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# Impact of Financial Deregulation on the Manufacturing Sector in Nigeria: 1981-2016 An ARDL Approach

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## Abstract

*T*here has been shift from state-dominated development paradigm towards a more market determined strategy of development in the recent years. In view of this, empirical works have been conducted to examine the impact of financial deregulation on the economy. However, the existing studies focused aggregate output and overlooking sectoral impact. This paper therefore, further contributes to the empirical literature on financial markets and the Nigerian economy as it provides sector specific results concerning the impact of Nigeria's financial system deregulation on the economy with focus on the manufacturing sector using time series data from 1981-2016 and employing ARDL cointegration technique. It was found that financial deregulation does not significantly influence manufacturing output and credit to the sector which points to the underdeveloped nature of the financial

*system. It was suggested that there is need for the development of the system through mobilization of more savings from the public and linking resources from the informal or traditional financial sector to the banking system. This is expected to increase broad money supply ($M_2$) as a percentage of GDP, reduce interest rate, and increase access to funds and investment in the manufacturing sector. Also, it is further suggested that interest rate and exchange rate should be moderately regulated downwards to a more inclusive competitive level that would facilitate access to funds and foreign currencies in the banking system by manufacturing firms, and enhance investment in the sector.*

**Keywords:** Financial system, Deregulation, Manufacturing

**INTRODUCTION**

Prior to financial liberalization, the government of developing countries practiced financial repression thereby subjecting the administrative framework of the financial system to its whims and caprices, such that financial policies implemented will suit its desires. Their development strategies were designed such that the government or its agencies were vested with the responsibility to make decision regarding the allocation of resources thereby giving the market forces a less important role to play in economic development. Due to the widely spread benefits attainable from financial deregulation many developing countries in order to achieve economic buoyancy have experienced the gradual but apparent liberalization of its financial sector. The state-dominated development paradigm has shifted towards a more market determined strategy of development in the recent years due to the relatively low growth rate of incomes, industrial output and recurring balance of payment crises. Also, countries have been influenced by the astonishing success of Japan and East Asian countries in accelerating growth through the market-determined strategy of development (Nair, 2004).

At an early stage of development, entrepreneurs mainly depend on their savings for the needed investment funds. As the economy develops, banks emerge to facilitate the financing of new investments. Further growth in the economy sees the development of markets for tradable securities. Such markets do not replace but complement banking functions (Maduka & Onwuka, 2013).

Although financial deregulation reform can increase efficiency by channeling resources into productive use, its impact on the manufacturing sector is empirically ambiguous as we could not lay our hands on any empirical work that investigates the relationship. The ambiguity is partly traceable to measurement of financial deregulation. In attempts at measuring it, a good number of studies have used partial measures of financial deregulation via the adoption of proxies like the real interest rate (Asamoah, 2008; Acaravci et al. 2009; Obamuyi (2009)), ratio of broad money supply to GDP (Matsheka, 1998; Reinhart et al., 2005; Seck and Elnil, 1993;) and ratio of credit to the private sector to GDP (Shahnoushi et al. 2008; Baliamounne-Lutz, 2001). Others used both ratio of broad money supply to GDP and ratio of private sector credit to GDP (Maduka & Onwuka, 2013).

Other studies measured financial deregulation using traditional dummies of 0 for no deregulation and 1 for deregulation (Okpara, 2010). Others, having observed the partiality in financial deregulation measures above resort to constructing index. The index in some cases is not comprehensive to capture deregulation as they structure their index and limit it to

deregulation in the money market (Fowowe, 2008). According to Obiwuru *et al.* (2012), "true as claim that proxies need not be actual, economics and econometrics does not limit optimization to end but extends it to means". Deregulation is a matter of degree (arising from adoption, changes or combinations of reforms) that reflects the gradual changes in the entire financial system, thus it far exceeds measuring with a single indicator that only reflects a fraction effect, or using dummy extremes of 0 and 1 that ignore the gradual progression, or an index limited to a fraction of the financial market, ignoring the inter-relationships between markets (Obiwuru *et al.*, 2012). Since poor, partial, extreme and wrong measurement, would imply poor, partial, extreme and wrong conclusions and recommendations, this study, has an objective of measuring financial deregulation, using a more comprehensive index of financial deregulation following the work of Orji *et al.* (2015) and Obiwuru *et al.* (2012) and testing its effect on the manufacturing sector in Nigeria using time series data spanning 1981-2016, to confirm the truth in McKinnon's Hypothesis in the long-run using an ARDL model.

