

Effect of Financial Deepening on Manufacturing Sector Output in Nigeria

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Abstract: *This study investigated the effect of financial deepening on manufacturing sector output in Nigeria between the period of 1981-2018. The data used were sourced from Central Bank of Nigeria (CBN) Statistical Bulletin 2018. The variables were the performance of manufacturing sector output as the dependent variable, while, money supply as a ratio of GDP and credit to private sector as a ratio of GDP as the independent variables. The study employed unit root test, to determine the stationarity of the variables, co-integration approach to determine the long run equilibrium relationship of the variables and Error Correction Model (ECM) to determine the speed of adjustment. The further test carried out in this study were serial correlation, hetroscedasticity and normality test. Ordinary Least Square (OLS) method of data analysis was adopted. From the model it was concluded that financial deepening has a positive significant effect on the performance of manufacturing sector out.. The study recommends that Federal government of Nigeria (FGN) through central bank of Nigeria (CBN) should enhance the financing of manufacturing sector by improving credit flow to the sector because of its strategic importance in creating and generating growth of the economy.*

Keywords: *Manufacturing sector output, financial deepening, MS/GDP, CPS/GDP, hetroscedasticity and normality test*

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1. INTRODUCTION

Financial deepening is the ability of financial institutions to expand the provision of financial services to all sectors of the economy. It involves the provision of wider range financial assets targeted towards the development of all facets of the society Akinmulegun, & Akinde, (2015). In the recent development experts has extend their tentacles to capture how financial deepening will contribute to the performance of manufacturing sector output in an economy. Manufacturing sector over the decades has been describes as an engine of growth in an economy, antidote for poverty and unemployment reduction and wealth creator. Financial deepening as an important aspect of financial institution has revived many sectors in an economy; as a result manufacturing output is not excluded. However, well-developed financial sector can help to mobilise domestic savings and investment thereby increasing output growth (Besci and Wang, 1997). It can also

help to attract sufficient funds from surplus sectors to the deficit sectors thereby freeing up funds for manufacturing activities at a very reasonable cost (Gokmenoglu et al, 2015). It is further argued that a well-structured financial sector development in any economy has the ability to provide financial services that could boost the level of innovation in the manufacturing sector thereby paving way for both investors to take advantage of the new opportunities created. Recently the Nigerian government has placed more emphasis on the development of manufacturing and agricultural sectors in order to promote sustainable growth and development. It is believed that an improved manufacturing sector is a prerequisite for economic development Abiola Adama & Ogunjobi (2018). In most economies, industrial/manufacturing sector serves as the medium for the production of goods and services, the generation of employment and the enhancement of incomes. Hence, the sector is often described as the hub of every economy. Unfortunately, the situation is different in Nigeria, as the contribution of the secondary sector (manufacturing, building and construction) to total gross domestic product (GDP) has been comparatively frail when compared to the other sectors of the economy in Nigeria.

In Nigeria, several policies targeted at improving the productivity of the manufacturing sector towards the growth of the economy have been implemented. Such policies include the Development Plans, the Structural Adjustment Programme (SAP) and the adoption of Financial Sector Reforms in 1986 as part of the economic reform programmes. The government made efforts to liberalize the financial sector through financial reforms which should arouse and turn the banking sector into a diversified, resilient and dependable sector of the economy to enable manufacturing firms access the required funds to finance production. The financial regulatory bodies in Nigeria embarked on consistent financial reforms to enhance financial deepening in the Nigerian financial system. Financial deepening is the improvement in the supply of financial services with an array of choice of services in all sectors of the economy (Ohwofasa & Aiyedogbon, 2013). It means an increased ratio of money supply to Gross Domestic Product (GDP). It refers to liquid money; the more the liquid money in an economy, the more opportunities opened for continued growth (Sackey & Nkrumah, 2012). Financial deepening indicates an enhancement in the financial services that are modified to all the levels in the economy. It also refers to the increase in the supply of money as a ratio of money supply to Gross Domestic Product and other price index which ultimately suggests that the more liquid money that is obtainable in the economy, the more the opportunities that exist in the economy for constant growth. Financial deepening is an all-inclusive process which engrosses the interface of primary markets, secondary markets and retail market, instruments (deposits, bonds, loans, debt securities and foreign exchange) and other stakeholders such as companies, banks and other deposit-taking institutions. Financial deepening is also the process in which institution and financial markets aid the exchange of goods and services, savings mobilization from investors, acquisition of information from the companies and the prospective investment and hence, the allocation of public savings for the purpose of production (Levine, 2005).

