

## Financial Deepening and the Performance of Manufacturing Firms in Nigeria

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### Abstract

This study 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. The study therefore recommended that government should launch new financial reforms capable of enhancing the accessibility of manufacturing sector to credit and ensure adequate implementation and monitoring of the existing policies on financial reforms in Nigeria with a view to deepening the Nigerian financial system and thereby promoting manufacturing firms' performance in Nigeria.

**Key words:** Financial deepening; Manufacturing firms; Financial reforms; Broad money supply

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### INTRODUCTION

Industrialization is perceived to be the major force that drives modern economy in both developed and developing countries. 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 Nigerian embarked on consistent financial reforms to enhance financial deepening in the Nigerian financial system, thereby,

increasing the growth in the economic activities in the country. Financial deepening simply means a boost in the quantity of financial services accessible to all the levels in the economy to enhance diversification of financial risk. When there is an improvement in the financial development, availability of financial services is broadened. Thus, more funds are made accessible for investible purposes.

A major motive behind financial deepening is ensuring that manufacturing sector benefits immensely from the liberalised financial system but as revealed by data, the manufacturing firms are still underperforming. For instance, the average contribution of the manufacturing sector to the Gross Domestic Product (GDP) from 1970 to 1980 was 8.2%. It increased slightly to 9.3% from 1981 to 1990 and from 1991 to 2000, it reduced to 7.4% and further reduced to 6.4% from 2001 to 2010 and between 2011 and 2016, it increased to 8.7% (Central Bank of Nigeria, 2016).

Despite the several developmental plans and financial reforms in Nigeria, the country has not achieved industrial development; the several policies and reforms introduced and implemented by different governments as remedy to the challenges facing the industrial sector have mostly been unsuccessful when considering the insignificant input of the industrial sector to gross domestic product (Ewetan & Ike, 2014). Hence, it becomes necessary at this level of economic development in Nigeria to find out if financial deepening has affected manufacturing firms performance in Nigeria. This is pertinent at this critical period when the Government is conceiving and implementing several policies to reposition the financial system in Nigeria and diversify the economy as a result of sharp collapse in the global price of crude oil with high volatility.

Therefore, the objectives of the study are to examine the effect of financial deepening on the performance of manufacturing firms in Nigeria from 1970 to 2016 and to compare the effect of financial deepening on manufacturing firms performance in the pre-financial reform period (1970-1985) and post financial-reform periods (1985-2016).

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## 1. LITERATURE REVIEW

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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. Also, 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 (King & Levine, 1993; Levine, 2005).

Conceptually, to deepen the financial system means to ease up the financial system, thereby, participants in the system can partake in the financial markets for making savings and investment decisions, and markets can also deploy a tangible amount of capital without corresponding movements in the prices of asset. Similarly, the financial sector can create a broad menu of assets for diversifying risks. In other words, when a market is deepened, savers and borrowers are availed the opportunities to invest in varieties of investment or risk-sharing and risk-management instruments (Goswami & Sharma, 2011). It has been acclaimed that the greater the degree of financial development, the wider the availability of financial services that allows for diversification of financing risk. Hence, the availability of financial services in a country depends on the level of financial development of such country. This improves the long-run economic growth of a country and per capita income of citizens (Patrick, 1966).

Torruam, Chiawa and Abur (2013) examined the link between financial deepening and growth in Nigerian economy. The study conducted a granger causality test for a period of 22 years. A unidirectional causality between economic growth and financial deepening in Nigeria was discovered and it was concluded that financial deepening impacted on the growth of the Nigerian economy. The result implies that the financial sector development in Nigeria had significantly improved the financial structures and consequently the efficient delivery of financial services to increase the participation of the private sector for economic growth.

Ayila, Akighir & Iorember (2014) investigated the cause-effect relationship that exists between financial deepening and economic growth in Nigeria for 32 years in a five-variable multivariate model with the Autoregressive Distributed Lag (ARDL) approach. It was found that a unique cointegrating relationship exists among economic growth, financial deepening, market capitalization, index of openness and interest rate. Also, in the long-run, financial deepening has a direct and significant influence

on the growth of the economy. Nzotta and Okereke (2009) examined financial deepening and economic development in Nigeria from 1986 to 2007. It was discovered that deposit money banks/gross domestic product ratio, financial savings ratio, lending rates and cheques/gross domestic product ratio has statistical significant relationship with financial deepening.

