

## The Implication of Capital Market Development on Manufacturing Sector in Nigeria Within the Framework of Ardl – Bound Testing Approach

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**Abstract:** In order to enhance manufacturing sector productivity, the sector must have access to long term funds in the economy. Previous studies that examine the effect of capital market on manufacturing sector did not capture the short run and long run effect of capital market on manufacturing using dynamic technique of Autoregressive Distributed Lag technique. Premised on this, this study explored the short run and long run effect of capital market on manufacturing output in Nigeria using Bound Test and Autoregressive Distributed Lag technique from 1985 to 2017 base on secondary data obtained Central Bank of Nigeria (CBN) Statistical Bulletin. Evidence of long run relationship was found among manufacturing output, market capitalization, volume of transactions and all share price index as indicated by Bound Test. The result of the ARDL revealed that market capitalization had significant and positive effect on manufacturing output both in the long run and short run. Also, volume of transactions had positive effect on manufacturing sector output in the short run but negative in the long run while all share price index had negative and insignificant effect on manufacturing output both in the short run and long run. The result of the granger causality test indicated that both market capitalization and all shared price index did not granger cause manufacturing sector output while volume of transaction granger cause manufacturing sector output. The implication of this study is that that, capital promote manufacturing sector productivity in the short and not in the long run in Nigeria. The study contributed to previous knowledge by investigating the dynamic relationship between capital market and manufacturing sector using a more robust technique of Autoregressive Distributed Lag technique developed by Pesaran and Shin (1999).

**Key words:** Capital Market; Manufacturing Sector; ARDL

**JEL Classifications:** G23, L6, L60

### 1. Introduction

A well develop capital market plays significant role in the movement of idle funds from economic units with excess financial resources to the economic units with investment opportunities. Capital market ensures adequate circulation of financial

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resources and effective and efficient usage of the resources for productive and investment activities through the creation of medium and long term financial instruments. Capital market which is a subset of the financial market is a market where medium and long term funds can be obtained by real sector through the issue of long term financial instruments. It provides a mechanism for the linkage of different sectors of the economy together in order to ensure the effective and efficient allocation and usage of idle financial resource for economic prosperity and growth (Kwode, 2015).

Capital market plays a highly germane role in the growth and development process of an economy. The market provides a means for obtaining long term funds at low cost to finance long term capital project by industrial sector. The market also enables government to have access to long term financial resources in order to provide infrastructural facilities which are necessary tools for growth and development (Faloye & Adekunle, 2016). Nwaolisa, Kasie and Francis (2013) assert that capital market plays vital role in the economy through the channeling of financial resources and creating connection between the deficit and surplus sector by providing modern financial assets and structures for the mobilization and distribution of savings among competitive uses which are critical for both foreign and local investment growth.

Akinmulegun and Oluwole (2014) opine that manufacturing sector is one of the major sectors in an economy. Manufacturing sector comprises of firms that involves in the transformation of raw materials into finished or industrial goods. The sector engages in the employment of different factors of production such as land, labour, capital and technologies in the production of consumable or industrial products. Manufacturing sector contributes significantly to an economy in terms of export, employment creation, generation of foreign earnings and acceleration of gross domestic product. Commenting on the role of manufacturing sector in the economy, Omolara and John (2016) opine that the sector accounted for employment of larger percentage of the workforce in the economy in Nigeria. Manufacturing sector has been playing leading role in most developed countries like Germany, United State, Japan and China among others given them hedge in terms of growth, trade capacity and foreign earnings accumulation.

Manufacturing sector being a long term investment sector requires long term financial resources for its activities, thus comes it linkages with capital market. Hayatudeen and Adamamu (2017) assert that a well develop capital market must be able to meet the long term financial needs of the real and manufacturing sector. In order to ensure the development of the manufacturing sector, Okoye, Nwisienyi and Eze (2013) state that the capital market must provide adequate long term financial resources for financing the development or importation of technological know-how and invention required for manufacturing sector expansion and development.

