adopted the multiple regression method based on the Ordinary Least Squares estimation technique. The findings concluded that there is a statistically significant relationship between exchange rate fluctuations and the profitability of manufacturing firms in Nigeria.

This effect of exchange rate variability on manufacturing sector performance in Ghana was investigated by Abdul-Mumuni (2016) using time series data from 1986 to 2013 and employing the autoregressive distributed lag (ARDL) approach to examine the effects of the exchange rate, imports, FDI and interest rate on manufacturing as a percentage of GDP. The empirical results showed that there exist both short and long-run relationships between exchange rate and manufacturing sector performance. The author concluded that in Ghana as the exchange rate appreciates, the manufacturing sector performance improves and as it depreciates, the sector is adversely affected.

Lawal (2016) x-rayed the effect of exchange rate fluctuations on manufacturing sector output in Nigeria from 1986 to 2014. Data were sourced from the Central Bank of Nigeria (CBN) statistical bulletin and World Development Indicators on manufacturing output, consumer price index, government capital expenditure and real effective exchange rate, and were analyzed using the Autoregressive Distribution Lag (ARDL) approach. It was discovered that exchange rate fluctuations have a long run and short-run relationship on manufacturing sector output. The result showed that the exchange rate has a positive impact on manufacturing sector output but not significant.

Muhammed & Santi (2018) examined the relationship between the financial sector and the real sector in Thailand, using GARCH, VECM and the granger causality techniques of data evaluation. The result of the

study revealed that the real sector proxy by the GDP is significantly sensitive to the variation in both capital and money markets, in addition, the findings upheld that there exists interdependency between the financial market and the real sector of the Thai economy. The work advocated for an expansion of the Thai financial environment.

Tomola, Adebisi & Olawale (2012) assessed the interconnection between Bank Lending, economic growth and the manufacturing sector viability in Nigeria, using the cointegration and VECM, evidence from the study test result attest that there is a significant relationship between bank credit the manufacturing sector and the sector output viability. Thus, an increase in lending to the manufacturing sector is admonished by the paper. A study was undertaken by Loto (2012) employed descriptive and pooled OLS regression techniques to assess the implication of global economic meltdown and the manufacturing sector performance in Nigeria. The study empirical evidence revealed that there exists an insignificant relationship between manufacturing output and economic meltdown.

Sogules & Nkoro (2016) examined the impact of bank credits on performance of manufacturing sector using annual time series data from 1970 to 2013. Manufacturing sector output was used as dependent variable whereas the independent variables are bank credits to manufacturing and government expenditure. Using error correction mechanism for the analysis, result revealed that bank credits exhibited negative significant impact on the performance of manufacturing sector in Nigeria. It was thus recommended among others that bank credits to the manufacturing sector should be properly monitored to ensure that funds meant for this sector are not diverted for other purposes.

III.   Research Methodology

3.1 Research Design
The paper adopted the ex-post-facto research design under which provides the empirical pathway for estimating the data.

3.2 Model Specification
This study examines the impact of deposit money banks' credit on Nigeria's manufacturing sector performance. The theoretical underpinning of this study is the Cobb-Douglas production function and the model is provided as:

$$MGDP = BCMS^{\alpha_1} \, INTR^{\alpha_2} \, REXCR^{\alpha_3} U^e \qquad\qquad (1)$$

$$LnMGDP = \alpha_0 + \alpha_1 LnBCMS + \alpha_2 LnINTR + \alpha_3 LnINFR + e$$

Equation (1) above could also be transformed into a linear form thus:

Where: Ln =   Natural logarithms, $\alpha_{0-}\alpha_3$= parameters, MGDP =Manufacturing sector contribution to Gross domestic product, BCMS = Banking sector credit to the manufacturing sector, INTR   = Interest rate, INFR = Inflation rate, e_u = Random term.
The model a-priori theoretical assumption is as stated below, $\alpha_1 > 0$, $\alpha_2 < 0$, $\alpha_3 < 0$

3.3 Data Analysis Techniques
The time series data for this study sourced from the CBN Annual Statistical Bulletin were analyzed using the descriptive analysis, the unit root test, cointegration test and error correction model (ECM) among others techniques of data analysis. The Phillips-Perron (PP) test was applied in testing for the unit root test. Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. The stationary linear combination is called the cointegrating equation and may be interpreted as a long-run equilibrium relationship between the variables. The ECM method was adopted because of the inherent theoretical compatibility with the Johansen cointegration test.