Garba (2014) examined the relationship between financial sector development and economic growth in Nigeria. The study shows that variables of financial sector development; total market capitalization, banking sector credits and foreign direct investment affect economic growth variable positively. Emeka and Aham (2013) also examined the impact of financial sector development on economic growth nexus in Nigeria. The annual data set for the period of 30 years was analysed with the Error Correction Mechanism (ECM). A positive effect was found to exist between financial sector development and the growth of the economy in Nigeria. The study also found that financial sector depth and private sector credit are not effective and failed to improve economic growth in Nigeria.

Obamuyi, Edun and Kayode (2012) investigated the effect of bank lending and economic growth on the output of manufacturing in Nigeria using a times series data from 1973 to 2009. Findings from the study show that manufacturing capacity utilization and bank lending rates significantly affects manufacturing output in Nigeria. Atoyebi et al (2013) investigated the nexus between capital formation and manufacturing sector capacity utilization in Nigeria with annual data from 1981 to 2009. The study employed ordinary least square regression analysis to evaluate the data and the granger causality to determine the directional relationships that exist among the variables. Findings from the study reveal that gross fixed capital formation has indirect and significant relationship with average capacity utilization rate. Gross domestic product has a bi-directional relationship with average capacity utilization.

Mesagan and Ezeji (2016) examined the economic and social infrastructure in manufacturing sector performance in Nigeria. The study also investigated if prime rate of inflation and lending rate are key determinants of manufacturing sector depression in Nigeria. Manufacturing value added has direct and significant relationship with government capital expenditure growth and government expenditure on education growth. It was also found that there exists an indirect and insignificant relationship between manufacturing value added and electricity consumption, prime lending rate, electricity generation, inflation rate, growth in government expenditure on health.

Werigbelegha and Ogiriki (2015) examined the performance of stock market and growth in manufacturing sector in Nigeria between 1987 and 2013. The data for the study was tested with the Ordinary Least Square

(OLS) econometric techniques. Direct and significant relationship was found between stock market performance and the manufacturing sector. Also, there is a direct and significant relationship between stock market new issues and manufacturing sector performance in Nigeria. Bernard and Adenuga (2016) examined the nexus between economic reforms and manufacturing sector performance in Nigeria. The data obtained from 1981 to 2009 was evaluated with the Ordinary Least Squares (OLS) method. Unilateral relationships were found to exist between exchange rate, electric power consumption and government capital expenditure. Also, the study shows that exchange rate has direct and significant impact on manufacturing output while the consumption of electric power has indirect and significant effect on manufacturing output. All other employed variables in the study has indirect and insignificant effect on manufacturing output.

Imoughele and Ismaila (2014) studied monetary policy impact on Nigeria manufacturing sector performance. Granger causality test, co-integration and VAR model were used to analyse the data obtained for the period of 1986 to 2012. In the previous and current year, broad money supply and interest rate has insignificant impact on the manufacturing output while rate of inflation, external reserve and exchange rate have significant effect on manufacturing sector output. Also, the rate of interest, external reserve and exchange rate has negative impact on manufacturing sector output while broad money supply and inflation rate affect the sector positively. Real exchange rate, external reserves and Nigeria manufacturing output has unidirectional relationship.

Odior (2013) also examined the impact of macroeconomic factors on manufacturing output in Nigeria. The study employed ordinary least squares regression models (OLS) to analyse the data obtained for a period of 37 years. Broad money supply has less effect on manufacturing productivity while manufacturing sector credit and foreign direct investment sharply increase the level of manufacturing productivity in Nigeria.

Olanrewaju, Aremo and Aiyegbusi (2015) investigated the impact of banking sector reforms on manufacturing sector output in Nigeria. Data ranging from 1970 to 2011 were analysed using cointegration analysis and error correction mechanism (ECM). The study showed that bank assets, lending rate, real rate of interest and exchange rate has direct, significant but very low impact on manufacturing firms' productivity in Nigeria. Interest rate spread and financial deepening shows an indirect and significant impact on growth of manufacturing sector output in Nigeria. Ogar, Nkamare & Effiong (2014) examines the effect of commercial bank credit on manufacturing sector in Nigeria. Time series data obtained for the study were analysed with ordinary least square (OLS) of multiple regression model. The study shows that credit from commercial bank has significant relationship with manufacturing sector, indicating that credit from

commercial bank would improve economic growth, if made accessible to the manufacturing firms.