Regulatory authorities have embark on series of capital market reforms in Nigeria to ensure that capital market plays its role of providing long term finance to manufacturing sector. The Nigerian capital market has been witnessing significant growth and expansion in the recent years with respect to market capitalization. Market capitalization rose from ₦10,275.3 billion in 2011 to ₦14,800.9 billion and ₦19,077.4 billion in 2012 and 2013 respectively before falling to ₦16,875.1 billion in 2014 (CBN, 2017). However, market capitalization rose to ₦17,003.4 billion in 2015 before falling to ₦16,185.7 billion in 2016 due to the recession witnessed in the economy which almost crumble activities in the real and financial sector before rising to ₦21,128.9 billion in 2017 (CBN, 2017). In terms of all share price index, the market rose from ₦20,730.6 billion in 2011 to ₦28,078.8 billion and ₦41,329.2 billion respectively in 2012 and 2013 (CBN, 2016). However, the all share price index fell to ₦34,657.2, ₦28,642.3 billion and ₦26,874.6 billion in 2014, 2015 and 2016 before rising to ₦38,243.2 billion in 2017 (CBN, 2017).

According to Central Bank of Nigeria Statistical Bulletin (2017), the contribution of manufacturing sector output fell from 12.7% in 2009 to 6.7% in 2010 before rising to 7.2% in 2011, 7.8% in 2011, 9% in 2013 and 9.8% in 2014. However, the contribution of the sector to gross domestic product fell to 9.5% and 8.8% in 2015 and 2016. Though, the sector's contribution to gross domestic product is 8.8% in 2017 this is not encouraging when compared with 2005 and 2006 when growth rate was 12.2% and 11.2% respectively (CBN, 2017). From the review of statistics, it is obvious that manufacturing sector's contribution has not improved, hence, there is need to identify major driver of manufacturing sector's productivity in Nigeria.

One of the major factors impeding the manufacturing sector is inadequate financial resources. Hayatudeen and Adamu (2017) state that manufacturing sector depends mainly on short-term financing from commercial banks and money market which is inadequate for financing the long term capital investment of manufacturing firms. Ibi, Joshua, Eja and Olatunbosun (2015) opine that in Nigeria, manufacturing companies have continued to face challenges such as capacity underutilization, dilapidated infrastructures, technological shortage, escalating production cost, policy non-implementation, general macroeconomic instability and lack of finance to maximize production capacity. However, given the capital shortage being experienced by manufacturing companies especially from commercial banks, there is need for the sector to explore the funding opportunities presented by the capital market.

The choice of Nigeria lies in the fact that the economy has been experiencing diverse challenges in the recent time despite the change in government and several policies initiated to enhance sectoral performance and economic growth. It is believed that the manufacturing sector can play central role in the development of the economy if adequately financed. The sector can contribute to employment generation, foreign

exchange earnings, export promotion and gross domestic product. This study thus examined the effect of capital market development on manufacturing sector in Nigeria. The remaining part of this paper is structured as follow. Part two presented the review of literature in the study area. Part three focused on methodology. Part four present and interpret results while part five concluded the study.

## 2. Literature Review

The role of capital market on the economy has been a subject of discussions among scholars. Capital market which is one of the major sectors in the financial system plays import role in mobilizing and re-allocating funds in large volume to the real sector. Schumpeter (1932) emphasized the role of financial market in ensuring availability of financial resources needed for real sector activities which is germane for growth and development. Thus, under a regulatory framework, the capital market promotes investment in financial instruments which are used to raise funds by real sector for long term production activates. Bencivenga and Smith (1991), Levine and Zervos (1996) reported that capital market has long run linkage with the development of the real sector by accumulation and allocating savings for productive and real investment which stimulate overall growth in the economy. Thus, the linkage between capital market and manufacturing sector is adequately established in financial development theories and as a result of this, empirical studies have erupted on the relationship between capital market and manufacturing sector in recent years.