2. LITERATURE REVIEW

2.1.1 The McKinnon–Shaw hypothesis (1973)

McKinnon (1973) and Shaw (1973) postulated that in a developing country especially, when interest rate is liberalized, it will lead to increase in the real interest rate which will lead to increase in savings, spur investments and eventually lead to economic growth. The initial framework of McKinnon (1973) and Shaw (1973) focused on financial repression and the need to alleviate financial repression through allowing the market to determine real interest rates, removal of credit control among others. The outcome of repression, according to McKinnon

(1973) and Shaw (1973) will be low savings, high consumption, low investments and repressed economic growth. The McKinnon–Shaw framework is centered on the distortions in the market caused by financial repression (Savanhu et al., 2011).

Thus, McKinnon–Shaw framework argues that in order for an economy to experience economic growth via greater efficiency in capital accumulation and allocation, interest rate and ceilings, credit control and other restrictive financial legislations should be removed.

According to Rehman and Gill (2013), the important point of McKinnon’s hypothesis is that an increase in the desired rate of capital accumulation (private savings) at any given level of income leads to an increase in the average ratio of marginal propensity to income implying that a rise in return on capital leads to an increase in the need of real cash balancing holding for accumulation purpose. Thus, money is not a competing asset; rather money is conduit through which accumulation takes place in developing countries. This implies that an increase in real return on money can sharply raise investment saving propensities in developing countries.

Shaw (1973), proposed the “debt-intermediation hypothesis” whereby expanded financial intermediation between savers and investors resulting from financial liberalization (higher real interest rate) and financial development increases the incentive to save and invest, stimulates the investment due to increased supply of credit and increased level of average efficiency of investment. For Shaw, the investment (I) is a decreasing function of real interest rate (r) and the saving is an increasing function of economic growth rate (g) and real interest rate (r).

He further argued that increased financial intermediation provided the impetus for growth more directly. Liberalization would result in an expanded, improved and integrated financial sector that would lead to an increase in the savings rate, an increase in the rate of investment (by facilitating more lumpy investment); and a direct enhancement to growth (by improved financial technologies).

Hence, McKinnon–Shaw (1973) viewed financial liberalization as

1. Market-determined interest rates;
2. Greater ease of entry into the banking sector to encourage competition;
3. The elimination of directed credit programmes;
4. Reduced fiscal dependence of the state on credit from the banking system (to allow for greater expansion of credit to the private sector);
5. The integration of formal and informal markets;
6. A movement towards equilibrium exchange rates and, eventually, flexible exchange rate regimes with open capital accounts (Serieux, 2008).

McKinnon (1973) and Shaw (1973) further assert that higher real interest rate also aid the channeling of funds to the most productive enterprises and facilitate technological innovation and development. This they explain that paying an interest rate that is above the marginal efficiency of investment, can induce some entrepreneurs to disinvest from inferior processes to improved technological processes and high yielding enterprises, thus generating new positive net savings which is important for reducing foreign dependence and stimulating more investment and consequently growth.

However, Fry (1995) identified five prerequisites for successful financial liberalization:

1. Adequate prudential and supervision of commercial banks, implying some minimal levels of accounting and legal infrastructure
2. A reasonable degree of price stability

3. Fiscal discipline taking the form of a sustainable government borrowing requirement that avoids inflationary effects
4. Profit-maximizing, competitive behaviour by the commercial banks
5. A tax system that does not impose discriminatory explicit or implicit taxes on financial intermediation.