Aiyetan & Aremo (2015) examined the effect of financial sector development on output growth of manufacturing firms in Nigeria. Data from 1986 to 2012 were analysed by Vector Autoregression (VAR). Findings reveal that the manufacturing output growth in Nigeria is enhanced by relaxing financial development constraints and deepening the financial sector. Ojong, Anthony and Arikpo (2017) examined how financial deepening has impacted on manufacturing sector growth in Nigeria. The data from 1985 to 2014 were analysed with the aid of ordinary least square (OLS) multiple regression technique. Findings from the study shows that indirect and insignificant relationship exist between credit to private sector credit to gross domestic product and manufacturing sector contributions to gross domestic product in Nigeria. It was also found that there is a direct and insignificant relationship between broad money supply to gross domestic product, and the contribution of manufacturing sector to gross domestic product in Nigeria.

From the reviewed literature, some of the studies focused mainly on the relationship between financial deepening/financial development and growth of the economy in Nigeria (Ayila, Akighir & Iorember ,2014; Emeka & Aham ,2013; Garba ,2014; Nzotta & Okereke ,2009; Torruam, Chiawa & Abur, 2013), while some focused on the relationship between a particular dependent variable of financial deepening and manufacturing firms' productivity in Nigeria (Atoyebi, Ishola, Adekunjo, Kadiri & Ogundeji, 2013; Obamuyi, Edun & Kayode, 2012; Werigbelegha & Ogiriki ,2015), while some delved into the impact of the activities of banks on the manufacturing sector (Olanrewaju, Aremo & Aiyegbusi, 2015; Ogar, Nkamare & Effiong ,2014). None of these studies specifically researched into the link between financial deepening and the performance of the manufacturing sector in Nigeria. Literature on the impact of financial deepening on manufacturing sector's performance appeared to be very rare in the case of Nigeria.

Therefore, this study filled these gaps by focusing solely on the impact of financial deepening on the performance of manufacturing firms in Nigeria, thereby shifting attention from aggregate analysis (economic growth) to sectoral analysis (manufacturing sector). This becomes imperative since manufacturing sector is the basis for determining a nation's economic efficiency (Amakom, 2012).

## 2. METHODOLOGY

Annual time series data sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and National Bureau of Statistics (NBS) were employed for the study. Due to the linearity nature of the models formulated to examine the nexus between financial deepening and the performance of manufacturing firms in Nigeria, descriptive statistic,

cointegration, Autoregressive Distributed Lag (ARDL) estimation technique and the Mann-Whitney U test were employed in obtaining the numerical estimates of the coefficients in the models.

For the purpose of specifying the models to assess the impact of financial deepening on the performance of manufacturing sector output in Nigeria, the neoclassical production function was adopted. The neoclassical production function relates physical output of a production process to physical inputs or factors of production; labour, human capital and other forms of capitals such as credit. The theory propounded that the relationship between the capital and labour of an economy determines its output. It depicts that the consumer's income is equal to the firm's total output thus:

$$Y_t = f(K_t, A_t, L_t) \quad (1)$$

Where  $Y_t$  is the production output,  $K_t$  is the Capital Stock,  $L_t$  is Labour Supply and  $A_t$  include variables such as money supply, credit to private sector.

The model for the study is modified on the views of Olanrewaju *et al.* (2015) and Odior (2013). The model is specified hereunder in a long-run form as:

$$MFGI_t = \delta_0 + \delta_1 FDMS_t + \delta_2 FDPC_t + \delta_3 RCAP_t + \delta_4 RGCF_t + \delta_5 LQDR_t + \delta_6 INTR_t + \delta_7 GEXP_t + \mu_t \quad (2)$$

The short-run model transformation of equation (2) can thus be specified as:

$$\Delta MFGI_{t-i} = \delta_0 + \delta_1 \Delta FDMS_{t-i} + \delta_2 \Delta FDPC_{t-i} + \delta_3 \Delta RCAP_{t-i} + \delta_4 \Delta RGCF_{t-i} + \delta_5 \Delta RFDI_{t-i} + \delta_6 \Delta INFR_{t-i} + \delta_7 \Delta GEXP_{t-i} + \delta_8 \Delta \mu_{t-i} + \mu_t \quad (3)$$

Where:

MFGI = Index of manufacturing production (performance of the manufacturing sector)

FDMS = Ratio of broad money supply to gross domestic product (proxy of financial deepening for the economy)

FDPC = Ratio of private sector credit to gross domestic product (proxy of financial deepening for banking industry)

RCAP = Ratio of market capitalization to gross domestic product (proxy of financial deepening for capital market)

RGCF = Ratio of gross capital formation to gross domestic product

LQDR = Liquidity ratio for banks

INTR = Interest rate

GEXP = Growth in government expenditure

$U_t$  = Error term

$\delta_0$  = Intercept

$\delta_1, \delta_2, \delta_3, \delta_4, \delta_5, \delta_6, \delta_7$  = Coefficients to be estimated

The *a priori* expectation is that:  $\delta_1, \delta_2, \delta_3, \delta_4, \delta_7 > 0$  and  $\delta_5, \delta_6 < 0$ .

