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Financial Deepening and Performance of Manufacturing Firms in Nigeria

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Abstract: *Manufacturing sector is expected to be the engine for growth and development in any economy. The sector has continued to face several challenges hindering its optimal performance in Nigeria. In an attempt to revitalize the sector to play the expected roles, there have been concerted efforts by successive governments in Nigeria to deepen the financial system through the implementations of several financial reforms. Despite these efforts, it seems that the manufacturing firms in Nigeria have not achieved the desired level of performance. Based on the foregoing, this study investigated the effect of financial deepening on manufacturing firms' performance in Nigeria. The data from 1986 to 2017, used for the study, were sourced from the publications of the Central Bank of Nigeria, National Bureau of Statistics and World Economic Indicators. Autoregressive Distributed Lag model was used to produce the parameter estimates. Also, Toda-Yamamoto causality procedure was applied to examine the causation among the variables. Further, the validity of the results was examined using Breusch-Pagan-Godfrey test. The findings reveal that financial deepening has a significantly positive effect on the average capacity utilization of manufacturing firmsin Nigeria. Further, the findings show a unidirectional causality from financial deepening to average capacity utilization of manufacturing sector in Nigeria. The major implication of the findings is that financial deepening has significant effect on manufacturing sector performance in Nigeria. It is therefore recommended among others that government should promote financial deepening strategies that increase capital expenditure, relax capital market entry requirements and allow institutional interest rate to operate at equilibrium level to encourage credit to the private sector, thereby enhancing manufacturing sector performance in Nigeria.*

Keywords: *Manufacturing Sector, Financial Deepening, Average Capacity Utilization and Credits to the Private Sector*

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I. Introduction

Financial system has always played an important role in supporting economic programs and activities. Sanusi (2010), observed that a well-functioning financial system is able to mobilize household savings, allocate resources optimally, efficiently diversify risk, enhance the flow of liquidity, reduce information asymmetry and transaction cost. These functions therefore, suggest that financial system is expected to play a crucial role in promoting manufacturing sector performance,economic growth and development.

The contribution of the financial system towards the growth of the manufacturing sector is mainly credited to the role it plays in savings mobilization and allocation of resources from the surplus to the deficit sectors of the economy (Nwakoby&Ananwude, 2016).Significant roles in intermediation are expected to be carried out by the banking sector and the capital market. As such, there is always the need to reposition them for efficient and effective performance through regular reform process geared towards deepening the financial system to forestall financial crisis and distress (Uduak&Ubong, 2015). It is generally agreed in theoretical literature that intensification of financial institutions and instruments through reforms would greatly reduce transaction and information costs in an economy with a multiplier effect on savings rate, investment decision and technological innovative enterprises (Nwakoby&Ananwude, 2016).

According to Ezu, Okoh and Okoye (2017), the high rate of growth and stability obtainable in developed nations can be attributed to the reforms undertaken in their financial system overtime. Nigerian government has embarked on various reforms geared toward deepening the financial system to make the banks and the capital markets to be among global players in the international financial markets.

Financial deepening are productsof restructuring, innovations and reorganization embarked upon by financial regulatory bodies to develop the financial system, which enables the economic sectors to expand, become buoyant and competitive (Ojo, 2010). Hence, it is therefore expected to enhance manufacturing firm productivity, sustainable economic growth and development.

Mckinnon(1973), in his book on "money, capital and economic development," proposed the theory of financial repression and financial deepening to study the relationship between the financial system and economic growth. According to him, financial repression is the imposition of controls on financial structure and developmentMackinnon (1973) and Shaw (1973), produced a theoretical basis to show how some financial controls that produce financial repression effect could make the financial sector stifle a country's development instead of promoting it. The studies show that a sound and well-deepened financial system produces effective intermediation process which can promote economic growth and development.

It is disturbing to note that despite the various financial deepening strategies utilized in Nigeria, industries are closing down and many small scale firms have closed up shop. The performance of the manufacturing sector has been declining, with Nigeria importing almost every vital household needs. Specifically, between 2000 and 2017, over 900 manufacturing industries either shut down or temporarily halted production while the average capacity utilization in the manufacturing sector fell from about 79% in 1979 to about 56% in 2010, and to 54.5% in 2017 (The Finder, 2018).

As a result of the foregoing, it should be obvious that an endgame of some sort is here with us, except the manufacturing sector performance is greatly enhanced. The situation has caused massive job lost, fueling the already high unemployment rate in Nigeria. Therefore, it is therefore necessary to investigate if financial deepening has impacted on the performance of manufacturing firms in Nigeria, especially at this critical period when the Government is making frantic efforts to reposition the financial system and diversify the economy forsignificant growth.

The vast majority of literature on financial deepening in Nigeria focused on its effect on economic growth. Many of the available few studies on financial deepening and manufacturing firm performance in Nigeria, proxy financial deepening with monetization ratio and bank-based measures only (Olanrewaju, Aremo&Aiyegbusi, 2015; Luqman, 2014; Sulaiman&Azziz, 2012; Nzotta&Okereke, 2009, and Agu&Chukwu, 2008). The capital market-based measures were rarely applied on manufacturing sector performance in the Nigerian context.However, Hazinga (2012), Ibenta (2005), Ojo (2005) and Okaro (2002), emphasized the significant roles of capital market in financing long-term productivity for growth and development. Manufacturing sector requires and thrive better with long-term financing usually sourced from the capital market. Hence, to the best of knowledge, this study is a pioneering effort in combining the two strands of intermediation ratio (bank and capital market based indicators) and monetization ratio to measure the effect of financial deepening on manufacturing sector performance using ARDL analytical technique in Nigeria.