IV.   Results And Discussion

4.1 Descriptive Statistics
The descriptive statistics for the variables are summarized in table 1.

Table 1: Descriptive Statistics for the variables

Statistic	MGDP	BCMAS	BCMIS	INTR	INFR
Mean	2789.63	356.22	452.62	22.11	19.12
Median	826.03	72.24	22.85	21.55	12.22
Maximum	16781.06	2434.38	2215.74	36.09	72.84
Minimum	26.89	2.66	0.09	10.00	5.38
Std. Dev.	4058.56	581.63	738.48	6.18	17.07
Skewness	1.78	2.11	1.38	-0.064	1.78
Kurtosis	5.50	7.07	3.33	2.69	4.99
Jarque-Bera	30.66	55.79	12.61	0.18	27.17

Probability	0.00	0.00	0.001	0.91	0.00
Sum	108795.7	13892.61	17652.19	862.17	745.72
Sum Sq. Dev.	6.26E+08	1285520	20723245	1453.069	11078.23
Observations	39	39	39	39	39

Source: Researcher's Computation (e-view)

The descriptive statistics reported in table 1 shows that there is a wide deviation from the mean of all the variables under investigation. This is evidence in the values of standard deviation for manufacturing sector contribution to economic growth (MGDP), deposit money banks' credit to the manufacturing sector (BCMAS), interest rate on credit (INTR) and price level or inflation rate in Nigeria (INFR). These wide disparities reveal the extent of deviation and instability in real sector performance and deposit money banks' credit to the real sector. The wide fluctuation in the variables is also evidenced in the minimum and maximum values. Very high disparities suggest that banking sector credit to the real sector and the performance of the sectors have been inconsistent.

4.2 Unit Root Test
The Phillips-Perron unit root test results are summarized in table 2-3.

Table 2: Unit Root Test Using Philip Perron Procedure at Levels

Variable	Philip Perron statistic	1 %	5 %	10 %	Decision
Log(BCMAS)	-1.352	-3.616	-2.941	-2.609	Not Stationary
Log(INTR)	-2.582	-3.616	-2.941	-2.609	Not Stationary
Log(INFR)	-3.275	-3.616	-2.941	-2.609	Stationary at 5 & 10%
Log(MGDP)	-0.180	-3.616	-2.941	-2.609	Not Stationary

Source: Researcher's computation (e-view)

The results of the Phillips-Perron unit root test at levels reported in table 2 reveal that all the series were not stationary at the conventional 5 percent level of significance. This is because in absolute terms the Phillips-Perron test statistics are less than their corresponding critical values. Thus, the null hypothesis of unit root in each of the variables cannot be rejected at levels. In other words, all the variables were not stationary at order zero. The evidence of non-stationarity in all the variables necessitated the differencing of the series to check if they can become upon first differencing.

Table 3: Unit Root Test Using Philip Perron Procedure at First Difference

Variable	PP Statistic	1%	5%	10%	Remark
Log(Bcmas)	-5.503	-3.621	-2.943	-2.610	Stationary at 1st difference I(1)
Log(Intr)	-8.177	-3.621	-2.943	-2.610	Stationary at 1st difference I(1)
Log(Infr)	-9.699	-3.621	-2.943	-2.610	Stationary at 1st difference I(1)
Log(MGdp)	-4.475	-3.621	-2.943	-2.610	Stationary at 1st difference I(1)

Source: Researcher's computation (e-view)

Unit root test result displayed in table 3 shows that all the variables for investigation were stationary at order one. This implies that they attain stability by first differencing. It also shows that the null hypothesis of presence of unit root was rejected after first differencing for all the variables. The attainment of stability is a precondition for testing for long run relationship among the variable. Testing for long run relationship among the variables was carried out using the Johansen cointegration test. The choice of this test is based on the same order of stationarity for all the variables under investigation.