MFGI is the dependent variables while FDMS, FDPC, RCAP, RGCF, LQDR, INTR and GEXP are independent variables.



### 3. ANALYSIS AND RESULTS

The statistical properties of the variables were examined in this section to know the normality condition, the extent

of dispersion and the volatility, if present. The descriptive statistics are presented in Table 1.

**Table 1**  
**Descriptive Statistic**

	MFGI	RGCF	FDMS	FDPC	RCAP	LQDR	INTR	GEXP
Mean	107.4851	0.152378	14.45197	0.078411	0.076558	50.05121	13.77538	24.22970
Median	107.8000	0.132395	13.20472	0.056478	0.013429	46.80000	15.57837	19.24205
Maximum	182.7000	0.578197	23.88887	0.310354	0.307105	94.50000	29.80000	116.8357
Minimum	24.10000	0.000000	9.151675	0.000562	0.000328	29.10000	6.000000	-26.02529
Std. Dev.	40.81745	0.103112	3.831028	0.081523	0.103423	15.36055	6.418798	31.51605
Skewness	-0.434104	2.769159	0.750378	1.111862	1.050503	1.017320	0.361289	1.137583
Kurtosis	2.428696	11.17864	2.415004	3.351930	2.519341	3.824188	2.114371	4.160933
Jarque-Bera	2.115340	146.3448	6.161910	12.03841	6.967895	11.04364	3.048401	14.95117
Probability	0.347264	0.000000	0.045915	0.002432	0.030686	0.003999	0.217795	0.000567
Sum	5051.800	5.485592	823.7626	4.469430	2.756077	2752.817	771.4215	1332.633
	47	47	47	47	47	47	47	47

Source: Computed by the Authors using Data extracted from Central Bank of Nigeria (2016) Statistical Bulletin and National Bureau of Statistics (NBS) 2016.

From the results in Table 1, the Jarque-Berra statistics (JB) tests for the normality of the distribution with the null hypothesis tested normally distributed against the alternative tested not normally distributed. If the probability value as presented in Table 1 exceeds 5%, then the null hypothesis of normal distribution is accepted, otherwise the null hypothesis of normal distribution is rejected.

From the result of the JB probability, it can be concluded that index of manufacturing production (MFGI) and interest rate (INTR) are normally distributed as their respective probabilities are greater than 5% while the null hypothesis is rejected for ratio of broad money supply to gross domestic product (FDMS), growth in government expenditure (GEXP), ratio of private sector credit to gross domestic product (FDPC), ratio of market capitalization to gross domestic product (RCAP), and liquidity ratio

(LQDR) and ratio of gross capital formation to gross domestic product (RGCF) as their probabilities are less than 5%. The result from Table 1 suggests that the level of financial inclusion is relatively low; this is apparent as on average, ratio of broad money supply to GDP is 14.45%. Also, it is evident that all the variables are positively skewed during the study period except index of manufacturing production (MFGI).

The study deployed Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test to examine the stationarity of the time series and test the null hypothesis of unit root. It is expected that the series do not contain unit root in order to find relationship among the variables in the long run. The test is carried out at level, and first difference using 5% Mackinnon Critical value

**Table 2**  
**Augmented Dickey-Fuller (ADF) Unit Root Test Result**

Variable	Method	At Level			At First Difference			Order
		ADF Statistics	5% critical value	Prob.	ADF Statistics	5% critical value	Prob.	
MFGI	ADF	-2.198500	-2.926622	0.2096	-6.793935*	-2.928142	0.0000	I(1)
FDMS	ADF	-2.317158	-2.914517	0.1703	-7.688445*	-2.915522	0.0000	I(1)
FDPC	ADF	-0.275985	-2.914517	0.9215	-6.974634*	-2.915522	0.0000	I(1)
RCAP	ADF	-0.788764	-2.948404	0.8099	-6.040572*	-2.951125	0.0000	I(1)
RGCF	ADF	-6.306319*	-2.948404	0.0000	-	-	-	I(0)
LQDR	ADF	-2.860565	-2.916566	0.0568	-6.658032*	-2.917650	0.0000	I(1)
INTR	ADF	-1.425545	-2.916566	0.5631	-11.70125*	-2.916566	0.0000	I(1)
GEXP	ADF	-7.609129*	-2.916566	0.0000	-	-	-	I(0)

\* significant at 1%, \*\* significant at 5%

Source: Computed by the Authors using Data extracted from Central Bank of Nigeria (2016) Statistical Bulletin and National Bureau of Statistics (2016).