The very few that applied capital market indicators either studied financial deepening and economic growth or used static model analytical techniques. The use of static models, which allowed for only a contemporaneous relationship between variables, so that a change in one or more of the explanatory variables at time t causes an instant change in the dependent variable at time t, may not be appropriate for financial deepening. Therefore, dynamic models, where the current value of dependent variable depends on its previous values, or on previous and current values of one or more of the explanatory variables, should be formulated for financial deepening and manufacturing sector performance relationship. Therefore, ARDL analytical approach is employed for this study. According to Pesaran, Shin and Smith (2001), the ARDL approach has the ability to capture dynamic adjustment from initial equilibrium to a new equilibrium, while estimating the short run and long run relationship among the variables in the model. Besides, the technique has the capacity to correct the endogenueity problem among time series data.

Objectives of the study

The broad objective of this study is to examine the effect of financial deepening on the performance of manufacturing firms in Nigeria. The specific objectives are to;

- Investigate the existence of long run relationship among broad money supply, private sector credit, market capitalization and manufacturing sector capacity utilization in Nigeria
- Determine the effects of broad money supply, private sector credit and market capitalization on the average capacity utilization of the manufacturing sector in Nigeria.
- Ascertain the causal link among broad money supply, private sector credit, market capitalization and manufacturing sector capacity utilization in Nigeria

II. Literature Review

Conceptual Issues

Financial deepening is an increase in the provision of financial resources with a wider choice of services geared to all levels of society (Ohwofasa&Aiyedogbon, 2013). It also refers to the multiplier effects of financial reforms on the larger economy. Financial deepening generally means an increased ratio of money supply to Gross Domestic Product (GDP), enhanced with credit facility to the private sector and enlarged capital market depth to stimulate capital formation. It refers to liquid money; the more liquid money is available in an

economy, the more opportunities exist to enhance manufacturing sector productivity and continued economic growth (Ojo, 2010).

Conceptually, financial deepening is often understood to mean that; sectors and agents are able to use a range of financial markets and products for savings and investment decisions, including at long maturities. Financial intermediaries and markets are able to deploy larger volumes of capital and handle larger turnover, without necessitating large corresponding changes in asset prices, and the financial system can create a broad range of assets for risk-sharing purposes (diversification or hedging). In other words, deep markets allow savers to invest in a broad range of quality investment and risk- sharing instruments and also allow borrowers to likewise tap a broad range of financing and risk management instruments (Goswami& Sharma, 2011).

Financial deepening is usually measured by two basic quantitative indicators; 'monetization ratio' and 'intermediation ratio'. **Monetization ratio** includes money-based indicators such as the ratio of broad money supply to GDP (M_2/GDP), while **intermediation ratio** consists of**bank-based** *measures* like bank credit to the private sector (CPS/GDP) and ***capital market-based measures*** such as stock market capitalization (Ojo, 2010; Ndebbio, 2004).

Empirical Evidences

Several studies with mixed results have been conducted across countries to establish the relationship between financial deepening, manufacturing sector performance and growth. Some of the studies used developing and developed countries data sets. Some others adopted sub-regional African approach. Findings produced mixed conclusions depending on data and the financial deepening indicators adopted.

In a study on the cycles of financial expansion and contraction and their impact on real economy using Data Envelopment Analytical technique, Aizenman, Pinto and Sushko (2013) selected eight real economic sectors fundamentals in twenty-eight countries from 1960 to 2005. Their findings show that after periods of accelerated growth, there is the tendency for financial contractions to follow thereafter.

Mert and Serap (2017) investigated the causality between financial development and firm growth in Turkish manufacturing industry from 1989 to 2010. Adopting a non-causality method proposed by Dumitrescu and Hurlin for the study which considered heterogeneity and cross-sectional- dependence, showed that the supply-leading hypothesis holds for majority of the subsectors. The study noted that the result was robust across the subsectors irrespective of the financial development proxy adopted. In addition, the study showed that firm growth is not uniform across subsectors in Turkey.

Nwanna and Chinwudu (2016) investigated financial deepening and economic growth nexus in Nigeria from 1985 to 2014. The study focused on the impact of stock market and bank based financial deepening proxies; such as money supply, market capitalization, private sector credit and financial savings, on economic growth in Nigeria. The study was anchored on the supply leading hypothesis, using the Ordinary Least Square (OLS) analytical technique. The findings show that both bank based and stock market based financial deepening variables have significant and positive effect on economic growth in Nigeria. The implication of their findings is that banks and stock markets have important roles in stimulating economic growth in Nigeria.

Campbell and Asaleye (2016) investigated the effect of financial reforms on output growth of the manufacturing sector in Nigeria. The study focused on the effectiveness of financial reforms in promoting manufacturing sector productivity during the pre and post reform periods in Nigeria. Descriptive statistics and vector error correction mechanism analytical technics were employed, and the results showed that financial sector performed better in the post reform period compared to the pre-reform era. Surprisingly, the growth of manufacturing output was not impressive in the post-reform period, and also the correlation coefficient of financial indicators was low during the period. The implication of the finding is that the development of manufacturing sector under financial reforms in Nigeria has not been impressive. The study concluded that the increased gross domestic product experienced in Nigeria during the period does not contribute significantly to the manufacturing sector to the point of inducing development of the sector. Hence, the study emphasized the need to properly review the financial reforms recently introduced so that it can enhance output growth of the manufacturing sector.

Olanrewaju, Aremo and Aiyegbusi (2015) investigated the effect of banking sector reforms on the output of manufacturing sector in Nigeria between 1970 and 2011. Their findings shows that the effects of Bank assets, Lending rate, Exchange rate and Real rate of interest on manufacturing output were positive and significant but with low impact. It was also found that the financial deepening and interest rate spread negatively and significantly affected the output growth of manufacturing sector in Nigeria. They concluded that the effects of banking sector reforms on the output growth of manufacturing sector were significantly low in Nigeria. However, theirfindings indicated that the effect of the various banking reforms could vary widely on the Nigerian economy depending on the time lags involved.