The paper therefore, further contributes to the empirical literature on financial markets and the Nigerian economy as it provides sector specific results concerning the impact of Nigeria's financial system on the economy with focus on the manufacturing sector. This makes the study different from earlier ones by Obiwuru *et al.,* (2012); Maduka and Onwuka, (2013); Orji *et al.,* (2015); Obamuyi, (2009); and Sulaiman *et al.,* (2012) that investigated the impact of financial deregulation on the aggregate output thereby overlooking the sectoral impact. The paper is organized starting with introduction, followed by a review of the conceptual issues, overview of the Nigerian financial system, theoretical framework, review of empirical literature, methodology, results presentation and discussion, and conclusion and recommendation.

## LITERATURE REVIEW
Two key concepts are used in this study. These are financial deregulation and manufacturing sector. The concepts are defined as follows:

### Concept of Financial Deregulation
Financial deregulation entails the removal or relaxation of regulations affecting the type of business financial firms may undertake, the type of firms permitted to deal in the particular markets, or the terms on which dealing is allowed. Financial deregulation/liberalization is therefore a matter of degree, and does not imply a shift to total laissez-faire. Regulations which have been relaxed include controls on interest rates at which banks can lend or borrow, controls on operations by banks outside their country of registration and restrictiaaons on the types of business a particular financial institutions can transact, direct credit abolition and exchange rate deregulation. Deregulation has been favoured as it leads to more competition and efficiency gains, causing both developed and developing economies to incorporate such policies into their Structural Adjustment Programs (SAP, 1986 for Nigeria) as opposed to its opposite; financial regulation or repression (Obiwuru et al., 2012).

According to Orji et al. (2015)**,** financial liberalization refers to the removal of controls and restrictions placed on the financial sector by a governing authority. Financial liberalization gained attention in the early 1970s due to the seminal work of McKinnon (1973) and Shaw (1973) in which they argued that liberalization of the financial sector will lead to increase in savings, encourage investments and induce economic growth. Hence, many countries especially developing countries have embraced financial liberalization as the way forward for their economies. Financial liberalization became a useful and important monetary policy in

many countries following the directive from the "Washington Consensus" or "Bretton Woods." Mustapha, (2011).

## Concept of Manufacturing Sector

The manufacturing sector in Nigeria consists largely of a handful of factories engaged in the production of construction materials, clothing, textiles, footwear and processed foods using simple assembly process (Kayode & Teriba, 1977). Mike (2010) asserts that the sector is a part of the real sector reputed to be an important engine of growth, an antidote for unemployment, a creator of wealth and the threshold for sustainable development. The art of manufacturing according to Mustapha (2011) adds value to commodities and eventually creates more wealth. He further added that the ability of a nation to manufacture depends, to some extent, on their level of technological development.

## Overview of Nigerian Financial System

The Nigerian financial system comprises of various institutions, instruments and regulations. According to Central Bank of Nigeria (1993) cited in Maduka and Onwuka(2013), the financial system refers to the set of rules and regulations and the aggregation of financial arrangements, institutions, agents that interact with each other to foster economic growth and development of a nation. The financial system plays a key role in the mobilization and allocation of savings for productive purposes. It also assists in the reduction of risks faced by firms and businesses in their production processes, improvement of portfolio diversification, and insulation of the economy from external shocks (Nzotta, 2004). In addition, the system provides linkages for different sectors of the economy and encourages a high level of specialization and economies of scale.

