



IMPACT OF COMMERCIAL BANK'S CREDIT ON MANUFACTURING SECTOR OUTPUT IN NIGERIA

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ARTICLE INFO

Article history

Received : 30 December 2023

Revised : 11 June 2024

Accepted : 24 June 2024

Keywords

Commercial Bank's Credit;
Manufacturing Sector Output;
Deposit Interest Rate;
Small and Medium Businesses

JEL classification

D01; O12

ABSTRACT

This study examines the impact of commercial banks' credit (CBC) on manufacturing sector output (MSO) in Nigeria from 1992 to 2021 using Ex-Post Factor Research Design Approach. The study's findings indicate that commercial banks credit (CBC) has a beneficial and substantial impact on manufacturing sector output (MSO). The long-term value of CBC has a positive and substantial impact on MSO. A 1% rise in Credit to Small and Medium Businesses (CSM) led to a 0.1866% increase in MSO. Conversely, a unit increase in deposit interest rate (DINR) resulted in a 0.0081% fall in MSO. In the long run, a unit increase in Government Capital Expenditure (GOV) caused a 0.1482% increase in MSO. Therefore, the study recommends that using its monetary policies, federal government can make an efficient policy that allows the manufacturing sector and small and medium enterprises to access bank credit at low interest rates.

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1. INTRODUCTION

Manufacturing converts raw materials into final consumer items, intermediates, or partially finished products. Like other industrial endeavours, manufacturing improves agriculture, broadens the economy, and increases a nation's foreign exchange profits. Furthermore, it allows local workers to gain new expertise. Nigeria has a long-standing history of manufacturing that dates back to the pre-colonial era. The Hausa, Benin, and Ibo cultures are characterised by a decentralised social structure, with numerous small-scale producers producing items for commerce and various social activities (Charles-Anyaogu et al., 2018). The manufacturing sector is a crucial component of the contemporary economy, possessing numerous dynamic benefits for economic transformation. Kunemoemi & Robert (2020) asserted that manufacturing has been a pivotal catalyst in most developing economies. Bhorat et al. (2019) argue that throughout the history of economics, there are very few instances where a nation has achieved sustainable economic development without the manufacturing sector playing a leading role.

Nigeria's manufacturing industry has been severely neglected because of an overwhelming reliance on oil. Unlike the historical experiences of Britain, the US, Germany, Japan, and Russia, as well as the more recent growing economies in Asia, such as China, India, Singapore, Taiwan, and Thailand, this finally led to the country achieving homogeneity. South Korea and Malaysia. Brazil and Ghana were referenced in a recent study by Obidigbo in 2012.

The lack of access to industrial financing is the main reason for the minimal growth in the manufacturing sectors of Nigeria and other emerging countries. Adelegan (2011) reported that managers of firms in Nigeria are dissatisfied with the limited availability of finances and the high-interest rates, which pose substantial challenges to conducting business. Supporting this perspective, the 2011 Federal Republic of Nigeria report indicated that the quantity and quality of bank funding to the private sector declined as banks exercised greater prudence in response to the financial crisis. Insufficient finance has impeded companies from investing in vital elements such as state-of-the-art machinery, information and communication technology, and the development of human resources. The aspects above are crucial for cost reduction, productivity improvement, and competitive advantage enhancement (Ume et al., 2017).

A sustainable banking system is essential to absorb poor economic conditions and financial distress, especially in economies that depend heavily on commodities, as underlined by Hasanov et al. (2018). Alkhazaleh (2017) contend that the primary obligation of banks to provide credit is essential for financing all sectors of the nation. Timsina et al. (2017) argue that credit constitutes the primary source of revenue in the portfolios of most banks, thus highlighting the significance of credit management as a primary concern. The banking systems in an economy perform crucial services that support the growth and advancement of the economy, particularly in the manufacturing sector. The advancements in science and technology have resulted in increased collaboration and amalgamation of sectors within and beyond Nigeria. The increased integration of these industries is a tangible expression of this technical progress. Macroscopic economic indicators fluctuate because of external disturbances, of which no sector is exempt (Okotori, 2019).