The effect of financial sector reforms on the growth of manufacturing sector in Nigeria was studied by Dada (2015). He selected a sample of manufacturing output and financial sector variables; credit to

manufacturing sector, real rate of interest to manufacturing sector, market capitalization to manufacturing sector and total deposit to manufacturing sector to examine the effect of financial sector reform on manufacturing sector development. The study, covered the period 2001- 2011, using co-integration and Granger causality techniques to establish the relationship between the two phenomena. The study found that financial reforms have direct effects on the growth of the manufacturing sector in Nigeria. The study emphasized the need for government to create a conducive and an enabling environment through improved infrastructures and security as well as formulating and implementing policies that will protect local industries so as to promote growth and development of the manufacturing sector in Nigeria.

Ogunsakin (2014) investigated the impact of financial sector reforms on the performance of manufacturing sector in Nigeria, employing the multivariate co-integration technique as developed by Johansen and Juselius (1990). Having established the co-integration of the included variables, the findings further revealed that financial sector reforms in Nigeria did not have significant impact on manufacturing performance in Nigeria during the period of study. The study posited that government should establish appropriate policies that will stimulate increase availability and efficient allocation of credit to the private sector.

Atoyebi, Okafor and Falana (2014) examined the global financial meltdown and its effect on manufacturing sector in Nigeria. The study focused on the influence of global financial recession onmanufacturing sector in Nigeria. The study found that financial crisis would cause commodity prices to fall, decline in export, and lower portfolio.

Ogar, Nkamare and Effiong (2014) investigated how commercial bank credit can influence manufacturing sector output in Nigeria. They used time series data analysed with Ordinary least square of multiple regression model to establish the relationship between dependent variable and independent variables. The study shows that commercial bank credit, if well channelled to the worthy customers and sectors will enhance productivity and economic growth in Nigeria. That is, commercial bank credit had a significant effect on manufacturing sector output. .

Ayila, Akighirand Iorember (2014) examined the cause and effect relationship between financial deepening and economic growth in Nigeria for 32 years with a five-variable multivariate model, using Autoregressive Distributed Lag (ARDL) technique. Their finding reveals a unique co-integrating relationship among economic growth, financial deepening index of market capitalization, openness and interest rate. Further, the bound testing cumulative sum of square recursive residuals results suggested that financial deepening has a positive and significant effect on economic growth in the long-run.

Odior (2013) investigated the impact of macroeconomic factors on manufacturing productivity in Nigeria over the period of 37 years from 1975 to 2011. The result revealed the presence of a long-term equilibrium relationship, as evidenced by the co-integrating equation of the VECM and concludes that credit to the manufacturing sector in the form of loans and advances and foreign direct investment have the capacity to significantly increase the level of manufacturing productivity, while broad money supply has less impact in Nigeria.

Torruam, Chiawa, and Abur (2013) studied the impact of financial deepening on economic growth their causal relationship in Nigeria for the period of 22years. Their finding revealed the existence of a unidirectional causality between economic growth and financial deepening in Nigeria and concluded that financial deepening has positive impact on economic growth. Their result implies that developing the financial sector improves financial structures and ensures efficient delivery of financial services to the private sector to invest and attract more private sector participation for increase output in Nigeria.

Maxwell and Oluwatosin (2012) examined the influence of financial deepening on manufacturing output in Nigeria from 1970 to 2010. The study employed vector autoregression technique to analyze banking annual data obtained from Central Bank of Nigeria statistical bulletin and annual reports. The results showed that coefficients of financial deepening indicators utilized do not exert significant effect on manufacturing output in Nigeria. The study also revealed that the impact of non-oil trade balance on the manufacturing output is not significant. According to the study, the finding could be due to the weak capacity of Nigerian manufacturing firms to compete effectively in the international market. Thus, it was recommended that policy action should focus on innovative and productive enhancing reform that will be better directed towards meeting the needs of the manufacturing sector in Nigeria.

Onwumere, Ibe, Ozoh and Mounanu (2012) investigated the impact of financial deepening on economic growth in Nigeria for a period from 1992 to 2008. They adopted the supply-leading hypothesis using variables such as broad money velocity, market capitalization, money stock diversification, economic volatility and market liquidity as proxies for financial deepening and gross domestic product growth rate for economic growth. Their finding showed that broad money velocity and market liquidity enhance economic growth in Nigeria, while money stock diversification, economic volatility and market capitalization did not within the period studied.

Obamuyi, Edun and Kayode (2012) examined the effect of bank lending and economic growth on manufacturing output in Nigeria using a time series data covering a period of 36 years from 1973 to 2009. Their findings revealed that manufacturing capacity utilization and bank lending rates significantly affect manufacturing output in Nigeria.

Nzotta and Okereke (2009) studied the relationship between financial deepening and economic development in Nigeria from 1986 to 2007. They considered a high level of financial deepening a necessary condition for accelerating growth in an economy because of the central role of financial system in mobilizing savings and allocating same for development process. Further, they found that financial deepening index is low in Nigeria over the study period, and that the nine explanatory variables utilizedare useful and have statistical relationship with financial deepening. They also found that four of the variables used in the study; lending rates, financial savings ratio, ratio of cheque to GDP and the ratio of deposit money banks to GDP have significant relationship with financial deepening.

III. Data and Methodology

The study used time series data on manufacturing sub-sector, and financial deepening from 1986 to 2017, obtained from the publications of the National Bureau of Statistic (NBS), Central Bank of Nigeria, World Development Indicators and Nigerian Stock Exchange Fact-book.

To ensure robustness of the estimation, Auto-Regressive Distributed Lag (ARDL) model framework analytical technique is employed. Besides, controlled variables are included to produce a well-specified model. According to Gujarati (2006), the best approach in model specification is to include explanatory variables that on theoretical grounds, directly influence the dependent variables and that are not accounted for by other included variables. Therefore, the choice of the controlled variables included in the estimation was based on theories and Nigerian specific dynamics, availability of data and as indicated by the literature, especially from Agu and Chukwu (2008), Rasheed (2010), Odior (2013), Nguena and Abimbola (2013), Imoughle and Ismaila (2014), Olanrewaju, Aremo and Aiyegbusi (2015), Karimo and Ogbonna (2016), Nwanna and Chinwudu (2016) models.