This suggests that financial liberalization crucially depends on the assumption of perfect information and perfect competition (Arestis and Demetriades, 1999).

2.1.2 Empirical Review

Okoli, (2018) examined the relationship between financial deepening and stock market returns and volatility in the Nigerian stock market. Estimation depending on the measures of financial deepening and market returns were evaluated using GARCH (1, 1) model. Four modeled equations were estimated and analyzed. Financial deepening is represented by two variables, the ratio of the value of stock traded to GDP (FD1t) and the ratio of market capitalization to GDP (FD2t). Empirical results revealed that financial deepening (FD1t) measured as the ratio of value of stock traded to GDP do not affect the stock market and there is no news about volatility. But financial deepening (FD2t) measured as the ratio of market capitalization to GDP affect the stock market. It indicated that financial deepening reduces the level of risk (volatility) in the stock market. Result also recorded that the conditional volatility of returns is slightly persistent.

Ademola, & Obamuyi (2018) investigated the effect of financial deepening on the performance of manufacturing firms in Nigeria from 1970 to 2016. The data were sourced from the Central Bank of Nigeria Statistical Bulletin and the National Bureau of Statistics. The model was specified, and the hypotheses were tested with the Autoregressive Distributed Lag model and Mann-Whitney U Test test. The Augmented Dickey-Fuller, Phillips-Perron and Breusch-Pagan-Godfrey tests were carried out to ensure robust regression results. Results obtained from the study revealed that broad money supply has direct and significant impact on index of manufacturing production (p-value= 0.0039) in Nigeria, credit to private sector has indirect and insignificant impact on index of manufacturing production (p-value= 0.1167) in Nigeria and market capitalization has an indirect and significant impact on index of manufacturing production (p-value= 0.0051) in the long-run and a direct and insignificant impact (p-value= 0.1596) in the short-run. The study also discovered that financial deepening impacted more on the manufacturing sector performance in the post-financial reforms period.

Abiola Adama, and Ogunjobi, (2018) examined the causal effects of market capitalization and the manufacturing sector from 1987-2016. The study employed dynamic Ordinary Least Square method for the analysis. The results showed unidirectional causality, confirming the hypothesis of the 'supply-leading view' and 'demand-following view' except for market capitalization and output in the manufacturing sector, where independence was observed. The variance decomposition shows that the forecast error shock of credit to private sector and prime interest rate show more variations in manufacturing sector performance than other financial indicators. The long-run result using output in manufacturing sector as dependent variable shows a positive significant relationship with other financial sector indicators, except for broad money stock and deposit liability.

Mesagan, Olunkwa, & Yusuf (2018) focused on financial sector development and manufacturing performance in Nigeria over the period of 1981 to 2015. In the study, three indicators such as manufacturing capacity utilization, manufacturing output and manufacturing value added were employed to proxy manufacturing performance while money supply as a

percentage of GDP, domestic credit to the private sector and liquidity ratio were employed to proxy financial development. The study observed that credit to the private sector and money supply positively but insignificantly enhanced capacity utilization and output, but negatively impacted value added of the manufacturing sector in the short run.

Omolara, & Asaleye (2016) examined the effect of financial reforms on output growth of the manufacturing sector in Nigeria from 1986-2016. The study is justified given the need to provide empirical evidence on the effectiveness of financial reforms in promoting output growth in the manufacturing sector during the pre and post – reform era in Nigeria. The findings from the statistical and econometric analysis indicate that the financial sector performed better in the post reform era compared to the reform era. Surprisingly, the growth of manufacturing output indicator was low in the post reform era. Vector Error Correction Model (VECM) result indicate a short run divergence between variables. The paper concludes that Nigeria experienced increase in Gross Domestic Product (GDP) with minimal contribution from the manufacturing sector.