The Nigerian financial system can be divided into two sub-sectors; the formal and informal sectors. The informal sector has no formalized institutional framework, no formal structure of rates and comprises the local money lenders, thrift collectors, savings and loan associations and all forms of Asusu associations (Nzotta and Okereke, 2009). According to Olofin and Afangideh (2008), this sector is poorly developed and not integrated into the formal financial system, therefore, its exact size and effect on the economy remain unknown and are a matter of speculation. The formal sector on the other hand comprises of bank and nonbank financial institutions. Bank financial institutions are the deposit taking institutions. As financial intermediaries, they channel funds from surplus economic units to deficit units to facilitate trade and capital formation. They include; central bank, commercial banks, development banks, co-operative and commerce banks, etc. while, the nonbanks financial institutions include; the money markets, capital markets, insurance companies, pension funds, etc. These institutions are not deposit taking institutions, but some of them perform intermediation functions of channeling funds from surplus to deficit units for economic activities, for instance, money and capital markets.

The regulatory institutions in the financial system are; the Federal Ministry of Finance, Central Bank of Nigeria as the apex institution in the money market, the Securities and Exchange Commission (SEC) as the apex institution in the capital market, Nigeria. Deposit Insurance Corporation (NDIC), National Insurance Commission (NAICOM) and the National Pension Commission (PENCOM) (Maduka and Onwuka, 2013).

**Review of Empirical Studies**

A number of authors have estimated the impact of financial deregulation on the economy of variety of nations. One of such studies was conducted by Ndebbio (2004) who examined the relationship between financial deepening and economic growth and development using selected sub-Saharan African countries using data from 1980-1989. He used ratio of broad money supply to GDP and growth rate of per capita real money balances to represent financial deepening and other control variables which affect economic growth such as the rate of inflation, human capital and the growth rate of labor as explanatory variables as against real per capita GDP which is dependent variables. His regression results showed that financial deepening does positively affect per capita growth of output in these selected SSA countries, even though his parameter estimate of the variable of financial deepening was insignificant in one of his equations and he attributed this to shallow finance and the absence of well-functioning capital market in most SSA countries.

Maduka and Onwuka (2013) investigated the long run and short run relationships between financial structure and economic growth using time series data. The study used Johansen and Juselius (1990) co-integration to test for long-run relationship among the variables and vector error correction to estimate the short run dynamic of the coefficients. The main results reveal that financial market structure has a negative and significant effect on economic growth in Nigeria which suggests a low level of development of the country's financial sector.

Obiwuru et al. (2012) assessed the impact of financial sector deregulation, savings, credit to private sector, and the economic growth of Nigeria from 1970 to 2009 using ARDL-bound test approach. The results revealed that financial deregulation has no significant positive impact on real interest rate in both long and short run which therefore suggests no conformity with the McKinnon-Shaw hypothesis which posits that deregulation of the financial system enhances competition in the system and has positive effect on interest rate. But savings and the credit to private sector have no significant positive effect on financial deregulation (or the real interest rate) as its effect in the short run were minimally positive, and highly negative in the long-run. The same effect was revealed in the economic growth variable. Generally, the study revealed that financial deregulation did not induce positive real interest rate in order to encourage savings which according to the authors, suggest that interest rate on deposit has not been the major factor that goad depositors to save in Nigeria, but rather the lack of investment alternatives outside financial assets.

Orji et al. (2015) examined the impact of financial liberalization on output growth in Nigeria over the period of 1986-2011. Their study employed the Ordinary Least Square (OLS) method of estimation, and the results revealed that financial liberalization policy (proxied by credit to private sector/GDP) is negatively related to output growth in Nigeria. The findings suggests that credits to private sector may have been used for buying and selling of consumables, or diverted to some unproductive ventures, rather than production activities, which would have contributed positively to economic growth. Apart from this, available evidence reveals that the amount of credit to the private sector, as a fraction of the total credit to the economy, is too negligible to contribute positively to aggregate output growth. The findings also showed that there is unidirectional causality running from output growth to financial liberalization. It implies that policies promoting economic growth in Nigeria will likely stimulate the gains from financial liberalization in the long-run. Also, the co-integration test revealed that a long-run relationship exists among the variables in the model.