Model Specification

In line with the objectives of the study the equation is specifiedas follows;

$CTSA = f(FDMS, FDPC, RCAP, RGCF, RFDI, INFR, INTR, EXCR, GEXP)$ ... (1)

The ARDL model is specified as:

$$CTSA_t = \alpha_0 + \alpha_1 FDMS_t + \alpha_2 FDPC_t + \alpha_3 RCAP_t + \alpha_4 RGCF_t + \alpha_5 RFDI_t + \alpha_6 INFR_t + \alpha_7 INTR_t + \alpha_8 EXCR_t + \alpha_9 GEXP_t + \beta_1 CTSAt_{-1} + \beta_2 FDMS_{t-1} + \beta_3 FDPC_{t-1} + \beta_4 RCAP_{t-1} + \beta_5 RGCF_{t-1} + \beta_6 RFDI_{t-1} + \beta_7 INFR_{t-1} + \beta_8 INTR_{t-1} + \beta EXCR_{t-1} + \beta_{10} GEXP_{t-1} + \epsilon_{t-1} + \mu_t \quad \ldots\ldots\ldots (2)$$

Where:

CTSA= Average capacity utilization of manufacturing sector (proxy for manufacturing sector performance).

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

FDPC= Ratio of private sector credit to Gross domestic product (proxy for bank based financial deepening)

RCAP= Ratio of market capitalization to GDP (proxy for capital market based financial deepening)

RGCF= Ratio of Gross capital formation to Gross domestic product (proxy for capital stock)

RFDI= Ratio of foreign direct investment to Gross domestic product

INFR= Inflation rate

INTR = Interest rate

EXCR = Exchange rate

GEXP = Growth in government expenditure

ϵ_t= Error term

α_0 = Intercept

t-1= lag of the explanatory variables

$\alpha_1, -\alpha_9$and $\beta_1 - \beta_{10}$=Coefficients to be estimated (partial regression coefficients)

***A priori*expectations**

A priori expectation is the anticipated relationship between dependent variable and independent variables in a model as established by theory. All the variables are expected to be positively related to manufacturing sector capacity utilizationexcept inflation rate and interest rate where inverse relationships are expected.

Therefore, with the use of *a priori* expectations, a one-tail test is the most appropriate (Gujarati, 2006, Brooks, 2000). As such, a one tail-test using 5 percent level of significance is applied for this study. Estimate with a probability greater than 0.05 is considered insignificant, while with a probability of less than 0.05 is

significant. Ramsey-Reset specification error test was used to examine the stability of the ARDL model.Finally, Toda-Yamamoto causality test procedure was employed to establish the causal link between financial deepening and manufacturing sector performance in Nigeria.

Test of Model Adequacy

According to Gujarati (2006), hypothesis testing presumes that the model employed for empirical analysis is adequate in the sense that it does not violate the assumptions underlying the classical normal linear regression model. Therefore, test of model adequacy is necessary for test of hypothesis. If the models are deemed practically adequate, they could be used for forecasting purposes.

For the purpose of this study, Durbin-Watson test for serial correlation, Breusch-Pagan-Godfrey (BPG) test for heteroscedasticity, Breusch-Godfrey (BG) serial correlation Lagranger Multiplier (LM) test for higher order Autoregressive Moving Average (ARMA) errors, Ramsey-Regression specification Error Test and Jarque-Bera test for normal distribution are employed

IV. Analysis and Findings

Unit Root Test

The study applied Augmented Dickey-Fuller (ADF) test to examine the stationary 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 long run relationship among the variables. The test is carried out using 5% Mackinnon Critical value. The results are presented in table1.

Table 1 : Augmented Dickey-Fuller (ADF) Unit Root Test Result

		At Level			At First Difference			
Variable	**Method**	**ADF statistics**	**5% critical value**	**Prob**	**ADF statistics**	**5% C.Value**	**Prob**	**Order of integration**
CTSA	ADF	-1.124376	-2.960411	0.6933	-3.395503	-2.963972	0.0192	I (1)
EXCR	ADF	1.779038	-2.960411	0.9995	-3.151292	-2.963972	0.0333	I (1)
FDMS	ADF	-0.466101	-2.960411	0.8849	-4.889081	-2.963972	0.0004	I (1)
GEP	ADF	-0.277565	-2.986225	0.9152	-3.062119	-2.986225	0.0428	I (1)
INFR	ADF	-3.562543	-2.991878	0.0148	-	-	-	I (0)
INTR	ADF	-4.631820	-2.960411	0.0008	-	-	-	I (0)
FDPC	ADF	2.918922	-2.960411	1.0000	-3.467470	-2.963972	0.0162	I (1)
RCAP	ADF	-0.658500	-2.960411	0.8427	-5.690353	-2.963972	0.0001	I (1)
RFDI	ADF	-3.295890	-2.960411	0.0238	-	-	-	I (0)
RGCF	ADF	-1.625888	-2.960411	0.4578	-5.799929	-2.967769	0.0000	I (1)

Source: E-view 5.0 version output data

From tables 1, the ADF unit root test reported Interest rate (INTR) and Ratio of foreign direct investment (RFDI) as stationary at levels as their ADF test statistics are significant at 5% levels. This implies that the variables are integrated of order zero at 5% significant level. The test reported other variables as stationary at first difference. This implies that they are integrated of order one at 5% significant level. This finding implies that while some of the series are stationary at levels, others contain unit root but became stationary after first differencing

ARDL Bounds Test for Co-Integration

With the scenario in table 1 where, some of the variables are stationary at level and others are stationary at first difference, there is a practical difficulty that has to be addressed when we conduct F-test, because exact critical values for the F-test are not available for an arbitrarily mix of I(0) and I(1) variables. However, Peseran et al. (2001) prescribes a technique to investigate the appropriate order in which the variables are co-integrated. They supplied bound for the critical value for the asymptotic distribution of the F-statistic. For various situation (e.g. different numbers of variables, (k+1)), they give lower and upper bound on the critical values. In each case, the lower bound is based on the assumption that all the variables are I(0), and the upper bound is based on the assumption that all the variables are I(1). If the computed F-statistic falls below the lower bound we would conclude that the variables are I(0), so no co integration is possible, by definition. If the F-statistics exceeds the upper bound, we conclude that we have co-integration. Finally, if the test statistic falls between the bounds, the test is inconclusive. The result of the test is presented in table 2.