Udoh, and Ogbuagu (2012) examined the link between financial development and industrial growth. Using an aggregate production framework and autoregressive distributed lag (ARDL) cointegration technique for Nigerian time series data covering the period 1970 to 2009, the study finds a cointegration relationship between financial sector development and industrial production. Both the long run and short run dynamic coefficients of financial sector development variables have negative and statistically significant impact on industrial production. The inefficiency of the financial sector is responsible for the adverse impact on industrial production. Appropriate measures should be taken to eliminate the constraints and challenges facing small and medium scale enterprise (SME) funding schemes, as these enterprises form the bedrock of the Nigerian industrial sector. Furthermore, industrialization requires a lot of innovations and entrepreneurship.

Aiyetan & Aremo (2018) examined the effect of financial sector development on manufacturing output growth without examining its effect on the disaggregated manufacturing output growth in Nigeria; hence, the present study filled this gap. The study employed Vector Autoregression (VAR) analysis to test whether or not financial sector variables stimulate the growth of output in manufacturing sector of the Nigerian economy, by maintaining interactions with some key macroeconomic variables in the Nigerian economy using annual data from 1986 to 2012. The study also applied unit root and Johansen cointegration tests to examine the behavior of the macro data. The result suggests that relaxing financial development constraints and deepening the financial sector are crucial to boosting the manufacturing output growth in Nigeria.

3. METHODOLOGY

3.1 Research design

Ex-post facto research design will be employed and it usually involves the study *of* independent and dependent variables in which the researcher has no control over, thus cannot in any form manipulate.

3.2 Nature and Sources of Data

Data for the study will be obtained from secondary sources notably from publications of the Central Bank of Nigeria (CBN) Statistical Bulletin, between 1986 and 2018.

3.3 Model Specification

The first objective of the study was captured in the model, which shows the effect of financial

deepening on the performance of manufacturing sector output. The model was a modification of the models from Ademola, & Obamuyi (2018) who investigated the effect of financial deepening on the performance of manufacturing firms in Nigeria from 1970 to 2016

The previous researchers used model:

$$IMP = f(CPS, MC, MS),$$

Where

IMP = Index of manufacturing productivity

CPS= Credit to private sector

MC= Market capitalization,

MS= Money supply

The model were modified as follows

$$PMSO = f(MS/GDP, CPS/GDP), \quad \text{Equation (1)}$$

Where:

M_{SO} = Manufacturing sector output

M_S/GDP= Money supply as a ratio of GDP

C_{PS}/GDP= Credit to private sector as a ratio of GDP

The relationship can be explicitly formulated into an econometric equation thus:

$$M_{SO} = b_0 + b_1 M_{S}/GDP + b_2 C_{PS}/GDP + p \quad \text{Equation (2)}$$

Where b_0 is a constant or intercept, b_1 , and b_2 are the coefficients of the explanatory

Variables, p is stochastic error term.

4. DATA ANALYSIS

The method used is the Ordinary Least Square (OLS) regression techniques. This method was adopted because it posses unique estimating properties which include unbiased, efficiency and consistency, when compared with other linear unbiased estimators. The (OLS) is said to posses the least or minimum variance. We start with stationary test of the variables used.

Table 1 Unit Root Test

variables	ADF		Integration	%
	First diff	Level		
M _{SO}	-5.685669	-0.929397	I(1)	1%
CAP	-5.883431	-1.251747	I(1)	1%
TNI	-5.511788	-1.042431	I(1)	1%

Source: Author's Computation using e-view version 9.

From the table above it was observed that on the application of ADF test on the level series none of the variables were found to be stationary. But all the included variables become stationary at first difference. This implies that all the variables are stationary at the order of integration stated above and at 1% level of significance.