Asamoah (2008) examined financial liberalization and its impact on savings, investment and the growth of GDP in Ghana. The study made use of monthly data on savings and interest rates, as well as seasonal and yearly dummy variables. Using the ordinary least square (OLS) regression analysis, the results showed that the increase in interest rate over the post-liberalization years of the financial sector had led to a corresponding increase in savings which in turn had a positive impact on the growth of GDP. It showed that financial liberalization has increased the rate of capital accumulation and improved efficiency in capital utilization which is both essential for economic growth.

Acaravci et al. (2009) review the literature on the finance-growth nexus and investigate the causality between financial development and economic growth in sub-Saharan Africa for the period 1975-2005. Using panel co-integration and panel generalized method of moments estimation for causality, the results of the panel co-integration analysis provide evidence of no long-run relationship between financial development and economic growth. The empirical findings in the paper show a bi-directional causal relationship between the growth of RGDP per capita and the domestic credit provided by the banking sector for the panels of 24 sub-Saharan African countries. The findings imply that African countries can accelerate their economic growth by improving their financial systems and vice versa.

Obamuyi (2009) examined the relationship between interest rates liberalization and economic growth in Nigeria. Using annual data from 1970 to 2006 while applying a co-integration and error-correction model, he showed that the real lending rates have a significant effect on economic growth and there exists a long-run relationship between economic growth and interest rate liberalization. He also confirmed a positive relationship between interest rates and investment and between investment and economic growth. Hence confirming the results of Fowowe (2009) that interest rate is growth enhancing in the long-run.

Sulaiman et al., (2012), investigated the effect of financial liberalization on the economic growth in Nigeria using financial deepening (M2/GDP) and degree of openness as financial liberalization indices, the findings showed that there exists a long-run equilibrium relationship among the variables. The study concluded that financial liberalization has a growth-stimulating effect on Nigeria and recommended that economic stability should either be maintained or pursued before implementing any form of financial liberalization measures and the regulatory and supervisory framework for the financial sector should be strengthened.

From the foregoing review of empirical studies conducted in Nigeria, it is observed that the authors generally focused attention on aggregate output thereby overlooking sector-specific impact of financial deregulation. In view of this, this study empirically investigated the effect of financial deregulation on the manufacturing sector in Nigeria.

**Theoretical Framework**
The financial repression hypothesis, have been mainly concerned with advanced economies where the capital markets are well developed. In the case of underdeveloped capital markets, the Mckinnon-Shaw framework has explicitly sought to relate capital market developments to long term economic growth in the developing countries (McKinnon, 1973, Shaw, 1973). The McKinnon-Shaw proposition is that a repressed financial sector interferes with development in several ways: savings vehicles are not well developed, financial intermediaries that collect savings do not allocate them efficiently among competing uses, and firms are discouraged from

investing because of financial polices of repression that reduce the returns to investment or makes them uncertain, and as a result growth is retarded (Orji et al., 2015a).

Therefore, financial liberalization theory argues for improved growth through financial deepening and financial sector reform, the key relations of financial liberalization paradigm are: positive real deposit rate raise the savings rate, a positive correlation between the degree of financial deepening and the growth rate, increased real rate raise the level of investment, and increased real deposit rate promote economic growth (Oshikoya, 1992; Ozturk, 2008). The McKinnon-Shaw (1973), proposition is based on the underlying classical assumption that savings determine investment and that a full utilization of resources is always guaranteed. According to Orji et al. (2015b), the theory is of the view that financial development is a major determinant of economic growth. The advocates of this view which include McKinnon (1973), Shaw (1973), and Kapur (1976) maintained that financial development play a key role in the process of economic growth. Specifically, they advocated for a liberal financial system in order to mobilize increased volume of financial saving and allocate it to productive investment, thereby contributing to economic growth. They proposed that a repressed financial sector will hamper development in ways such as: low savings rate, inefficient financial intermediaries, and restrictive financial policies for credit facilities and investment hence retarding economic growth.