Table 2.: ARDL Bounds Result

LOS	I(0)	I(1)
10%	1.88	2.99
5%	2.14	3.30
2.5%	2.37	3.60
1%	2.65	3.97
F-Stat	73.31909	
D.F	9	

Source: E-view 9.0 version output data

Table 2 shows that for the equation estimated, computed ARDL F-statistics is greater than the 5% upper bound critical value, ie 73.32 > 3.30. Hence, it is hereby concluded that the variables are I(1), and are cointegrated.Therefore, the null hypothesis of long run relationship among the variables of the model is hereby accepted. The implication of this is that the variables will sustain their association in the long run and will not wander apart from one another. Although, the variables may deviate from their association in the short run, their togetherness would return in the long run.

Thus, it is concluded that, with the support of macroeconomic variables included, there exist long run relationship between financial deepening and manufacturing sector performance in Nigeria within the period examined. As a result, the financial deepening variables should be able to explain the variations in the performance of the manufacturing sector even in the long run.

To examine the effect of financial deepening variables on average capacity utilization of manufacturing firms, an ARDL estimation technique was employed and the result is presented in table 3.

Table 3: ARDL Long and Short Run Result
Dependent Variable: CTSA

Long Run Estimates				Short Run Estimates			
Variable	**Coefficient**	**t-stat**	**Prob**	**Variable**	**Coefficient**	**t-stat**	**Prob**
FDMS	4.475358**	5.979540	0.0055	$\Delta CTSA_{t-1}$	1.665685*	17.08052	0.0372
FDPC	-8.956261	-0.261797	0.8370	$\Delta FDMS_t$	3.991528**	9.451384**	0.0071
RCAP	-107.816921**	-5.249143	0.0098	$\Delta FDMS_{t-1}$	3.919045**	9.946752**	0.0038
RGCF	76.723348	0.887073	0.5381	$\Delta FDPC_t$	-79.886036**	-3.098339	0.0088
RFDI	-6.499928**	-9.893540	0.0041	$\Delta FDPC_{t-1}$	-171.747162**	-11.172411	0.0068
INFR	0.232036	1.489004	0.1503	$\Delta RCAP_t$	26.492505**	4.552497	0.0077
EXCR	0.436343**	9.030840	0.0002	$\Delta RCAP_{t-1}$	69.734653**	8.858642	0.0016
GEP	1.627695**	8.887390	0.0013	$\Delta RFDI_t$	2.842312**	8.040304	0.0028
INTR	0.077182	0.526273	0.6916	$\Delta RFDI_{t-1}$	-0.709363**	-5.308441	0.0085
C	34.836324**	6.054476	0.0042	$\Delta INFR_t$	0.470559	1.038241	0.5717
				$\Delta INFR_{t-1}$	0.032760	1.052097	0.4838
				$\Delta RGCF_t$	-175.396972**	-8164041	0.0076
				$\Delta RGCF_{t-1}$	-346.393246**	-7.827752	0.0079
				$\Delta EXCR_t$	0.146310**	7.198525	0.0028
				$\Delta EXCR_{t-1}$	0.366014**	8.709812	0.0009
				ΔGEP_t	0.311267**	10.600510	0.0099
				ΔGEP_{t-1}	0.217018**	8.553455	0.0041
				$\Delta INTR_t$	-1.262894**	-11.318465	0.0061
				$\Delta INTR_{t-1}$	-0.222630*	-2.778232	0.0200
				$CointEq_{t-1}$	-0.665685**	-6.826164	0.0026

** Implies significant at 5%* *** Implies significant at 1%*
Source: E-view 9.0 version output data.

Table 4: Statistical Properties and Post Diagnostic Results

Statistical Properties of Results		Post Diagnostic Tests Result	
R-squared	0.9699	BPG Heteroscedasticity (F-Stat)	2.7057
Adj R-squared	0.9476	BPG Heteroscedasticity Prob. F(28,1)	0.6519
F-statistic	430.0954	BPG HeteroscedasticityObs* R-squared	29.6092
Prob(Fstatistic)	0.0000	Prob. Chi-Square (28)	0.5821
Durbin-Watson Stat	2.1727	Scaled explained SS	0.0722
Akaike Info Criterion:	0.370542	Prob. Chi-Square (28)	1.0000
Model Evaluated	19683	B-G Serial Correlation LM (F-Stat)	1.0505

ARDL Best Model	(1,1,1,0,1,1,1,0,1,1)	B-G Serial Correlation LM Prob. F(2,10)	0.3854
		Obs* R-Squared	5.3822
		Prob. Chi-Square (2)	0.0678
		Ramsey RESET (F-Stat)	0.6946
		Ramsey RESET Prob. (F – Stat.)	0.3418
		Ramsey RESET (t – Stat.)	0.6942
		Ramsey RESET Prob. (t – Stat.)	0.4826
		Jarque-Bera Statistics for Normality	0.4377
		Jarque-BeraProb	0.8243

Source: E-view 9.0 version output data.

The result intable 3,shows that the lagged value of average capacity utilization of manufacturing sector ($CTSA_{t-1}$) capture important dynamic structure in its present value. The result indicates that a unit increase in the previous value of average capacity utilization would lead to an increase of 1.67 units in its current value. With a probability of 0.037, the effect is statistically significant at 5% level.

