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Financial Deepening and Manufacturing Sector Performance in Nigeria: Evidence from Bank, Non-bank and External Financing Sources

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Abstract

The paper investigated the effect of financing deepening on the performance of the manufacturing sector, using a time series data from 1981 to 2019. The study employed the bounds testing co-integration approach and confirmed the existence

of long-run convergence relationship between manufacturing value added and the regressors. The result of the empirical investigation confirms the finance-growth hypothesis. The bank financial deepening significantly influences the manufacturing sector performance. However, the non-bank financial deepening and external financing do not significantly influence the manufacturing sector performance in Nigeria. This evidence can be linked to the fragmentation of the shareholding structure of few leading firms and considerable number of firms operating in the market space but not listed on the stock exchange market. Also, the highly skewed FDI Inflows towards the extractive industries leave less financing options for the manufacturing sector. It is necessary to note that the manufacturing sector performance does not respond significantly to the lending interest rate – a situation not unconnected to the high cost of capital in the economy. Finally, the paper recommended the need for deliberate policies that aim to deepen the financial sector via intermittent intervention by the monetary authority and mandating compulsory financing of the real sector by the retail commercial banks to the tune of certain proportion of their total loan creation.

Keywords*: Financial deepening, Manufacturing sector, FDI, Bounds test*

JEL Classification: G23 O14 E43 C22

1. Introduction

Gezer (2018) states that a financial system exists to breach the gap between lenders and borrowers while managing the risks associated with lending. This makes the financial system relevant in an economy. Efanga, Ogochukwu and Ugwuanyi (2020) note that, for an economy to attain its macroeconomic objectives, it needs a sound financial system. This attributes to the reason why literature on the financial sector has gained a lot of recognition. Nwakobi, Oleka and Ananwude (2019) recognise that growth and development of an economy can be a result of the development of the financial sector. It has also been said that financial sector development is responsible for the different level of development among countries.

There is no doubt that the financial sector forms a crucial part of performance of an economy ever since Schumpeter (1911) indicated that financial intermediation cannot be neglected in the growth process of an economy. Similarly, Gurley and Shaw (1967) posit that financial intermediaries enhance capacity in the savings and investment process which are essential for growth. However, financial deepening is not limited

to financial intermediaries' functions in an economy as Islam, Liu, Khan, Reza, Yahia and Nasrin (2018) point out that other sectors of the economy are affected by the depth of the financial sector. Ductor and Grechyna (2015) opine that a trade-off exists between the real sector and financial deepening.

According to Adeyefa and Obamuyi (2018), financial deepening is more inclusive of every aspect of the financial system. Igwebuike, Udeh and Okonkwo (2019) explain financial development or deepening as the expansion of financial institutions and instruments. Nwakobi et al. (2019) assert that low cost of fund characterises the depth of a financial system due to the various options of financial instrument.

Kolawole, Ijaiya, Sanni and Aina's (2019) study describes financial deepening as the strategies that accelerate the development process. The study also explains that deepening of the financial sector can be viewed from the bank-based measure that entails the financial intermediaries' development and the market-based measure that entails the financial market development. In order to enhance the depth of the financial system, economies encourage reforms. These reforms can be implemented to prevent financial crisis or to mitigate an ongoing financial crisis. Also, these reforms can be in the form of financial liberalisation or deregulation like the Structural Adjustment Programme (SAP) by the International Monetary Fund to liberalise the financial sectors in Africa between 1980s and 1990s (Otchere, Senbet, & Simbanegavi, 2017).

The SAP was designed to deregulate the interest rate, promote privatisation of government-owned banks and, in general, develop the financial markets and banks industry. Nigeria adopted the SAP in 1986 to 1987 and it marked a defining moment in the Nigerian financial system that the effect is still being felt till today. Adediran, Oduntan and Matthew (2017) note that the reforms that the SAP brought to the financial sector led to other reforms that Nigeria has experienced till date. However, the problems of financial exclusion and inability to access fund by firms and businesses still persist in the Nigerian financial system (SMEDAN/NBS, 2017).

Ojong, Ekpuk, Ogar and Emori (2014) note that one of the reasons behind the Nigerian financial sector reform is to facilitate the increased contribution to the real sector by the financial system. However, it is not clear if the financial deepening promotes development of the real sector or the real sector triggers the development of the financial sector or the

financial sector has to develop to a particular level to trigger expansion of the real sector (Adeniyi, Oyinlola, Omisakin, & Egwaikhide, 2015; Ductor & Grechyna, 2015; Islam et al., 2018). Rousseau and Wachtel (2011) conclude that the relationship between financial development and the growth of the economy is unstable.