## METHODOLOGY
The method employed in carrying out the study is presented here as follows:

**Source of Data**
This research, in view of its nature made use of secondary data. Annual data were employed and were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and National Bureau of Statistics (NBS) financial and external sector statistics for the period 1981-2016. The 36-year period is selected to meet the requirement of the Central Limit Theorem that sample size must not be less than thirty years for normality purpose, and the fact that the larger the sample, the greater the reliability or validity of time series research findings (Gujarati, 2005).

**Discription of Variables**
Manufacturing output and commercial banks' loans and advances to manufacturing sector were used as the dependent variables as the data on them are easily accessible, and they are also considered appropriate in view of the focus of the study.

The independent variables are the ratio of broad money supply to GDP ($M_2$/GDP), ratio of credit to private sector to GDP (CPS/GDP), financial deregulation index, prime lending rate as proxy for interest rate, and exchange rate.

**Model Specification**
The econometric models used for the study is adapted from Obiwuru *et al.* (2012). Some of the variables are not in rate forms were specified in logarithmic forms to reflect their growth rate. The models are specified as follows:

$$InMAN_t = \beta_o + \beta_1 M2/GDP_t + \beta_2 CPS/GDP_t + \beta_3 FINDEX_t + \beta_4 InINT_t + \beta_5 InEXCHR_t + U_t \ldots\ldots(1)$$

$$InCBLTM_t = \beta_o + \beta_1 M2/GDP_t + \beta_2 CPS/GDP_t + \beta_3 FINDEX_t + \beta_4 InINT_t + \beta_5 InEXCHR_t + U_t \ldots(2)$$

Where lnRMAN     =         Log of real manufacturing output

InCBLTM      =         Log of commercial banks' loans and advances to manufacturing sector

$\beta_o$      =         Constant parameter

$\beta_i$      =         Coefficients of the explanatory variables

$M2/GDP_t$      =         Log of ratio of broad money supply to GDP in percentage

$CPS/GDP_t$      =         Log of ratio of credit to private sector to GDP percentage

$FINDEX_t$      =         Financial inclusion index

$INTR_t$      =         Prime lending rate as a proxy for interest rate

$lnEXCHR_t$      =         log of exchange rate

$U_t$      =         Stochastic disturbance term

$t$      =         Time subscript

Therefore, equation 1 and 2 were employed as models for this research.

**Method of Data Analysis**

The data collected for this research were analysed using Autoregressive Distributed Lag (ARDL) model along with error correction model. The ARDL model is an innovation in time series econometrics developed by Pesaran and Shin (1996); Pesaran and Pesaran (2001); for testing the existence of co-integration. The technique is applicable irrespective of whether the underlying variables are purely I(0) or I(1), or a mixture of both (Khosravi and Karimi, 2010). However, in the presence of I(2) variables, the computed F-statistics provided by Pesaran *et al.*(2001) will become invalid. Therefore, the use of unit root tests in the ARDL approach is inevitable to ensure that none of the variable is integrated of order I(2) or beyond. To detect the presence or otherwise of unit root, we adopted the conventional Augmented Dickey – Fuller (ADF) unit root test based on the model expressed below:

$$\triangle Y_t = \beta_0 + \beta_1 Y_{t-1} + \alpha_i \sum_{i=1}^{m} Y_{t-i}\triangle + u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

Where:      $\triangle Y_t$      = Differenced value of a given time series variable

$\beta_0$      = Constant Parameter

$\beta_1$      = Coefficient of the first lag value of the series variable

$Y_{t-1}$      = First lag value of a series variable

$\alpha_i$      = Coefficient of the lag values of the differenced time series variable

$\triangle Y_{t-i}$      = Lag values of the differenced series variable

$u_t$      = Error term.