The ARDL result also shows that a direct and significant link is established between ratio of broad money supply to gross domestic product (FDMS) and average capacity utilization of manufacturing sector both in the long-run and short run. A unit increase in the ratio of broad money supply to gross domestic product will lead to 4.48 units increase in average capacity utilization of manufacturing sector in the long-run. Also, a unit increase in the current and previous values of ratio of broad money supply to gross domestic product will lead to 3.99 and 3.92 units increase in the current value of average capacity utilization of manufacturing sector in Nigeria respectively. The probability values of 0.055, 0.0071 and 0.0038 show that the direct effect is statistically significant. The result is in consonance with the *a priori*expectation and the findings of Imoughele and Ismaila (2014), but contradicts the findings of Ewetan and Ike (2014) that a negative relationship exists between broad money supply and average capacity utilization of manufacturing sector in Nigeria.

The result further shows that in the long-run, a unit increase in the ratio of credit to private sector to gross domestic product (FDPC) will lead to 8.96 units decrease in average capacity utilization of the manufacturing sector. The result of the short-run reveals that a unit increase in the current and previous values of ratio of credit to private sector to gross domestic product will lead to 79.89 and 171.75 units decrease in average capacity utilization of the manufacturing sector respectively. The probability estimates reveal that the negative effect is statistically significant in the short-run but non-significant in the long run. Thus, estimate for the long-run has the same direction of effect with the short-run. This fails to agree with the *a priori* expectation and the finding of Ewetan and Ike (2014) where private sector credit produced a positive relationship with industrial output.

In the long-run, a unit increase in market capitalization (RCAP) will lead to 107.82 units decrease in average capacity utilization of manufacturing sector. However, in the short-run, a unit increase in the current and previous values of market capitalization will lead to 26.49 and 69.73 units increase in average capacity utilization of the manufacturing sector respectively. This result, with a probability value of 0.0098, indicates that market capitalization has indirect and significant effect on average capacity utilization of the manufacturing sector in the long-run. In the short-run, the result with probabilities values of 0.008 and 0.0016 reveal that market capitalization has direct and significant effect on average capacity utilization of manufacturing sector in Nigeria. Thus, the result implies that capital markets have not being providing the long-term financing required for manufacturing sector productivity.

The ratio of foreign direct investment to gross domestic product has an indirect and significant effect on average capacity utilization of the manufacturing sector, as a unit increase in the ratio of foreign direct investment to gross domestic product will lead to 6.50 units decrease in average capacity utilization of the manufacturing sector in the long run. Similarly, a unit increase in the previous value of ratio of foreign direct investment to gross domestic product will lead to 0.71 unit decrease in current value of average capacity utilization of the manufacturing sector. However, a unit increase in the current value of ratio of foreign direct investment to GDP will lead to 2.84 units increase in the average capacity utilization of manufacturing sector. The probability values indicate that the effect is statistically significant at 1% level.

This result is contrary to the *a priori* expectation that foreign direct investment should affect the performance of manufacturing sector positively. However, the negative relationship may be an indication that the manufacturing sector has not been able to attract foreign direct investment, hence low FDI inflows into the manufacturing sector in Nigeria. The result contradicts the findings of Odior (2013), that foreign direct investment is positively related to manufacturing output in Nigeria.

The ARDL results also show that both in the long run and short-run, inflation rate has a positive effect on average capacity utilization of the manufacturing sector. A unit increase in inflation rate will lead to 0.23 unit increase in average capacity utilization of the manufacturing sector in the long-run. In the short-run, a unit increase in the current and previous values of inflation rate will lead to 0.47 and 0.03 units increase in average capacity utilization of the manufacturing sector respectively. This result is not in consonance with the *a priori*

expectation of indirect relationship. The implication of the results is that inflation rate has not affected the performance of manufacturing sector adversely overtime, though with probabilities of 0.15, 0.57 and 0.48 for long-run, short-run present value and previous values respectively, the variable proved to be statistically insignificant. The result, although contrary to the *a priori*, it corroborates the finding of Imoughele and Ismaila (2014).

Further, the result shows that exchange rate has a direct effect on the average capacity utilization of manufacturing sector in Nigeria. A unit increase in exchange rate will lead to 0.44 unit increase in average capacity utilization of manufacturing sector. Also, in the short run, a unit increase in the current and previous values of exchange rate will lead to 0.15 and 0.37 units increase in average capacity utilization of manufacturing sector. The probability values of 0.0002, 0.008 and 0.003 for long-run, short-run current period and previous period respectively, indicate that the direct effect is statistically significant at 1% level. The finding is in agreement with the "*a priori*" that devaluation is expected to make manufacturing firms' products competitive in the international market and thereby promotes manufacturing sector productivity through exportation.

Also, the result indicates that government expenditure has a positive effect on average capacity utilization of manufacturing sector both in the long-run and short-run. A unit increase in government expenditure will cause 1.63 units increase in average capacity utilization of manufacturing sector in the long run. A unit increase in the present and previous values of government expenditure, will lead to 0.31 and 0.22 units increase in the current value of average capacity utilization of manufacturing sector respectively. The probability values of 0.0013, 0.0099 and 0.0041 for long-run, current and previous values respectively, indicate that the direct effect is statistically significant at 1% level. This finding indicates that government capital and recurrent expenditures overtime affected manufacturing sector positively.

In the long-run, interest rate produced a direct effect on average capacity utilization of manufacturing sector. A unit increase in interest rate, will lead to 0.08 unit increase in the average capacity utilization of manufacturing sector in the long-run. The 't' statistic of 0.53 and the probability value of 0.69 show that the direct effect is not significant. However, a negative relationship is maintained in the short-run. A unit increase in the current and previous values of interest rate will lead to 1.26 and 0.22 units decrease in the current value of average capacity utilization of manufacturing sector respectively. The 't' statistic values of 11.32, 2.78 and the probability value of 0.0061; 0.0200 for short-run current and previous values estimation respectively, indicates that the negative effect is statistically significant. The implication of this finding is that, an increase in the cost of funds in the short-run, will adversely affect the average capacity utilization of manufacturing sector. This finding is in line with the *a priori* expectation.