The real value added to the economy (manufacturing) is captured through capital formation (investment), which will increase future savings, investments, and wealth creation (Musa et al., 2022). The increase in capital production leads to higher savings, which in turn has a positive impact on the accumulation of private savings. As savings accumulate, gross domestic investment (GDI) increases, leading to GDP growth due to the income generated by the investment projects undertaken (Musa et al., 2023). While few empirical studies have addressed the relationship between bank credit and economic growth, Audu et al. (2021) and Elijah (2019) explicitly investigated the influence of bank lending on the output of Nigeria's manufacturing sector. Iorember & John (2016) and Ogar et al. (2014) examined the correlation between credit extended by commercial banks and the production level in the Nigerian manufacturing industry. The research was carried out utilising data sourced from Nigeria. Hacievliyagil & Eksi (2019) examined the correlation between bank loans and economic growth, emphasising the manufacturing sub-sector. These studies focused on few analysis and are not updated.

The significant concern for commercial banks' credit and its impact on the economies of developing countries, as well as the need for economic growth and development, influenced the decision to embark on this study. The main goal of this paper is to investigate how bank lending affects the manufacturing industry in Nigeria. Specifically, the study aims to analyse the influence of loans from commercial banks on the production of the industrial sector. Additionally, it seeks to assess the impact of loans granted to the private sector on the level of MSO in Nigeria.

The study comprises several sections, including the literature review, which examines relevant prior research and the theoretical framework. The methodology section outlines the model specification and research methods employed. The data presentation and analysis section justifies the empirical analysis of the dataset. Lastly, the conclusions section elucidates the study's findings and offers policy recommendations for various stakeholders.

2. RESEARCH METHODS

This study employed an Ex post facto research technique to illustrate the causal influence of the explanatory variables on the dependent Variable using multiple regression analysis. In addition, this analysis utilized secondary time series data from the Central Bank of Nigeria (2021), covering the period from 1992 to 2021 because during this period, a lot of activities and policies were introduced by government in order to boost manufacturing sector output.

This study adapted the research model of Magaji & Musa (2023) to examine the comparative influence of loans provided by commercial banks on Nigeria's manufacturing sector production between 1992 and 2021.

According to their model,

$$\begin{aligned} \text{RGDP} &= f(\text{CBC, DPI, GCE, } \mu) \dots\dots\dots 3.1 \\ \text{RGDP} &= \alpha + \beta\text{CBC} + \lambda\text{DPI} + \delta\text{GCE} + \mu \dots\dots\dots 3.2 \end{aligned}$$

Where as:

- RGDP = Real GDP (proxy for real sector),
- CBC = Commercial Bank Credit,
- DPI = Domestic Private Investment,
- GCE = Government Capital Expenditure,
- α = Intercept of Drift term;

The slope parameters β , θ , and δ represent the specific influence of the explanatory factors on the 14 regress. The variable μ functions as the residual term, encapsulating any other factors that impact the regressor variable but have been excluded from this regression equation. This study revised its model by removing DPI and Real Gross Domestic Product (RGDP) and substituting them with loans extended to small and medium-sized enterprises (CSM) and DINR. This study uses RGDP as a substitute for the real sector, specifically the manufacturing output sector. The other elements are considered explanatory variables.

$$MSO = f(\text{CBC, CSM, DINR, GOV}) \dots\dots\dots 3.3$$

The model's functional relationship described above can be converted to econometric form as shown below:

$$\log MSO = \alpha_0 + \alpha_1 \log CBC + \alpha_2 \log CSM + \alpha_4 \log DINR + \alpha_4 \log GOV + \mu \dots\dots 3.4$$

Where as:

- MSO = Manufacturing Sector Output in Naira (Billions)
- CBC = Commercial Bank Credit in Naira (Billions)
- CSM = Credit to Small and Medium Businesses in Naira (Billions)
- DINR = Deposit Interest Rates in Naira (Billions)
- GOV = Government Capital Expenditure in Naira (Billions)
- a_0 = Constant parameter
- a_1 - a_4 = Slope parameters
- u = error term.

3. RESULTS AND DISCUSSION

3.1. RESULTS

Descriptive Statistics

Table 1. Descriptive Statistics

	MSO	CBC	CSM	DINR	GOV
Mean	51217.62	6961.507	38.52589	10.98459	783.3050
Median	32525.56	3714.993	36.60940	10.19833	602.9974
Maximum	176075.5	22026.37	123.9321	23.24167	3129.890
Minimum	906.0293	75.45630	10.74789	4.206848	39.76330
Std. Dev.	52804.62	7126.120	28.06934	4.093402	713.4873
Skewness	0.878370	0.578344	1.237810	0.809906	1.601847
Kurtosis	2.564705	1.928519	4.199759	4.083813	5.498015
Jarque-Bera	4.094520	3.107497	9.460147	4.748048	20.62967
Probability	0.129088	0.211454	0.008826	0.093105	0.000033
Sum	1536528.	208845.2	1155.777	329.5377	23499.15
Sum Sq. Dev.	8.09E+10	1.47E+09	22848.74	485.9223	14762860
Observations	30	30	30	30	30