The two Autoregressive Distributed Lag (ARDL) models used in this study are expressed as follows:

**ARDL I**

$$\triangle InRMAN = \delta_0 + \delta_1 InRMAN_{t-1} + \delta_2 InM2/GDP_{t-1} + \delta_3 InCPS/GDP_{t-1} + \delta_4 FINDEX_{t-1} + \delta_5 INTR_{t-1} + \delta_6 InEXCHR_{t-1} + \sum\lambda_1 \Delta InMAN_{t-i} + \sum \lambda_2 \Delta InM2/GDP_{t-i} + \sum \lambda_3 \Delta InCPS/GDP_{t-i} + \sum \lambda_4 \Delta FINDEX_{t-i} + \sum \lambda_5 \Delta INTR_{t-I} + \sum\lambda_6 \Delta InEXCHR_{t-i} + \lambda_7 ECM_{t-1} + u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(4)$$

**ARDL II**

$\triangle InCBLTM = \delta_0 + \delta_1 InCBLTM_{t-1} + \delta_2 InM2/GDP_{t-1} + \delta_3 InCPS/GDP_{t-1} + \delta_4 FINDEX_{t-1} + \delta_5 INTR_{t-1} + \delta_6 InEXCHR_{t-1} + \sum \lambda_1 \Delta InCBLTM_{t-i} + \sum \lambda_2 \Delta InM2/GDP_{t-i} + \sum \lambda_3 \Delta InCPS/GDP_{t-i} + \sum \lambda_4 \Delta FINDEX_{t-i} + \sum \lambda_5 \Delta INTR_{t-I} + \sum \lambda_6 \Delta InEXCHR_{t-i} + \lambda_7 ECM_{t-1} + u_t$.........................................................(5)

Where $\delta_0$ = Constant Parameter

$\Delta$ = First difference operator

$\delta_i, \lambda_i$ = Vector of the parameter of the lagged values of the natural logarithmic values of the explanatory variables.

$ECM_{t-1}$ = Error correction term

$u_t$ = Error term

The terms with the summation signs ($\sum$) in the equations above represent the error correction dynamics while the second part of the equation with $\delta_i$ correspond to the long-run relationship. The null hypothesis in the four ARDL equations is $H_0 = a_1 = a_2 = a_3 = 0$. This denotes the absence of long-run relationship while the alternative hypothesis is $H_1$: $a_1 \neq a_2 \neq a_3 = 0$. The calculated F-statistic is compared with two sets of critical values. One set assumes that all the variables are I(0) and the other assumes they are I(1). If the calculated F – statistic exceed the lower and upper critical value, the null hypothesis of no co-integration will be rejected irrespective of whether the variables are I(0) or I(1). If it is below the upper value bound, there is no cointegration. Once a co-integration relationship has been ascertained the long-run and short run parameters of the relationship are then estimated. If there is no cointegration, the analysis stops at the bound test results estimation in order to avoid spurious regression that could arise from estimating the estimation of long-run and short-run parameters of the relationship.

**RESULT AND DISCUSSION**

The findings of the study are presented as follows.

**Unit Root Test Results**

As a precondition for applying the ARDL bound testing approach to cointegration, the need to ensure that none of the variables is beyond being integrated of the first order i.e. I(1) requires unit root tests of each of the variables in the model. The outcome of the unit root tests using the Augmented Dickey Fuller (ADF) test reveal that all the variables satisfy this condition. The results are presented in the Table 1.

**Table 1: Unit Root Test Results**

| | ADF Unit Root Test | | | |
|---|---|---|---|---|
| Variables | Critical Values | ADF at level I(0) | Critical Values | ADF at First Difference |
| InMAN | | | -4.252879 | -6.266269*** |
| InCBLTM | | | -4.252879 | -4.679336*** |
| InM2/GDP | | | -4.252879 | -5.264732*** |
| InCPS/GDP | | | -4.252879 | -5.453403*** |
| FINDEX | | | -4.262735 | -7.017144*** |
| INTR | -3.204699 | -3.263346* | | |
| InEXCHR | | | -4.252879 | -5.36174*** |

Note: ***statistical significance at 1% level; **statistical significance at 5%;