**Table 3**  
**Phillips-Perron (PP) Unit Root Test Result**

Variable	Method	At Level			At First Difference			Order
		PP test Statistics	5% critical value	Prob.	PP test Statistics	5% critical value	Prob.	
MFGI	PP	-2.210101	-2.926622	0.2056	-6.796913*	-2.928142	0.0000	I (1)
FDMS	PP	-2.375425	-2.914517	0.1532	-7.948464*	-2.915522	0.0000	I (1)
FDPC	PP	-0.057381	-2.914517	0.9486	-6.974572*	-2.915522	0.0000	I (1)
RCAP	PP	-0.417684	-2.948404	0.8952	-6.605220*	-2.951125	0.0000	I(0)
RGCF	PP	-6.308726	-2.948404	0.0000	-	-	-	I(0)
LQDR	PP	-3.009475**	-2.916566	0.0403	-	-	-	I (0)
INTR	PP	-1.889156	-2.915522	0.3349	-11.77226*	-2.916566	0.0000	I (1)
GEXP	PP	-7.609384*	-2.916566	0.0000	-	-	-	I (0)

\*significant at 1%, \*\*significant at 5%

Source: Computed by the Authors using Data extracted from Central Bank of Nigeria (2016) Statistical Bulletin and National Bureau of Statistics (2016).

From Tables 2 and 3, the ADF and PP reported that growth in government expenditure (GEXP) and ratio of gross capital formation to GDP (RGCF) were found to be stationary at levels as their ADF statistics were significant at 5% while index of manufacturing production (MFGI), ratio of broad money supply to GDP (FDMS), ratio of private sector credit to gross domestic product (FDPC), interest rate (INTR) were stationary at first difference. The ADF showed that ratio of market capitalization to gross domestic product (RCAP) is stationary at first difference while the PP result for ratio of market capitalization to gross domestic product (RCAP) is stationary at level. Also, the ADF results revealed that liquidity ratio (LQDR) is stationary at first difference while the PP result for liquidity ratio (LQDR) is stationary at level.

The ARDL bound test was carried out to test the long run co-movement among the economic variables. Before any useful conclusion could be made regarding relationships between the series, it is of importance that co-integration first exists.

From Table 3, some of the variables were stationary at level and some were stationary at first difference. Thus, the Bound cointegration was carried out with the results given in Table 4:

**Table 5**  
**ARDL Long and Short Run Result**  
Dependent Variable: MFGI

Long Run Estimates				Short Run Estimates			
Variable	Coefficient	t-stat	Prob	Variable	Coefficient	t-stat	Prob
FDMS <sub>t</sub>	0.269435*	3.237911	0.0039	$\Delta$ MFGI <sub>t-1</sub>	0.423522	2.001776	0.0504
FDPC <sub>t</sub>	-0.576185	-1.636172	0.1167	$\Delta$ FDMS <sub>t</sub>	-3.170625	-1.680181	0.1077
RCAP <sub>t</sub>	-0.507418	-3.210368	0.0051	$\Delta$ FDPC <sub>t</sub>	0.535845	1.642252	0.1154
RGCF <sub>t</sub>	-0.502288**	-2.222785	0.0373	$\Delta$ RCAP <sub>t</sub>	-0.680648	-1.458208	0.1596
LQDR <sub>t</sub>	0.218695	1.041437	0.3095	$\Delta$ RGCF <sub>t</sub>	-0.179950	-0.231878	0.8189
INTR <sub>p</sub>	0.137897*	6.282004	0.0000	$\Delta$ LQDR <sub>t</sub>	0.301801	1.000895	0.3283
GEXP <sub>t</sub>	0.046771	3.487486	0.0041	$\Delta$ INTR <sub>t</sub>	0.726723	4.469054	0.0002
C	0.525391**	2.013967	0.0570	$\Delta$ INTR <sub>t-1</sub>	-0.596377	-2.432582	0.0240
				$\Delta$ GEXP <sub>t</sub>	0.064544	2.921865	0.0187
				CointEq <sub>t-1</sub>	-0.380006	-5.280251	0.0000

\* Implies significant at 1%, \*\* Implies significant at 2%

Source: Computed by the Authors using Data extracted from Central Bank of Nigeria (2016) Statistical Bulletin and National Bureau of Statistics (2016).