Source: Processed data, 2023

Table 1 presented the precise descriptive statistics of the retrieved data sample. The computed statistical measures include the Mean, Median, Standard Deviation, Skewness, Kurtosis, Jarque-Bera, and Probability. Furthermore, the total number of observations amounts to 30. The data include MSO, CBC, CSM, DINR, and GOV. The MSO, CBC, and series' DINR values demonstrate a normal distribution, as evidenced by a Jarque-Bera probability value over 0.05. However, the CSM and GOV series do not follow a normal distribution since their Jarque-Bera probability values are less than 0.05. In addition, MSO and CBC display a platykurtic distribution characterised by a Kurtosis value below 3, whereas CSM, DINR, and GOV display a leptokurtic distribution. Lastly, the standard deviation of manufacturing sector output from the mean is more significant than commercial bank credit. This suggests that expanding the industrial sector's production directly results from Nigeria's continuous growth of bank credit flow.

Unit Root Test

Table 2. Stationarity Test with Augmented Dickey-Fuller Test

Variables	ADF Test Statistic	5% Critical Value	Order	Remarks
LogMSO	-3.9366	-3.5806	I[1]	Stationary
LogCBC	-3.5748	-3.5806	I[1]	Stationary
logCSM	-5.4035	-2.9718	I[1]	Stationary
DINR	-3.5864	-3.5742	I[0]	Stationary
logGOV	-6.2480	-3.5806	I[1]	Stationary

Source: Processed data, 2023

The Augmented Dickey-Fuller unit root test, as shown in Table 2, concluded that the data series for MSO, CBC, CSM, and GOV were stationary at first difference, indicating that they were integrated of order one, I(1), with a significance level of 5 percent. Conversely, the Deposit Interest Rates (DINR) stayed steady, categorised as integrated of order zero, I(0). Once the variables are stationary, the following step is to estimate the parameters of the model in order to determine their influence on the dependent variable. Therefore, this study will employ the ARDL strategy, as it is the suitable estimation technique for variables with different levels of stationarity. The VAR Lag Order Selection Criteria will be utilised to determine the appropriate lag order for the ARDL Bound test for Cointegration.

Optimal Lag Selection Criteria

Table 3. Optimal Lag Selection Criteria

Lag	Login	LR	FPE	AIC	SIC	HQ
0	-40.05404	NA	1.72e-05	3.218146	3.456039	3.290872
1	78.40556	186.1508	2.24e-08	-3.457540	-2.030178*	-3.021182
2	112.8947	41.87965*	1.38e-08*	-4.135335*	-1.518505	-3.335344*

Source: Processed data, 2023

The appropriate lag length for the model is determined in the first step of the ARDL procedure using the Akaike Information Criterion approach of the restricted VAR estimate. A delay of 2 was employed, as shown in Table 3.

ARDL Long Run Bound Test

Table 4. F-Bounds Test

Test Statistic	Value	Significance Level	I(0)	I(1)
F-statistic	10.7784	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Processed data, 2023

Table 4 confirms the enduring presence of the factors in the long term. The ARDL Bounds cointegration study revealed a significant long-run link among the variables, as indicated by the F-statistics exceeding the lower and upper-class boundaries at significance levels of 1%, 2.5%, 5%, and 10%.

ARDL Regression Output

Table 5. ARDL Regression Output

Variable	Coefficient	Std. Error	t-Statistic	Probability
LOGMSO(-1)	0.4877	0.1347	3.6198	0.0021
LOGCBC	0.1846	0.1228	1.5037	0.1510
LOGCBC(-1)	0.3783	0.1359	2.7836	0.0127
LOGCSM	0.1224	0.0426	2.8676	0.0107
LOGCSM(-1)	0.0642	0.0362	1.7745	0.0939
DINR	-0.0020	0.0029	-0.6959	0.4959
DINR(-1)	-0.0061	0.0031	-1.9234	0.0713
LOGGOV	-0.1201	0.0607	-1.9797	0.0642
LOGGOV(-1)	-0.0734	0.0588	-1.2475	0.2291
LOGGOV(-2)	-0.1491	0.0521	-2.8619	0.0108
C	1.1204	0.2459	4.5550	0.0003
R-squared	0.9983			
Adjusted R-squared	0.9973			
F-statistic	1033.338			
Prob(F-statistic)	0.0000			
Durbin-Watson stat.	1.7153			

Note: Dependent Variable: logMSO; ARDL (1,1,1,1,2)

Source: Processed data, 2023

The ARDL analysis, as shown in Table 5, indicates that the Variable of interest is statistically significant at a 5% level. This is obvious from the probability value of Prob < 0.05. On the other hand, if the probability value is more significant than 0.05, the Variable is not deemed to have statistical significance at that level. Table 5 displays the F-statistics, which measure the overall significance of the variables. The F-statistics value is 1033.338, with a probability value of 0.0000. This suggests that the model is highly successful and robust.