*statistical significance at 10%

Source: Author's estimation using E-views 9

As a first step in the analysis, the variables were transformed into natural logarithm form except for interest rate and financial inclusion index. Tests for unit roots in the variables at both level and first difference values were conducted using the augmented Dickey-Fuller (ADF) test. Table 1 shows that interest rate is stationary at level I(0) while manufacturing output, commercial banks' loans and advances to manufacturing sector, ratio of broad money supply to GDP, ratio of credit to private sector to GDP, financial inclusion index, and exchange rate were stationary after first difference. Therefore, it was found that the null hypotheses of a unit root at level and first difference values were rejected in the ADF test for interest rate and other variables respectively. This is because in absolute term, the ADF t-test statistic values of the variables examined were found to be statistically significantly greater than their critical values. While the test statistic value of interest rate was significant at 10%, the test statistic values of other variables were significant at 1% as indicated above. This implies that none of the series is I(2) and can all be included in the ARDL estimation.

**ARDL Bound Test for Co-integration**

The ARDL estimation was done using two different models specified above. It begins by examining the relationship between the explanatory variables (ratio of broad money supply (M$_2$) to GDP, ratio of credit to private sector to GDP, financial inclusion index, interest rate, exchange rate) and the dependent variable (manufacturing output) in ARDL I model, followed by the relationship between the explanatory variables (ratio of broad money supply (M$_2$) to GDP, ratio of credit to private sector to GDP, financial inclusion index, interest rate, exchange rate) and the dependent variable (commercial banks' loans and advances to the manufacturing sector) in ARDL II model.

The two different models were used to in order to investigate the McKinnon-Shaw hypothesis on the impact of financial deregulation on the economy with focus on the manufacturing sector's output and access to credit from deposit money banks. Also, maximum of two lag lengths were considered to reduce the problem of degree of freedom in the time series analysis.

In each of the ARDL procedure examined, the optimum lag length selection criteria was carried out in order to determine the number of lag(s) to be included in the ARDL models prior to the bound test. The results are presented in Table 2 and Table 4.

**Table 2: Lag Length Selection for ARDL I Model**

| Lag | AIC | SC | HQ |
|---|---|---|---|
| 0 | 0.713279 | 1.024348 | 0.820660 |
| 1 | 1.685777 | 1.669385 | 1.284804 |
| 2 | 1.248302 | 2.109927 | 1.538213 |

Source: Authors' computation using E-views 9

From Table 2, the Shwarz Criterion (SC) and Hannan-Quinn criterion indicate that one maximum lag is to be included in the ARDL I model. The results of the ARDL bounds testing approach are shown in Table 3.

**Table 3: ARDL Bounds Test for Co-integration (ARDL I Model)**

Dependent Variable: ΔlnMAN

| Function | | **F-Statistics** |
|---|---|---|
| F(InMAN/InM2/GDP,InCPS/GDP, FINDEX, INT,InEXCHR) | | 0.7476731 |
| Critical Value | Lower Bound | Upper Bound |
| 10% | 2.26 | 3.35 |

Note: *** Statistical significance at 1% level; ** statistical significance at 5%;

\* Statistical significance at 10%
Critical values are obtained from Pesaran et al. (2001).
Source: Authors' computation using E-views 9

Having conducted the unit root test and the optimum lag selection, F-statistic test for cointegration is required to determine whether there is cointegration among the variables captured in the unrestricted error correction version of the ARDL model. This has been estimated using the bound testing approach and the results presented in Table 3 above.

From Table 3, the bound test results reveal that there is no existence of long run relationship between the explanatory variables (ratio of broad money supply ($M_2$) to GDP, ratio of credit to private sector to GDP, financial inclusion index, interest rate, exchange rate) and the dependent variable (manufacturing output) . In the function F(InMAN/InM2/GDP,InCPS/GDP, FINDEX, INT,InEXCHR), the null hypothesis that there is no cointegration is accepted at 1%, 5% and 10% levels as the F-statistic, 0.7476731 is less than the critical values at both the upper bounds and lower bounds indicating that there is no co-integration between the variables. The estimation procedure for ARDL I model stops here as a further regression to estimate the long-run and short-run parameters will lead to spurious results. Next step is to examine the ARDL II model.