**Table 4**  
**ARDL Bound Wald statistic Result**

LOS	I(0)	I(1)
10%	2.03	3.13
5%	2.32	3.5
2.5%	2.6	3.84
1%	2.96	4.26
F-Stat	3.536911	
D.F	7	

Source: Computed by the Authors using Data extracted from Central Bank of Nigeria (2016) Statistical Bulletin and National Bureau of Statistics (2016).

Table 4 shows that for the three equations estimated, computed F-statistics are greater than the 5% upper bound, it is conclude that the variables are I(1) as in 3.54 > 3.5. Hence, the variables are cointegrated.

In order to examine this objective, an ARDL estimation technique was employed to conduct an empirical analysis. This estimation technique was employed owing to the fact that some of the variables in the model are stationary at levels and some were stationary at first difference.

**Table 6**  
**Statistical Properties and Post Diagnostic Results**

Statistical properties of results		Post diagnostic tests result	
R-squared	0.863	BPG Heteroskedasticity (F-Stat)	0.6076
Adj R-squared	0.778	BPG Heteroskedasticity Prob. F(13,21)	0.8214
F-statistic	10.173	B-G Serial Correlation LM (F-Stat)	0.9985
Prob(F-statistic)	0.0000	B-G Serial Correlation LM Prob. F(2,19)	0.3869
Durbin-Watson Stat	2.275	Ramsey RESET (F-Stat)	1.4843
Akaike Info Criterion:		Ramsey RESET Prob	0.2373
Model Selection	8.20	Jarque-Bera Statistics	0.2529
ARDL Best Model	(1,0,0,0,2,0,1,0)	Jarque-Bera Prob	0.8812

Source: Computed by the Authors using Data extracted from Central Bank of Nigeria (2016) Statistical Bulletin and National Bureau of Statistics (2016).

The result of the Autoregressive Distributed Lag Model (ARDL) revealed that a unit increase in the ratio of money supply to gross domestic product will induce 0.269 unit increase in index of manufacturing production in the long-run while a unit change in the ratio of money supply to gross domestic product will induce 3.171 decrease in index of manufacturing production in the short-run. This connotes direct and significant impact of the ratio of broad money supply to gross domestic product on index of manufacturing production on the long-run and, indirect and insignificant impact on the index of manufacturing production. The result implies that available money in circulation arouse manufacturing production. With the positive impact, monetary policy will become effective on manufacturing production. The short-run result is in line with the findings of Olanrewaju *et al* (2015) that an indirect relationship exists between ratio of money supply to gross domestic product and the index of manufacturing production.

The ratio of credit to private sector to gross domestic product being an indicator of financial deepening in the banking sector, shows that in the long-run, a unit increase in ratio of credit to private sector to gross domestic product will lead to 0.576 unit decrease in index of manufacturing production in the long-run while a unit change in ratio of credit to private sector to gross domestic product will lead to 0.536. This implies that on the long-run, ratio of credit to private sector to gross domestic product has indirect and insignificant impact on index of manufacturing production while there is direct and insignificant relationship in the short-run. The implication of this is that credit to private sector has not been significantly effective on improving manufacturing production and hence, it does not conform with the *a priori* expectation. The likely reason for this may be that a larger chunk of loans from financial institutions go to the service sector with a small portion going to the manufacturing sub-sector.

The ratio of market capitalization to gross domestic product statistically shows that a unit increase in market capitalization will stimulate 0.507 unit decrease in index of manufacturing production in the long-run while a unit increase in ratio of market capitalization to gross domestic product will stimulate 0.681 unit decrease in

index of manufacturing production. This predicts indirect and significant impact on the index of manufacturing production in the long-run while in the short-run, there is indirect and insignificant impact on the index of manufacturing production. The implication of this result is that the aggregate valuation on current share price and total number of outstanding stocks of listed companies have not affected manufacturing sector performance positively. This result contradicts the findings of Werigbelegha and Ogiriki (2015).