4.3 Cointegration Test Result
Table 4: Johansen cointegration test result

Series: LOG(MGDP) LOG(BCMAS) LOG(INTR) LOG(INFR)				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.648449	61.02352	47.85613	0.0018
At most 1	0.324330	22.34371	29.79707	0.2798
At most 2	0.178163	7.837865	15.49471	0.4829
At most 3	0.015499	0.577955	3.841466	0.4471
Trace test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				

**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.648449	38.67981	27.58434	0.0013
At most 1	0.324330	14.50585	21.13162	0.3250
At most 2	0.178163	7.259910	14.26460	0.4589
At most 3	0.015499	0.577955	3.841466	0.4471
Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Researcher's computation (e-view)

The test of long run dynamics among the variables in the manufacturing share of GDP model reported in table 4 indicates that there exist one cointegration equation for the trace and maximum eigenvalue equations. This implies that at least one of the variables tend to adjusts speedily to long run dynamics. The existence of long run relationship is a pre-condition for fitting the error correction model.

4.4 Estimation of ECM
The parsimonious ECM portraying the empirical relationship between bank credit and manufacturing sector performance is reported in table 5.

Table 5: Long run result of manufacturing sector output model

Variable	Coefficient	t-Statistic	Prob.
C	0.142329	4.594168	0.0001
DLOG(BCMAS)	0.010420	0.642631	0.5259
DLOG(BCMAS(-1))	0.025226	1.521644	0.1397
DLOG(BCMAS(-2))	0.029881	1.186224	0.2459
DLOG(INTR(-1))	0.054761	0.557296	0.5819
DLOG(INFR)	0.071533	2.427790	0.0221
DLOG(INFR(-2))	0.055900	1.887702	0.0699
DLOG(MGDP(-2))	0.145651	0.962259	0.3445
ECM(-1)	-0.024169	-1.206578	0.2381
R-squared = 0.47; Adjusted R-squared=0.31; F-statistic = 2.97; Prob (F-statistic) =0.02; DW Stat = 2.0			

Source: Researcher's computation (e-view)

The result of manufacturing share of GDP reported in table 5 indicates that deposit money banks' credit to the manufacturing sector impacted positively on the performance of manufacturing sector. This implies that increases in deposit money banks' credit stimulated output in the sector. This is in consonance with theoretical apriori expectation and economic theory. Deposit money banks' credit is however not significant in explaining this impact at 5 percent level. Interest rate on credit does not conform with economic theory by bearing positive sign with output of manufacturing seor. This implies that reduction in cost of fund retarded production and vice versa. The impact of interest rate on performance of manufacturing sector is also not significant at 5 percent level. Inflation rate deviated from theoretical expectation by bearing positive sign. However, it is significant at 5 percent level. This implies that price level has serious implication on manufacturing sector's performance in Nigeria over the period under investigation. The goodness of fit shows that only about 47 percent of the systematic variation in manufacturing sector performance is explain by deposit money banks' credit to the agricultural sector, interest rate and price level in Nigeria over the period under investigation. The negative sign of the error correction model and its insignificance at 5 percent level reveals that the variables in the mining sector performance model respond slowly to changes in long run changes in manufacturing sector performance in Nigeria over the period under investigation.

Table 6: Manufacturing sector Model's Diagnostic Test Result

Test	F-statistic	Probability	Decision
Breusch-Godfrey Serial Correlation LM Test	0.67	0.52	Accept H_0
Normality Test	0.19	0.91	Accept H_0
Breusch-Pagan Godfrey Heteroskedasticity Test	0.24	0.98	Accept H_0
'Ramsey Rest Test	0.16	0.69	Accept H_0

Source: Researcher's Computation

The diagnostic test results of the manufacturing sector performance presented in table 6 show no evidence of autocorrelation given the Breush-Godfrey LM test statistic and its probability. Also, the result indicated that the error term is normally distributed around it mean. The test for heteroscedasticity shows that it is absent in the model hence confirmed the assumption of homoscedasticity. Furthermore, the Ramsey RESET test indicated that no variable is missing in the model. These results provide evidence that variables/data in this model conform to the basic assumptions of ordinary least squares estimation.

V.   Conclusion And Recommendation

This study examines the impact of deposit money banks' credit to the real sector on the performance of the manufacturing sector. Banking sector credit to the manufacturing sector was not crucial in explaining performance of the manufacturing sector and the economy at large in the long run as a result of the insignificance of the variable at 5 percent. Adequate funding and infrastructural development are crucial in enhancing performance of manufacturing sector. The non-availability of long term funds required for financing investments in the real sector by banks, high interest rate charged by banks on credit and unpredictable and uncontrolled/rising price level may have accounted for the poor effect of banking sector credit on the performance of the manufacturing sector in Nigeria during the period under study. To this end, the study recommends for increase banks' funding for manufacturing sector to boost production and economic growth in the country.

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