**Table 4: Lag Length Selection for ARDL II Model**

| Lag | AIC | SC | HQ |
|---|---|---|---|
| 0 | -0.853275 | -0.542205 | -0.745894 |
| 1 | -0.595486 | -0.011877 | -0.396458 |
| 2 | -0.263232 | 0.598393 | 0.026679 |

Source: Authors' computation using E-views 9

We estimated the ARDL II model to investigate whether there is long run relationship between the explanatory variables (ratio of broad money supply ($M_2$) to GDP, ratio of credit to private sector to GDP, financial inclusion index, interest rate, exchange rate) and the dependent variable (commercial banks' loans and advances to the manufacturing sector). The procedure starts with the optimum lag length selection criteria as reported in Table 4. Based on Akaike Information Criterion (AIC) Shwarz Criterion (SC), and Hanna-Quinn Criterion (HQ), one lag length was selected.

**Table 5: ARDL Bounds Test for Cointegration (ARDL II Model)**

Dependent Variable: $\Delta$InCBLTM

| Function | F-Statistics |
|---|---|
| F(InCBLTM/InM2/GDP,InCPS/GDP, FINDEX, INT,InEXCHR) | 1.7945422 |

| Critical Value | Lower Bound | Upper Bound |
|---|---|---|
| 10% | 2.26 | 3.35 |

Note: *** Statistical significance at 1% level; ** statistical significance at 5%;

* Statistical significance at 10%
Critical values are obtained from Pesaran et al. (2001). Source: Authors' computation using E-views 9

From Table 5, the bound test results reveal that there is no long-run relationship between ratio of broad money supply $M_2$) to GDP, ratio of credit to private sector to GDP, financial inclusion index, interest rate, exchange rate and the dependent variable (commercial banks' loans and advances to the manufacturing sector) as the F-statistic, 1.7945422 is less than all the critical values at the upper and lower bounds. Hence, we could not go further to estimate the long run coefficients and speed of adjustment of the variables to long run equilibrium since there is no long run relationship among the variables in the system above.

## CONCLUSION AND RECOMMENDATIONS
The findings of this study which reveal that there is no existence of long-run relationship between financial deregulation and the growth of the manufacturing sector could be because firms in the sector are more of small and medium scale firms holding large and highly liquid money due to the underdeveloped nature of the Nigerian financial system of which they are excluded from participating actively in, and the need to safeguard against the uncertainties of the system. According to Gbandi and Amissah (2014), small and medium enterprises represent about 90% of total manufacturing establishments in Nigeria.

Also, the result which reveals that commercial banks' credit and advances to the manufacturing sector is not related to financial deregulation in the long-run implies that the liberalization of the financial system is yet to have significant impact on the sector as manufacturing firms are not heavily dependent on bank loans because firms in the sector largely rely on their own

sources of funding such as personal savings and retained earnings, and informal sources of funds; as such, the variables of financial deregulation as captured in the system are not important channels in the long-run. The narrow/liquid money ($M_1$) or the ratio of $M_1$ to GDP may be having greater role in the manufacturing sector. However, this needs empirical verification. In addition, it could be that the supply of financial assets is not enough or affordable to be accessed by the manufacturing sector in Nigeria.

The findings which revealed that financial deregulation does not significantly influence manufacturing output and credit to the sector, and points to the underdeveloped nature of the financial system calls for the need for the development of the system through mobilization of more savings from the public and linking resources from the informal or traditional financial sector to the banking system. This is expected to increase broad money supply ($M_2$) as a percentage of GDP, reduce interest rate, and increase access to funds and investment in the manufacturing sector.

Also, it is recommended that interest rate and exchange rate should be moderately regulated downwards to a more inclusive competitive level that would facilitate access to funds and foreign currencies in the banking system by manufacturing firms, and enhance investment in the sector. Finally, there is need for the development of indigenous technology and encouragement of firms in the sector to use locally sourced raw materials.

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