The R-squared and its Adjusted form measure the coefficient's level of determination, evaluating the model's quality. The R-squared value was 0.9983, while the Adjusted R-squared value was 0.9973. The statement suggests that the alterations in the independent variables can explain 99% of the variations in RGDP. Therefore, the model demonstrates an exact alignment. The Durbin-Watson score of 1.7153 suggests a positive serial correlation in the model.

ARDL Long Run Test

Table 6. Long Run Test

Variable	Coefficient	Std. Error	t-Statistic	Probability
LOGCBC(-1)	0.562987	0.134991	4.170553	0.0006
LOGCSM(-1)	0.186657	0.047412	3.936914	0.0011
DINR(-1)	-0.008154	0.004228	-1.928566	0.0707
LOGGOV(-1)	-0.342725	0.083456	-4.106643	0.0007
C	2.1873	0.2496	8.7624	0.0000

Source: Processed data, 2023

The long-term relationship is illustrated in Table 6, using the MSO as the dependent Variable. The CBC has a favourable and statistically significant impact on Nigeria's manufacturing sector production performance over a lengthy period, specifically after lag1. An increase of 1% in CBC is linked to a corresponding increase of 0.5629% in MSO. Similarly, the short-term output (ECM) indicates that the current value of CBC had a statistically significant impact at the 5 percent significance level (P-value 0.0168).

ARDL Error Correction Model

Table 7. ECM Output

Variable	Coefficient	Std. Error	t-Statistic	Probability
D(LOGCBC)	0.1846	0.0696	2.6510	0.0168
D(LOGCSM)	0.1224	0.0276	4.4315	0.0004
D(DINR)	-0.0020	0.0017	-1.1448	0.2681
D(LOGGOV)	-0.1201	0.0435	-2.7575	0.0135
D(LOGGOV(-1))	0.1491	0.0384	3.8738	0.0012
CointEq(-1)*	-0.5122	0.0559	-9.1483	0.0000

Source: Processed data, 2023

The results of the Error Correction Model in the short run, about the impact of bank lending on the manufacturing sector in Nigeria, are presented in Table 7. An error correction model regression was performed to determine if there is a short-term relationship between the series. The ECT coefficient is significant because it can reflect the error term's direction and statistical importance. This phrase refers to the model's capacity to revert to a stable equilibrium state rapidly following temporary disturbances. The ECTt-1 was statistically significant at a 1% level, with a feedback coefficient of -0.5122. This coefficient suggests a moderate pace of 51.22% for correcting disequilibrium and periodically reaching a long-run equilibrium steady state position. Therefore, it indicates that the endogenous variables are moving towards a state of balance.

Diagnostic Test

Table 8. Diagnostic Test

Test Statistics	LM Version	
Serial Correlation (Breusch-Godfrey)	Obs.R-sqd = 1.0678	Prob. $\chi^2(1) = 0.3014$
Heteroscedasticity (Breusch-Pagan Godfrey)	Obs.R-sqd = 8.6068	Prob. $\chi^2(10) = 0.5698$
Normality (Jarque Bera)	0.7003	Prob. = 0.7045

Source: Processed data, 2023

According to the data presented in Table 8, the ARDL model being examined passes all diagnostic tests with success. The diagnostic assessment shows that concerns regarding serial correlation and heteroscedasticity do not influence the ECT residual estimate, as the Probability of obs*R2 is greater than 5% in both circumstances. In addition, the test confirms that the estimated residuals follow a normal distribution, as indicated by the results of the Jarque Bera test.

3.2. DISCUSSION

The statistical research demonstrates a significant and favourable correlation between the credit extended to small and medium enterprises (SMEs) and the MSO in Nigeria. This link is valid over a lengthy period and has a statistically significant degree of significance at the 1 percent level. According to Table 6, a 1% increase in CSM leads to a 0.1866% increase in MSO. Table 7 demonstrates that the ECM regression indicates a robust and statistically significant positive relationship between CSM and the manufacturing sector's production. This correlation is highly significant at a 1 percent level of significance.