Financial deepening, aside from being linked to growth in the economy, has also been connected to growth of the individual sector, especially the manufacturing sector. Akinmulegun and Akinde's (2019) study recognises that financial deepening influences the performance of the manufacturing sector. Ekor and Adeniyi (2012) state that the impact of financial deepening on the real sector with focus on the manufacturing sector in the economy can no longer be ignored. This demonstrates that financial deepening can lead to growth in the economy through the manufacturing sector channel.

Aminu, Raifu and Oloyede (2019) explain the manufacturing sector as an important sub-sector of the economy due to its role in promoting growth in the economy. Following the industrial revolution that happened in Britain, the manufacturing sector has proved to be a sub-sector that drives growth and development of any economy if the sector is given much attention (Mesagan, Olunkwa, & Yusuf, 2018). It is opined that financial sector performing at optimal level can have a significant impact on the manufacturing sector. Schumpeter (1911) states that finance is necessary for development as it generates investment for research and development that is essential for growth and development to take place. Since the manufacturing sector happens to be one, which thrives on research and development to produce essential goods and services, studies have been carried out to understand the relationship between finance and the real sector, especially the manufacturing sector.

Neusser and Kugler (1998) attempted to investigate the Schumpeterian theory for 13 OECD countries while recognising that the financial sector of some economies have been industrialised, thereby creating multiple finance options such as financial market and financial intermediaries. It was discovered that the results were incoherent for all 13 countries examined. Some countries seemed to have a long-run relationship with different variables – either the financial intermediary or financial market proxy. Adeyefa and Obamuyi (2018) explain that the manufacturing sector is affected by financial deepening when measured with broad money in the long run but not in the short run for the Nigerian case. However, Mesagan et al. (2018), using the same broad money variable combined with other

finance proxy such as liquid liabilities and credit to private sector, found that no significant relationship existed between financial sector and the growth of the manufacturing sector.

Focusing on the financial intermediary aspect of financial deepening, Olanrewaju, Aremo and Aiyegbusi (2015) concluded that financial deepening impacted the manufacturing sector performance negatively. The non-consensus between the results concerning the impact of financial deepening on the manufacturing sector prompts the authors to carry out a research to expand knowledge in the subject area.

The kind of relationship that exists between the manufacturing and financial sectors is still debatable. This could be as a result of the various measures available to measure financial deepening, or the manufacturing sector of advanced countries seems to be more developed than that of developing countries. Therefore, this study sees the need to add to the body of knowledge on the financial and manufacturing sectors relationship by paying attention to the financial intermediaries, financial markets and foreign finance in determining if financial deepening influenced the growth of the manufacturing sector of Nigeria in the long run. The study also employs the stylised fact to further give an overview of the nature of the financial sector in Nigeria and used the Autoregressive Distributive Lag (ARDL) and the Granger causality test in evaluating the long-run and short-run relationship between the finance and manufacturing sectors.

Stylised Facts

Figure 1 depicts the trend of manufacturing value added, bank financial deepening, foreign direct investment, lending interest rate and finance fragmentation in the non-bank financial institutions. Figure 1a shows the downward trend of the manufacturing sector in Nigeria. The share of manufacturing output in total output has declined considerably since 1981, reaching a record low of about 6% in 2010 before resuming an upward turn. The trend implies the relatively weak performance of the manufacturing sector. The decline would not be unconnected to the neglect of the real sector following the discovery of crude oil in commercial quantity. The manufacturing sector seems to have struggled to establish a steady stand between 1980 and 1992 (as shown by the incessant rise and fall) but fell drastically from its contribution of about 22% to 7% as at 2010 (WDI, 2019). Seeing the attendant economic damage caused by the undue

concentration on crude oil and other commodity exports, the campaign for diversification of the economy and import substitution programmes via the development of the domestic industries took centre stage in the early 2000. The effect of this re-awakening is reflected in the upward trend in the manufacturing sector performance in Nigeria after about four decades of gross neglect and declining contribution to the GDP. The trend of bank financial deepening (domestic credit to private sector) has been rising in the period 1980 – 2007. Though the trend is flatter compared to the fall in the manufacturing sector, the rising trend of bank financial deepening, despite declining performance of the manufacturing sector, indicates less policy concentration and response to the sector in the period 1980 to the late 1990s. A careful observation of the trend progression reveals that, from 1998 upwards, bank financial deepening experienced a steep upward trend, thereby leading the cycle of the manufacturing sector performance in a similar direction.