Udoh and Ogbuagu (2012) used total production framework and co-integration technique to examine the effect of financial sector development on industrial sector in Nigeria and it was found that both the long run and short run dynamic coefficients of financial sector development variables had negative and significant impact on industrial production. Dalvi and Baghi (2014) investigated the relationship between firms' performance and liquidity of shares using data from 154 companies listed in Tehran Stock Exchange It was revealed that there is a strong and positive correlation between the liquidity and firms performance. Dragota and Oprea (2014) indicated that the there is low level of efficiency in the market in Romania by investigating Romanian stock market's informational efficiency. Also, Chipaumire and Ngirande (2014) examined the impact of stock market on economic growth in South Africa and the result of the regression analysis indicated that stock market liquidity had positive impact on growth in South Africa.

Osamwanyi and Kasimu (2013) assessed the effect of stock market variables such as stock market capitalization, rate of stock turnover ratio, value of traded stock, number of listed securities and stock market index on real gross product in Sub-Saharan African countries using Granger causality test. It was found that there is no

causal relationship between stock market development and economic growth. Aye (2013) investigated the causality between financial deepening, economic growth and poverty in Nigeria from 1960 to 2001. The study adopted Vector Autocorrelation and Vector error correlation model and it was showed that is no evidence of the long run relationship between finance and economic growth. In the same year, Adefeso, Egbetunde and Alley (2013) investigated the long-run and causal link between the stock market and economic growth in Nigeria using data covering the period of 1980 to 2010 which was analyzed using error correction model (VECM) and it was indicated that stock market development and economic development have long run relationship in Nigeria.

By employing unit root test, co-integration test, granger causality test and the error correction mechanism (ECM), Ibi *et al.*, (2015) looked at the relationship between capital market and industrial sector development in Nigeria period from 1980 to 2012. The result of the analysis showed that there exist long run equilibrium relationships among the variables. Kwode (2015) examined the role of the capital market in financing the manufacturing sector in Nigeria from 1970 to 2012 through the adoption of ordinary least square method, co-integration test and error correction method and it was inundated that there is long relationship between capital market and the development of the manufacturing firms in Nigeria while capital market had insignificant impact on the manufacturing sector. Nwolisa and Chijindu (2016) assessed the casual relationship between index of industrial production and Nigeria stock market liquidity from 1981 to 2015. The result of the OLS regression reported that stock market liquidity has not positively influenced index of industrial production. Hayatudeen and Adamu (2017) assessed the impact of stock exchange on the manufacturing sector in Nigeria from 1980 to 2015 by employing Augmented Dickey Fuller (ADF) and Kwiatkowski-Philips-Schmidt-shin (KPSS) unit root test, co-integration test and error correction model (ECM). The study revealed that there is a long term relationship between stock exchange and the development of the manufacturing sector in Nigeria, but the growth in stock exchange activities did not impact significantly on the manufacturing sector during the period under review.

Studies in Nigeria and other countries have largely focused on the relationship between capital market and economic growth in Nigeria. Very few studies focused on the relationship between capital market and manufacturing sector in Nigeria (Kwode 2015; Hayatudeen & Adamu, 2017; Ibi *et al.*, 2015; Nwaolisa & Chijindu, 2016; Ariwa, Ani, Onyele, Okeleme & Okwuchkuw, 2017). There is need to conduct more study given the critical role of manufacturing sector in the economy and the significant challenges being faced by the manufacturing sector. Furthermore, few studies documented the short and long run effect of capital market on manufacturing sector productivity within the framework of Autoregressive Distributed Lag in Nigeria. Assessing the short run and long run implication of capital market on manufacturing sector will enable policy makers to know the most portent policy

framework to adopt in stimulating the sector's performance by effectively positioning the capital market in economy.

### 3. Methodology

This study employed time series data which spanned through the period of 1985 to 2017. Data were obtained mainly from secondary source particularly from Central Bank of Nigeria (CBN) Statistical Bulletins (2017) and Nigerian Stock Exchange (NSE). The study is based on non-experimental research design to examine the effect of market capitalization, volume of transaction and all share price index on manufacturing sector output in Nigeria.