Table 6 presented the results of a long-term study, indicating a statistically significant negative correlation between the current value of the DINR and the economy. The significance level is set at 10 percent. An increase or drop of 1 unit in DINR will lead to a corresponding decrease of 0.0081% in MSO. In the same way, the findings of the ARDL short-run analysis in Table 7 demonstrate an inverse relationship between the interest rate and MSO. A change of 1 unit in the DINR will decrease 0.002% in the manufacturing sector's output. The magnitude of the t-statistic (1.1445) supports the acceptance of the null hypothesis at a 10 percent significance level. This indicates that the influence of deposit interest rates in bank deposits on the manufacturing sector's output is insignificant.

The ARDL long-run regression analysis shows a strong negative correlation between GOV and MSO in the long run. The link becomes significant after a one-period delay. However, there was a clear link between government spending on capital and the output of the manufacturing industry in the short term after a single delay. A 1% increase in the Gross Production Value (GOV) results in a corresponding 0.1482% increase in manufacturing sector production. The null hypothesis is rejected with a high level of confidence ($p < 0.01$) and a small probability of 0.0012 (see Table 7).

The results of Okere et al. (2020) study support the correlation between the performance of the manufacturing industry and the provision of credit by commercial banks, as well as credit extended to firms in Nigeria. Their findings indicate that bank financing exerts a substantial and favourable influence on manufacturing. However, Ume et al. (2017) discovered that while there is a positive correlation over an extended period, it lacks statistical significance. The short-run analysis provides additional support for this theory, as it reveals a positive correlation between bank loans and output in the manufacturing sector. Therefore, this result indicates that bank loans and credit have a vital impact on bolstering Nigeria's industrial sector through the facilitation of efficient and robust production.

The presence of the negative sign suggests that the deposit interest rate in Nigeria has a restricted capacity to elucidate the country's industrial production in the immediate period. The impact of savings on the banking business is negligible, as seen by the correlation between reduced savings and inefficient interest rates on deposits and funds. Iorember & John (2016) revealed a negative association between interest rates and industrial output.

The Government's allocation of funds towards infrastructure projects, such as seaports, power, roads, and bridges, as measured by the GOV, indicates the Government's need to reconsider its capital expenditure to improve efficiency. Alternatively, if the Government does not allocate sufficient funds to the real sector, it may hinder manufacturing and lead to a decline in Nigeria's sector production.

4. CONCLUSION

This study investigates the influence of banking sector credits on the industrial sector in Nigeria. It expands upon the existing empirical framework in the literature by including additional economic factors at the province level, such as manufacturing sector production, commercial bank lending, loans to small and medium firms, deposit interest rates, and government capital expenditure and utilising a yearly dataset spanning 30 years in Nigeria from 1992 to 2021.

The results of this study suggest that bank lending, including commercial bank credit and loans to private firms, has a substantial influence on the manufacturing sector's production in Nigeria, both in the short and long run. The monetary authority can actively implement monetary policy to support the manufacturing sector. The deposit interest rate directly impacts the loan availability for the economy's manufacturing sector, consistent with prior research findings. Augmenting one's revenue to be deposited will ultimately elevate the accessibility of credit. This occurs due to the elevated deposit, increasing the demand for money. Nevertheless, the results of this study indicated a detrimental correlation with the manufacturing industry. The cause may be a need for more efficiency in the savings rate.

In addition, this study recorded an extraordinary increase in government capital expenditure. The analysis revealed that government capital expenditures had a detrimental impact on the manufacturing sector's output in the long term. Various explanations have been provided to elucidate the adverse yet substantial impact of government expenditures on the long-term development of the Nigerian economy. Nevertheless, the Government's impact (GOV) was both favourable and statistically significant in the immediate term. This suggests a growing recognition of the value of capital expenditure, leading to the Government becoming increasingly important soon.

The Study recommended that through its monetary authority, the Government should make an efficient policy that provides the manufacturing sector and small and medium enterprises with opportunities and easy access to bank credits and loans at a subsidised rate. Policymakers should create appropriate regulations to strengthen the two-way influence between the banking industry, where investable capital is obtained, and the manufacturing sector, which produces goods and services. Utilising borrowed money effectively and efficiently is essential if the stated goals of investment, productivity, and economic growth are to be met. There is a need for the monetary authority to revisit the deposit and saving levels of Nigerians critically. An efficient and effective policy to improve the maximum deposit interest rate should be made, and the Government should make sure that money allocated for capital projects is used wisely, that corruption is never tolerated, and that contractors use high-quality materials when building social infrastructure.

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