Furthermore, a unit increase in ratio of gross capital formation to gross domestic product will lead to 0.502 unit decrease in index of manufacturing production in the long-run and a unit increase in gross capital formation will lead to 0.18 unit decrease in index manufacturing production in the short-run. This implies that ratio of gross capital formation to gross domestic product has an indirect impact on index of manufacturing production both the long run and short run. Ratio of gross capital formation to gross domestic product proved statistically significant to the model in the long-run and insignificant in the short-run. The result also shows that both in the long run, a unit increase in banks' liquidity ratio will lead to 0.219 unit increase in index of manufacturing production and a unit change in banks' liquidity ratio will lead to 0.302 unit increase in index of manufacturing production in the short-run. Banks' liquidity ratio statistically showed a direct and insignificant impact on index of manufacturing production in both long-run and short-run. The implication of this is that banks' liquidity ratio has no adverse effect on the performance of manufacturing sector, though it proved statistically insignificant to the model.

In the long-run, a unit increase in interest rate will induce 0.138 unit increase in index of manufacturing production while a unit increase in interest rate will induce 0.596 unit decrease in the past year and 0.727 unit increase in the present year respectively. Thus, interest rate has direct and significant impact on index of manufacturing production in the long-run. Also, in the short run, the result reveals that there is an indirect and significant impact of interest rate on index of manufacturing production in the previous year and a direct and significant impact in the current year.

The result conforms to the *a priori* expectation in the short run but not in the long run, indicating that the manufacturers respond to short term loans while in the long term, it is believed that irrespective of the rate, they will break even and hence, they can acquire the loan even at increased rate of interest. It is expected that increase in the interest rate should affect the performance of sector adversely but findings from the study reveals that the interest rate has a direct impact on the output of manufacturing sector in the long run and in the short-run current year.

The ARDL result further shows that a unit increase in government expenditure will lead to 0.047 unit increase in index of manufacturing production in the long-run while the short run results show that a unit increase in government expenditure will lead to 0.065 unit increase in index of manufacturing production. Government expenditure has direct and significant impact on index of manufacturing production in both the short-run and long run. The reason may be that the funds expended on infrastructures and funds released by the federal government on improving the sub-sector via subsidy and palliatives yielded positive results on the performance of manufacturing firms.

It is also important to examine the statistical properties of our estimated result from Table 6, it is evident that the R-squared value of 0.863 indicates that about 86.3% variation in index of manufacturing Production is explained in the model by the explanatory variables. The F-statistics of 10.173 is statistically significant and this shows that there is a considerable harmony between index of manufacturing production and the explanatory variables put together. This confirms that all the independent variables jointly have significant influence on the dependent variable. The Durbin-Watson statistic of 2.275 indicates that there is no serial correlation associated with the regression result as this is in palace with the number two as a benchmark.

Also, from Table 6, it is evident that the Breusch-Pagan-Godfrey (BPG) tests for the presence of heteroskedasticity in a regression result; the BPG tests the null hypothesis of no heteroskedasticity against the alternative hypothesis heteroskedasticity. The BPG probability value was greater than 5% implying there is no presence of heteroskedasticity in the regression result. The B-G Serial Correlation Lagranger Multiplier (LM) test is used to test for higher order Autoregressive Moving Average (ARMA) errors and is applicable whether or not there is lagged dependent variable(s).

The B-G tests the null hypothesis of no serial correlation against the alternative hypothesis of serial correlation. The result of the B-G Serial Correlation LM probability was 0.3869 and this greater than 5%, hence we fail to reject the null hypothesis of no serial correlation implying that the model has no higher order correlation. In the model, the error correction term (CointEq<sub>t-1</sub>) is well specified and correctly signed. The CointEq<sub>t-1</sub> indicates how quickly or slowly variables return to the equilibrium. The coefficient of the CointEq<sub>t-1</sub> is approximately -0.38. It therefore means that about 38percent departure from long run equilibrium is corrected in the short run and incorporated into the long run relationship. The speed of adjustment of 0.38 denotes that 38% percent of any past deviation will be corrected in the current period. The negative sign in the CointEq<sub>t-1</sub> confirms the existence of co-integrating relationship. Hence, about 38% of the variations in the short run converge.

In examining the specification of our model, the Ramsey (Regression Specification Error Test) RESET was used to examine the stability of the ARDL model. The Ramsey RESET tests for specification error in terms of omitted variables, incorrect functional form and correlation between the explanatory variables and the error term. The Ramsey RESET tests the null hypothesis of unbiasedness and consistency which produces a zero mean vector for against the alternative of specification error. The result revealed that the probability is greater than 5% thereby failing to reject the null hypothesis; this implies that the model is free from specification error.