Table 2 Co-integration Result

Unrestricted co-integration Rank Test (Trace)

Hypothesized No.of CE(s)	Eigenvalue	Statistic Trace	Critical Value 0.05	Prob.**
None *	0.547091	38.97678	29.79707	0.0033
At most 1	0.273543	12.04660	15.49471	0.1547
At most 2	0.034139	1.181017	3.841466	0.2771

Source: Author's Computation using e-view version 9.

Trace test Indicates 1 co integrating equ (s) at the 0.05 level denotes rejection of the hypothesis at the 0.05 level mackinn on – Haug – michelis (1999) p- values.

Unrestricted co-integration Rank Test (maximum Eigen value)

Hypothesized No.of CE(s)	Eigenvalue	Statistic Trace	Critical Value 0.05	Prob.**
None *	0.547091	26.93018	21.13162	0.0068
At most 1	0.273543	10.86558	14.26460	0.1611
At most 2	0.034139	1.181017	3.841466	0.2771

Source: Author's Computation using e-view version 9.

Max- (s) at the 0.05 level denotes rejection of the hypothesis at the 0.05 level mackinnon- Haug – Michelis (1999) p- values

The result of the Johansen's co-integration test as shown in table above uses two test statistics namely the trace statistics and the maximum Eigen value proposed by Johansen and Juselius. The co-integration result indicates one co integrating equation as the trace statistics rejects the null hypothesis of no-co-integrating vector at 5 percent significance and accepts the alternative hypothesis of more than zero co-integrating equation, which indicates existence of long-run equilibrium relationship between the dependent and independent variables.

Table 3 Error Correction Model result for Financial deepening Equation

Dependent Variable: LMSO
 Method: Least Squares
 Date: 04/22/20 Time: 15:03
 Sample (adjusted): 1982 2018
 Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.438373	0.247478	17.93438	0.0000
LMSGDP	0.149418	0.179619	0.831860	0.4115
LPSCGDP	0.537195	0.109071	4.925206	0.0000
ECM(-1)	-0.578932	0.160150	-3.614935	0.0010
R-squared	0.708763	Mean dependent var		6.071049
Adjusted R-squared	0.710469	S.D. dependent var		0.293737
S.E. of regression	0.092670	Akaike info criterion		-1.817743
Sum squared resid	0.283394	Schwarz criterion		-1.643590
Log likelihood	37.62825	Hannan-Quinn criter.		-1.756346
F-statistic	109.5650	Durbin-Watson stat		1.734314
Prob(F-statistic)	0.000000			

Source: E-view output

Interpretation of Regression Result

A close examination of the estimated model shows that the result is satisfactory from the high value of the R^2 given to us as 0.708763 approximately 70% systematic variation in the dependent variable which is MSO using these two independent variables which are money supply as a ratio of GDP and private sector credit as a ratio of GDP. Only 30% is left unexplained and this is assumed to be captured by the error term, U.

The adjusted R^2 is given as 0.710469. This means that after adjusting for the degree of freedom, the adjusted R^2 explains approximately 71% systematic variation in the dependent variable. The higher the adjusted R^2 , the lower the residual variance error due to a one-on-one relationship between the both of them and this means our model have a better predictive ability. The F-ratio with the value of 109.5650 shows that the model easily passes the F-test at 1% significance level and this means that the hypotheses of a significant linear relationship between the dependent and independent variables taken together is validated.

The a priori criteria are determined by the existing economic theory and state the sign and magnitude of the variables. From the result report in table 4.3, and from the coefficient column, we discover that money supply as a ratio of GDP has a positive sign as 0.149418; this implies that increase in money supply as a ratio of GDP increase the Manufacturing sector output by 14%. It further confirm to a priori expectation. Private sector credit as a ratio of GDP has a positive sign given its value as 0.537195. This implies that increase in Private sector credit as a ratio of GDP increases the Manufacturing sector output by 53%, this confirm to theoretical expectation.