The result also show that a unit increase in gross capital formation to gross domestic product will lead to 76.72 units increase in average capacity utilization of manufacturing sector in the long-run, indicating a direct relationship. The 't' statistic of 0.89 and the probability value of 0.54 indicate that the positive effect of the variable is not statistically significant in the long run. In the short-run, a unit increase in the current and previous values of gross capital formation will lead to 175.4 and 3416.40 units decrease in the current value of average capacity utilization of manufacturing sector. The result is contrary to the *a priori* and it implies that domestic investment prevailing in the Nigerian economy is counter-productive in stimulating manufacturing sector productivity in the short-run. The 't' statistics and probability values for the short-run estimate, indicate that the negative effect is statistically significant at 1% level. This could be due to the use of an increase in gross capital formation in the short-run for importation as against productive investment in the manufacturing sector.

Besides, the intercept term (c) shows the mean or average effect of all the variables excluded from the model. Therefore, on the average, a unit increase in the value of the excluded variables will lead to 34.84 units increase in average capacity utilization of the manufacturing sector. In other words, given that all the included explanatory variables are held constant, the average capacity utilization of manufacturing sector would be 34.84 units. However, with a probability of 0.004, the direct effect is statistically significant at 1% level. The implication of this finding is that apart from financial deepening and the controlled variables included, there are other significant explanatory variables causing variation in average capacity utilization of manufacturing sector in Nigeria.

It is also important to examine the statistical properties of the estimated results. From the result in table 4, it is evident that the R-squared value of 0.97 indicates that about 97% variation in average capacity utilization of manufacturing sector is explained in the model by financial deepening and the controlled variables. The F-statistic of 430.1 with a probability of 0.000, is statistically significant and this shows that there is a considerable harmony between average capacity utilization of manufacturing sector and the explanatory variables put together. This confirms that broad money supply, private sector credit, market capitalization and the controlled variables jointly have significant influence on the average capacity utilization of manufacturing firms.

Also, the Breusch-Pagan-Godfrey (BPG) test is applied to investigate the presence of heteroscedasticity in the regression result. The BPG tests the null hypothesis of no heteroscedasticity (ie. homoscedasticity)

against the alternative hypothesis of heteroscedasticity. The result in table 4 presents three different types of tests for heteroscedasticity. The "F" test statistic is 2.7057 and chi-square (X^2) test statistic is 29.6092, with probability values of 0.65 and 0.58 respectively. Both test statistics give the same conclusion that there is no evidence for the presence of heteroscedasticity, since the probability values are considerably in excess of 0.05.

The "scaled explained sum of square" (SESS), which is the third test is based on a normalized version of the explained sum of squares from the auxiliary regression. The SESS statistics of 0.07225, with a probability value of 1.000, which is greater than 0.05 suggests the absence of heteroscedasticity.

Therefore, the "f" test, chi-square (X^2) test and the "scalled explained sum of square (SESS) test produced the same result that the model is homoscedastic.

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. Table 4 presents "F" statistic and chi-square (X^2) statistic for BG serial correlation LM test. The result of "F" statistic's probability for the B-G Serial Correlation is 0.1106 and the probability of chi-square is 0.068. Since the probabilities are greater than 5%, hence the null hypothesis of no auto-correlation cannot be rejected, implying that the model has no serial correlation.

Also, the Durbin-Watson statistic of 2.173 indicates that there is no serial correlation associated with the regression result as this is in line with "two" as a benchmark. Therefore, this finding is in agreement with the result of Breusch-Pagan-Godfrey test.

In the model, the error correction term $CointEq_{t-1}$ is well specified and correctly signed. The coefficient of the lag of co-integrating equation ($CointEq_{t-1}$) is approximately -0.6657. It means that about 66.57 percent departure from long run equilibrium is corrected in the short run. The negative sign in the lag of co-integrating equation confirms the existence of long-run relationship. Hence, about 66.57% of the variations in the short run converge. The zero (0) probability shows that the estimate is statistically significant at 1% level.

The Ramsey RESET test is used to examine whether the relationship between the dependent variable and the explanatory variables is linear or not. The results of this test as shown in table 4, is for one fitted term. Both F and t versions of the test are presented. From the result, the "t" statistic is 0.4532 and the "F" statistic is 0.0942. The probability of "F" statistic is 34% and 48% for "t" statistic. Since the probabilities are higher than 5%, the estimates are non-significant at 5% level. Hence, there is no apparent non-linearity in the regression equation and it is hereby concluded that the linear model specified for the relationship is appropriate.

The Jarque-Bera (JB) statistic for the normality distribution of the model is 0.44, with a probability of 82%. Since the probability of obtaining the JB statistic under the normality assumption is very high and greater than 0.05, the null hypothesis that the error terms are normally distributed cannot be rejected at 5% level.

Finally, based on the results of adequacy tests and the statistical characteristics of the model, it is hereby concluded that the inferences we made about the coefficients estimate are appropriate and valid, and that the model is fit for forecasting purposes.

Also, to investigate the causal link between broad money supply, private sector credit, market capitalization and average capacity utilization of manufacturing sector in Nigeria, Toda-Yamamoto causality framework was applied and the result obtained is presented in table 5.

Table 5.:Toda-Yamamoto Causality Test Results

H_o	***Chi-Square (X^2) Stat.***	***Df***	***P-Value***	***Decision***
FDMS → CTSA	6.01526	3	0.01574**	Causality
CTSA → FDMS	0.05178	3	0.68225	No causality
FDPC → CTSA	0.32863	3	0.25146	No causality
CTSA → FDPC	0.48113	3	0.16227	No causality
RCAP → CTSA	3.12841	3	0.08533	No causality
CTSA → RCAP	0.32274	3	0.22468	No causality
FDMS → FDPC, RCAP	4.92381	3	0.04386*	Causality
FDMS, FDPC → CTSA	1.20348	3	0.34228	No causality
FDMS, RCAP → CTSA	7.02312	3	0.01260**	Causality
FDPC, RCAP → CTSA	3.44301	3	0.05861	No causality
FDMS, FDPC, RCAP, → CTSA	9.86620	3	0.00364**	Causality

*Note: * and ** denotes rejection of the null hypothesis of non-causality at 5% and 1% respectively*.