#### 3.1 Model Specification

This study is anchored upon Irving Fisher's theory of capital and investment and followed the model of Ibi *et al.*, (2015) with little modification. The empirical model for this study is given as:

$$MOU = f(MKAP, VLT, ASPI)$$

This is econometrically given as:

$$MOU = \Theta_0 + \Theta_1 MKAP_t + \Theta_2 VLT_t + \Theta_3 ASPI_t + \epsilon_t$$

#### Where:

MOU = Manufacturing Output. MKAP = Market Capitalization. VLT = Volume of Transaction, ASPI = All Share Price Index.  $\Theta_0$  = Constant Term.  $\Theta_1 - \Theta_3$  = Parameters.  $\epsilon$  = Error Term

#### 3.2. Analytical Framework

The techniques employed in this study include Augmented Dickey Fuller (ADF), Bound Test and Autoregressive Distributed Lag. Before evaluation, the stationary properties of the data employed were investigated because non-stationary data may lead to spurious result. Thus, the study used Augmented Dickey-Fuller (ADF) and Philip-Perron unit root test for unit root testing.

The study employed Autoregressive Distributed Lag technique to examine the short run and long run effect of capitalization, volume of transaction and all share price index on manufacturing sector output. While Bound Test technique of the ARDL formwork is adopted to establish the long run co-integration among the variables. The technique is preferred to other co-integration techniques because it suitable for small sample data and also integrates sufficient number lags to capture the data thereby solving the problem of endogeneity and autocorrelation.

The Bound Testing approach to co-integration is given as:

$$\Delta \text{MOU}_t = \alpha_{01} + \delta_1 \text{MOU}_{t-1} + \delta_2 \text{MKAP}_{t-1} + \delta_3 \text{VLT}_{t-1} + \delta_4 \text{ASPI}_{t-1} + \sum_{i=1}^q \beta_1 \text{MOU}_{t-1} + \sum_{i=1}^q \beta_2 \text{MKAP}_{t-1} + \sum_{i=1}^q \beta_3 \text{VLT}_{t-1} + \sum_{i=1}^q \beta_4 \text{ASPI}_{t-1} + \varepsilon_{1t}$$

The Bound Test is subject to the testing the Null hypothesis of no co-integration to the Alternate hypothesis of the existence of co-integration among the variables. Thus, if the estimated F bound test is greater than the critical value at 5%, it will be concluded that there is long run relationship among the variables and vice versa.

The generalized *ARDL* model is given below according to Pesaran and Shin (2001) is given as:

$$Y_t = \alpha + \sum_{i=1}^p \delta_i Y_{t-i} + \sum_{i=1}^q \beta_i X_{t-i} + \varepsilon_t$$

Where  $Y_t$  is the endogenous variable,  $X_t$  represents the explanatory variables which can either be combination of  $I(0)$  and  $I(1)$  or purely  $I(1)$  according Pesaran and Shin (2001).  $\alpha$  is the constant,  $\delta$  and  $\beta$  are parameters to be estimated;  $p$  and  $q$  are optimal lag orders. Thus, the short run and long run coefficient of the effect of capital market on manufacturing sector is depicted in equations below:

$$\text{MOU}_t = \alpha_{01} + \delta_1 \text{MKAP}_t + \delta_2 \text{VLT}_t + \delta_3 \text{ASPI}_t + \varepsilon_t$$

$$\text{MOU}_t = \alpha_0 + \sum_{i=1}^p \lambda_1 \Delta \text{MOU}_{t-i} + \sum_{i=1}^p \lambda_2 \Delta \text{MKAP}_{t-i} + \sum_{i=1}^p \lambda_3 \Delta \text{VLT}_{t-i} + \sum_{i=1}^p \lambda_4 \Delta \text{ASPI}_{t-i} + \phi \text{ECT}_{t-1} + \mu_t$$