T-statistic, this is the measure use to determine the individual statistical significance of the variables in the model. From the model, it is obtained that money supply as a ratio of GDP is statistically insignificant. This implies that it contributes lowly to performance of small and medium scale enterprises. However, Private sector credit as a ratio of GDP is statistically significant given its value as 4.925206.

The Durbin-Watson statistics is used to test for the presence of autocorrelation in our in our model. From the result above, our Durbin-Watson result is (1.7), this does satisfy the above stated condition. This means that there is no presence of autocorrelation among the explanatory variables. Financial deepening has significant effect of the manufacturing sector output, The study conclude in favour of alternative hypothesis which state that financial deepening has significant effect of the manufacturing sector output.

Post-Estimation Test

Breusch-Godfrey Serial Correlation Lm Test

This serial correlation test was used to check for the serial relationship between the variables. The null hypothesis stated absence of serial correlation but the alternative hypothesis states the presence of serial correlation. The prob.chi square if greater than 5% level of significance signifies the acceptance of the alternative and rejection of null hypothesis while the prob chi square less than 5% level of significance signifies the acceptance of the null hypothesis and rejection of the alternative hypothesis.

Table 4: Serial Correlation

MODEL	LM-STAT	PROB
Financial deepening	0.036127	0.4429

Sources: Authors Computation E-view 9

The results above showed the prob. (chi-square) having a value of 0.44, 0 which is less than the 5% level of significance, except Financial deepening is greater than 0.05% so therefore we accepted the null hypothesis which stated that there is no serial correlation.

Table 5: Heteroscedasticity Result

MODEL	F-statistic	Prob
Financial deepening	0.251326	0.8598

Source: Authors Computation from E-view 9

At 5% significant level, probability level is 0.85, which is greater than 0.05. Therefore, null hypothesis is accepted. This means that the variance for the residuals is uniform (homoscedasticity).

Normality Test

In general, a normality test is used to verify if a data set is well-modelled by a normal distribution or not, or to compute how likely an underlying random variable is to be normally distributed. One of the assumptions of least square estimator is that the residuals are normally distributed; obeying well defined probability laws and also can bear any value which could be negative, positive or zero.

Table 6: Jarque-Bera Result

MODEL	Jarque-Bera	Prob
Financial deepening	1.267529	0.530591

Source: Authors Computation from E-view 9

It can be seen that the reported probability are greater than at 5% significant level and therefore, the null hypothesis is accepted. This means that the residuals are normally distributed

Discussion of Findings

The study found that financial deepening has significant positive effect on manufacturing sector output. The implication of these findings is that, The ability of the financial deepening to effectively and efficiently mobilise resources for the growth and the development of the manufacturing sector is not connected with the strong financial institution. Mesagan, Olunkwa, & Yusuf (2018) focused on financial sector development and manufacturing performance in Nigeria and found a strong positive effect between financial deepening on the manufacturing

sector output. The findings also corroborate with the findings of Omolara, & Asaleye (2016) that financial deepening is a pertinent determinant to manufacturing sector output in Nigeria.

5. CONCLUSION AND RECOMMENDATION

The study focuses on effect of financial deepening on the manufacturing sector output in Nigeria. Financial deepening is seen as an engine of growth in the developmental processes of the manufacturing sector out. The study adopts unit root, co-integration and error correction model, serial correlation, heteroscedasticity and normality on a time series data from 1981 to 2018. The study regressed financial deepening on manufacturing sector output. The regression result reveals that systematic variation in the dependent variable is explained by the two independent variables such money supply as a ratio of GDP and credit to private sector as a ratio of GDP. The F-statistic is significant at the 5% level showing that there is a linear relationship between the dependent and the independent variables. The study concludes that financial deepening has a positive significant effect on manufacturing sector output in Nigeria. The study recommend that Federal government of Nigeria (FGN) through central bank of Nigeria (CBN) should enhance the financing of manufacturing sector by improving credit flow to the sector because of its strategic importance in creating and generating growth of the economy.

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