Table 5 presents the result from the modified Wald test for the bivariate and multivariate causality tests, and it reports the Chi-square (X^2) test statistic obtained, together with 3 degrees of freedom in accordance with the appropriate lag length along with the probability estimates.

The result reveals that the chi-square (X^2) statistic of 6.02 with the associated probability of 0.02, confirm the existence of causality from broad money supply (FDMS) to average capacity utilization of

manufacturing sector. Hence, the null hypothesis of no causality from broad money supply to average capacity utilization cannot be accepted. However, with chi-square statistic of 0.05 and a probability of 0.68, the null hypothesis of no causality from average capacity utilization to broad money supply cannot be rejected. Therefore, a unidirectional causality from broad money supply to average capacity utilization is established.

Also, the Chi-square statistic (X^2) of 4.92 and a probability of 0.04, indicate the rejection of the null-hypothesis of no causality from broad money supply (FDMS) to private sector credit and market capitalization. However, with Chi-square statistic (X^2) of 1.20 and a probability of 0.34, the null hypothesis of no causality from private sector credit and market capitalization to average capacity utilization cannot be rejected. Hence, a unidirectional causality from broad money supply to private sector credit and market capitalization is established.

Furthermore, the null hypothesis of no causality from broad money supply and market capitalization to average capacity utilization of manufacturing sector cannot be accepted given the chi-square statistic of 7.02 and a probability of 0.01. The chi-square statistic and probability of 3.4 and 0.06, respectively, suggest acceptance of the null hypothesis of no causality from broad money supply and private sector credit to average capacity utilization of manufacturing sector. Finally, with chi-square statistic (X^2) of 9.87 and probability of 0.004, the null hypothesis that broad money supply, private sector credit and market capitalization do not cause average capacity utilization cannot be accepted.

Therefore, the finding provides evidence for a significant unidirectional causality from financial deepening to average capacity utilization of manufacturing sector in Nigeria. This finding is in line with the finding of Okoye, et al. (2016) that financial development leads to increase causal impact of financial deepening on industrial output. However, it contradicts the findings of Ewetan and Ike (2014) that suggests a unidirectional causal link running from industrialization to financial development.

Implications of findings

While some of the findings are in agreement with theoretical expectations, others are in contradictions. The implication which emerges from the empirical results with regards to the wrong signs of some of the parameters is that theoretical expectations would only be valid when all conditions are normal. Such outcome with wrong sign has important policy implications as market realities resulting from factors such as market inefficiencies, policy conflicts, information asymmetry and government interference in the interaction of market forces may produce results in direct contradiction to theoretical expectations. However, the first of the "ten commandments of Applied Econometrics" given by Peter Kennedy of Simon Fraser University in Canada, is that "thou shalt use common sense and economic theory" (Gujarati, 2006).

Various results have emanated from this study and it is worth noting that the results have varying policy implications. Thus, if both X_2 and X_3 are statistically significant, it means they both have incremental explanatory power. If X_2 is statistically significant and X_3 is not, then the latter has non explanatory power and the former is preferred (Brooks, 2008). Based on the foregoing, decision is made using Table 6 as follows:

Table 6: The effect of financial deepening on the average capacity utilization of manufacturing sector.

Manufacturing sector performance	period	Broad Money Supply (FDMS)	Credit to the private sector (FDPC)	Market capitalization of manufacturing firm (RCAP)	Periodic decision	Overall decision
Average capacity utilization of manufacturing sector (CTSA)	Short-run	Sig. (+)	Sig. (-)	Sig. (+)	Sig. (+)	Positive and Significant
	Long-run	Sig. (+)	Non-Sig.(-)	Sig. (-)	Non-Sig. (-)	

Source: Author's computation using result in Table 3

From table 6, the result reveals that financial deepening has direct and significant effect on the average capacity utilization of manufacturing sector in the short-run. However, the indirect effect in the long-run is statistically non-significant. Hence, financial deepening has a significantly positive effect on the average capacity utilization of manufacturing sector in Nigeria.

However, the ratio of private sector credit to gross domestic product has been detrimental in promoting the capacity utilization of manufacturing firms, both in the short-run and long-run. This implies that the credit made available to manufacturing firms have not yielded any significant positive effect on the capacity utilization of manufacturing firms in Nigeria. The more the loans are made available to the sector, the less the performance of the sector. This could be due to diversion of credit facilities to unproductive but high return investment opportunities.

The above behaviour of credit to private sector is a likely clue to one of the major causes of non-performance in the manufacturing sector in the country. It is expected that when credit are made available to manufacturing firms, outputs should be positively affected. This however calls for the attention of the

government, regulatory authorities and all stakeholders in the manufacturing sector to address the problem of funds diversion leading to this discovery.

Also, the Toda-Yamamoto causality result in table 5 provides evidence for a significant unidirectional causality from financial deepening to manufacturing sector capacity utilization in Nigeria. Hence, the results suggest that financial deepening causes average capacity utilization of manufacturing sector in Nigeria. This finding is in line with expectation because an appropriately deepened financial system is expected to promote capacity utilization of the manufacturing sector

V. Conclusion and Recommendations

The implication of the findings is that financial deepening causes, and has short-term effect on the average capacity utilization of manufacturing sector. Therefore, financial deepening strategies could only stimulate and enhance manufacturing firms performance significantly in the short-run.Hence, it is therefore recommended that;

* The regulatory authorities and banks should set up necessary machineries to monitor credit allocation to the manufacturing sector to ensure that they are used for projected productive purposes and not diverted to other sectors of the economy or channeled to other unproductive activities.
* Government should increase the money supply looking at the significance and direct effect of this instrument. Capital expenditure should be consistently increased above the recurrent expenditure. As against the present practice, capital and recurrent expenditure should be in the ratio 7:3 respectively. As such, more funds would be injected in financing capital projects such as power and road infrastructures to promote manufacturing sector performance.
* Government should relax capital market entry requirements and allow institutional interest rate to operate at market equilibrium level.

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