#### 4. Result and Discussions

**Table 1. Pearson Correlation Result**

	MOU	MKAP	VLT	ASPI
MOU	1.000000			
MKAP	0.352674	1.000000		
VLT	0.099924	0.472002	1.000000	
ASPI	0.156513	0.886056	0.378658	1.000000

Source: Researcher's Computation, 2019

The result of the correlation analysis among the variables are presented in table 1 and it indicates that the explanatory variables namely market capitalization, volume of transactions and all share price index are not perfectly correlated with manufacturing output with their correlation values being less than 70%. Furthermore, the result indicates that the explanatory variables namely market capitalization, volume of transactions and all share price index are positively and

weakly correlated with manufacturing output which implies increase in market capitalization, volume of transactions and all share price index will lead to increase in manufacturing output.

**Table 2. Summary of the Result of Unit Root Tests**

ADF			PP		Order of Int.
Variables	T-stat	P-value	T-stat	P-value	
MOU	-4.113108	0.0149	-3.537096	0.0135	<b>1(I)</b>
MKAP	-5.412059	0.0001	-5.388974	0.0001	<b>1(I)</b>
VLТ	-7.911257	0.0000	-12.70844	0.0000	<b>1(I)</b>
ASPI	-5.533132	0.0005	-7.708500	0.0000	<b>1(I)</b>

*Sources: Researcher's Computation, 2019*

The stationarity and order of the integration of the time series data employed in the study are checked by applying both ADF and PP techniques. The results of the two tests are reported in table 2. The results show that that manufacturing output, market capitalization, volume of transactions and all share price index are not stationary at first difference. Approximately, all two tests indicate the same results, which confirm the robustness of the variables. This implies that the time series are integrated of the same order, 1(I) which is a pre-condition for the adoption of ARDL technique according to Pesaran and Shin (1999).

**Table 3. Bound Co-integration Test Result**

Test Statistic	Value	K
F-statistic	<b>9.879324</b>	<b>3</b>
<b>Critical Value Bounds</b>		
Significance	<b>I0 Bound</b>	<b>I1 Bound</b>
10%	3.47	4.45
5%	4.01	5.07
2.5%	4.52	5.62
1%	5.17	6.36

*Sources: Researcher's Computation, 2019*

#### **(Akaike info Criterion Indicated Lag 2)**

In order to ascertain the long run relationship among the variables, the study employed Bound Co-integration technique as presented in table 3. The result indicates that there is long run relationship among the variables with F-statistics given as 9.879324 which is greater than both the lower bound and upper bound of 4.01 and 5.07 values of the Critical Value at 5% significance level. In this regard, the null hypothesis of no long run relationship among that manufacturing output, market capitalization, volume of transactions and all share price index is rejected.



**Autoregressive Distributed Lag****Table 4. Short Run Co-integrating Form**

<b>Selected Model: ARDL(1, 2, 2, 0)</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
<b>D(MKAP)</b>	0.199045	0.026772	7.434723	0.0000
<b>D(MKAP(-1))</b>	0.108615	0.041273	2.631618	0.0156
<b>D(VLT)</b>	0.000534	0.000204	2.613371	0.0162
<b>D(VLT(-1))</b>	0.000247	0.000149	1.653737	0.1131
<b>D(ASPI)</b>	-0.048180	0.007758	-6.210284	0.0000
<b>CoIntEq(-1)</b>	-0.592092	0.081103	-3.135491	0.0090

Sources: Researcher's Computation, 2019

The short run co-integrating form of the Autoregressive Distributed Lag is presented in table 4. The result reveals that market capitalization has positive and significant effect on manufacturing output in Nigeria. Also, the first period lag of market capitalization produced positive and significant effect on manufacturing output in the short run. This implies that one unit increase in market capitalization will lead to increase in manufacturing output in Nigeria.