The Jarque-Bera statistics test for the normality distribution of the equation, against the alternative hypothesis. The probability of the Jarque-Bera test concludes that the equation is normally distributed as the probability value is greater than 5%.

To test the null hypothesis that there is no significant difference in the impact of financial deepening on the performance of the manufacturing sector in the pre and post financial reform periods in Nigeria. Before the difference is examined, the normality test was conducted using the One-sample Kolmogorov-Smimov test as presented below in Table 7 below:

### 3.1 Test for Normality using One-Sample Kolmogorov-Smimov

Table 7 presents the One-Sample Kolmogorov-Smirnov test of the distribution of the impact of financial deepening on manufacturing production index in the pre-financial reform and post- financial reform periods.

**Table 7**  
**One-Sample Kolmogorov-Smirnov Test**

Performance of the manufacturing sector	Absolute	Positive	Negative	Kolmogorov-Smirnov Z	Asymp. Sig. (2-tailed)	Decision
Manufacturing production index	0.649	0.000	-0.649	2.109	0.000	Reject H <sub>0</sub> , it is not normally distributed

Source: SPSS 20.0 Computation



Normality assumption is assumed if the significance level is greater than 0.05. The result as shown in Table 7 indicates that the significant level is less than 0.05 implying that the data set does differ significantly from the normal distribution and therefore the violation of the normality assumption. In this instance, the non-parametric

statistical mean should be considered as the best possible option (Mordkof, 2016). Consequently, the Mann-Whitney test, an equivalent non-parametric test for the independent t-test was used to determine whether the mean difference was significant at the 5% level as shown in Table 8.

**Table 8**  
**Summary of Mann-Whitney U Test Result**

Measurement of Manufacturing Performance	Reform Period	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Prob.
Index of Manufacturing Production (MFGI)	Pre-Financial Sector Reform Period	16	11.63	186.00	50.000	186.000	-4.445	0.000
	Post-Financial Sector Reform Period	31	30.39	942.00				

Source: SPSS 20.0 Computation

From the above result of the Mann-Whitney U Test on Table 8, the asymptotic significance here is less than 5%. Hence, there is a significant difference in the impact of financial deepening on manufacturing production index during the pre-financial reform period and post-financial reform period ( $0.000 < 0.05$ ). The sum of rank for the pre-financial reform period for manufacturing production index is 186.00 while the sum of rank for the post-financial reform period is 942.00. The implication of this result is that the impact of financial deepening on the manufacturing sector performance was more felt during the post-financial reform period.

#### 4. CONCLUSION AND RECOMMENDATIONS

The study found that financial deepening in the economy, measured by ratio of broad money supply to gross domestic product, has direct and significant impact on the index of manufacturing production on the long-run and indirect and insignificant impact on the short-run. Hence, it is concluded that financial deepening in the economy positively impacted on the performance of manufacturing sector in Nigeria majorly in long-run. Financial deepening in the banking sector measured by ratio of credit to private sector to gross domestic product has indirect and insignificant impact on the index of manufacturing production in the long-run and direct and insignificant impact in the short-run. It is therefore concluded that credit to private sector has not impacted significantly on the performance of the manufacturing sector in Nigeria.

Also, financial deepening in the capital market measured by stock market capitalization showed indirect and significance impact on the index of manufacturing production in the long-run and indirect and insignificance impact in the short-run, affirming that stock market in Nigeria has failed to influence the performance of the manufacturing sub-sector positively. Thus, it is concluded that the study discovered contrasting relationships between variables of financial deepening and manufacturing sector output. The study also indicated that

capital accumulation overtime has not impacted directly on the output of manufacturing sector and that expenditure of government has impacted directly on manufacturing firms' performance while positive impact of banks' liquidity ratio is not pronounced. Also, the study revealed that financial deepening during the post-financial reforms period impacted better on manufacturing output than it did in the pre-financial reforms period.

There is therefore the need for the government to launch new financial reforms capable of enhancing the accessibility of manufacturing sector to credit and ensure adequate monitoring and implementation of the existing policies on financial reforms in Nigeria with a view to deepening the Nigerian financial system and thereby promoting manufacturing firms' performance in Nigeria. Also, government, through the financial regulatory authorities should monitor the allocation of credit to the manufacturing sector and ensure that such credits are used for productive purposes. In addition, the stringent conditions required for listing on the Nigerian Stock Exchange should be reviewed and relaxed to allow for participation of more manufacturing firms on the stock market and thereby giving them more ample opportunities to raise more funds to enhance their output.

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