The result of the short run relationship shows that both at current period and first period lag, volume of transactions has positive and significant effect on manufacturing output but significant at first period lag. The implication of this is that a unit increase in volume of transactions both at current period and first period lag will lead to increase in manufacturing output in Nigeria.

The result further shows that all share price index has negative and significant effect on manufacturing output in Nigeria which implies that a unit increase in all share price index will lead to fall in manufacturing output in Nigeria in the short run. Finally, the result indicates that the co-integrating equation has the expected sign with a coefficient of -0.592092 and probability of 0.0090 which is significant at 5%. This implies that any disequilibrium in the model will be adjusted at a speed of 59% annually.

**Table 5. Long Run Coefficient**

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
<b>MKAP</b>	1.209664	0.471059	2.567968	0.0179
<b>VLT</b>	-0.016262	0.010647	-1.527300	0.1416
<b>ASPI</b>	-0.523174	0.434213	-1.204879	0.2417
<b>C</b>	9.768616	2.545017	1.057140	0.3025

Sources: Researcher's Computation, 2019

The long run coefficient of the Autoregressive Distributed Lag is depicted in table 5. The result shows that market capitalization stimulate manufacturing output with a coefficient of 1.209664 which is significant at 5% given a p-value of 0.0179 which implies that a unit increase in market capitalization will lead to 1.209664 increase in manufacturing output which is in line with the a priori expectation.

Contrarily, the result of the long run coefficient indicates that volume of transactions negatively influenced manufacturing output in Nigeria with a coefficient of -0.016262 and probability value of -1.527300 which is greater than 5% significance level which suggested that manufacturing output will decrease by 0.523174 as volume of transactions increase by a unit.

Finally, all share price index has negative and insignificant relationship with manufacturing output with a coefficient of -0.523174 and its corresponding probability value of 0.2417 indicating that a unit increase in all share price index will lead to fall in manufacturing output by 0.523174.

**Table 6. Pairwise Causality Test Result**

<b>Null Hypothesis:</b>	<b>Obs</b>	<b>F-Stat.</b>	<b>Prob.</b>	<b>Result</b>
MKAP does not Granger Cause MOU		2.68614	0.0870	No
MOU does not Granger Cause MKAP	31	2.25741	0.1247	Causality
VLT does not Granger Cause MOU		4.45328	0.0217	One Way
MOU does not Granger Cause VLT	31	2.59880	0.0936	Causality
ASPI does not Granger Cause MOU		0.85314	0.4377	No
MOU does not Granger Cause ASPI	31	0.92642	0.4086	Causality

*Source: Researcher's Computation, 2019*

The result of the Pairwise Causality test is indicated in table 7. The result shows that there is independent relationship between market capitalization and manufacturing output and hence it is concluded that market capitalization does not granger manufacturing output. However, unidirectional relationship is established between volume of transactions and manufacturing output with causality running from volume of transactions to manufacturing output which implies that volume of transactions causes manufacturing output. Finally, independent relationship is found between all share price index and manufacturing output which implies that all share price index does not granger caused manufacturing output.

## 5. Conclusion

This study examined the effect of capital market on manufacturing sector output in Nigeria. The study adopted modern econometric techniques such as Phillip-Perron and Augmented Dickey-Fuller unit root test to determine the order of integration of the variables, Bound Co-integration test for ascertaining long run relationship among the variables, ARDL to estimate the short and long run effect of the independent variables on the dependent variables and Pairwise granger causality test for establishing the direction of causality among the variables.

The study concluded that, capital market stimulate manufacturing sector productivity in the short run rather than in the long run. It was recommended that policy should be formulated to increase entering into the market by small, medium and large manufacturing companies to increase the rate of market capitalization in the market which attracts investable funds from idle sector of the economy. Also, there is need for the development and introduction of new and advanced financial instruments like fixed income securities, hedging instrument, such as futures, forward and other derivatives, securities lending and collectives' investment schemes to increase the inflow of funds into the market and expand the volume of transactions in contributing positively to the manufacturing sector output.

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