Figures 1b and 1c show the manufacturing sector performance paired with foreign direct investment and lending interest rate respectively. Foreign direct investment inflow has been low in the period observed. Also worrisome is that only a negligible portion in these weak inflows targets the manufacturing sector (Ogundipe, Adu, Ogundipe, & Asaleye 2019). Consequently, the lending interest rate has averagely maintained an upward trend, hence constituting a deterrent to the performance of the manufacturing sector due to the rising cost of capital. Figure 1d depicts the characteristics of the non-bank financial institutions that will likely hinder its capability to bridge the finance gap in the real sector. Available evidence as at May 2020 shows that, of the 165 listed on the Nigerian Stock Exchange, only 10 (precisely 6%) control a cardinal wheel of the market. These companies control a whopping 90% of the total market capitalisation. In addition to the dominance of these titans, the highly skewed float in the shareholding structure also constitutes a significant impediment to the financing options available in the non-bank financial institutions.

As the assessment proceeds, the paper provides useful insights into the renewed interaction of the manufacturing sector with bank and non-bank financial deepening, and lending interest rate. This main thrust of the study provides an enhanced understanding and draws significant attention towards policy reengineering for adequate financing in the real sector. The remaining part of the paper is structured as follows: the second section

highlights related literature; the third section describes the research methods with detailed description of the data, variables, model and estimation procedure. The fourth section presents the result with relevant discussion. Finally, the fifth section concludes the paper and proffers relevant policy implication.

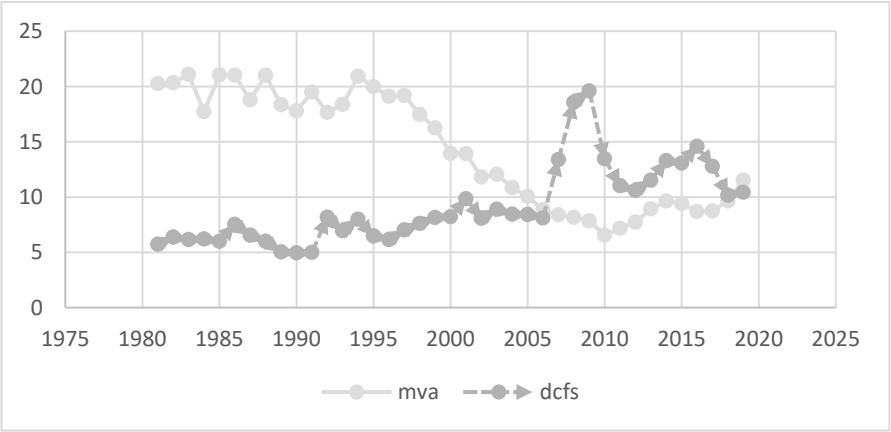

Figure 1a: MVA and DCFS

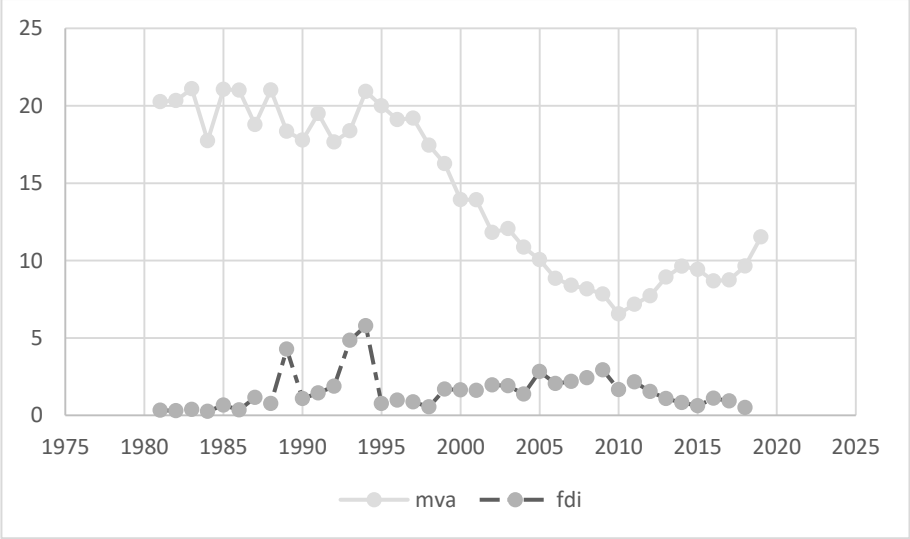

Figure 1b: MVA and FDI

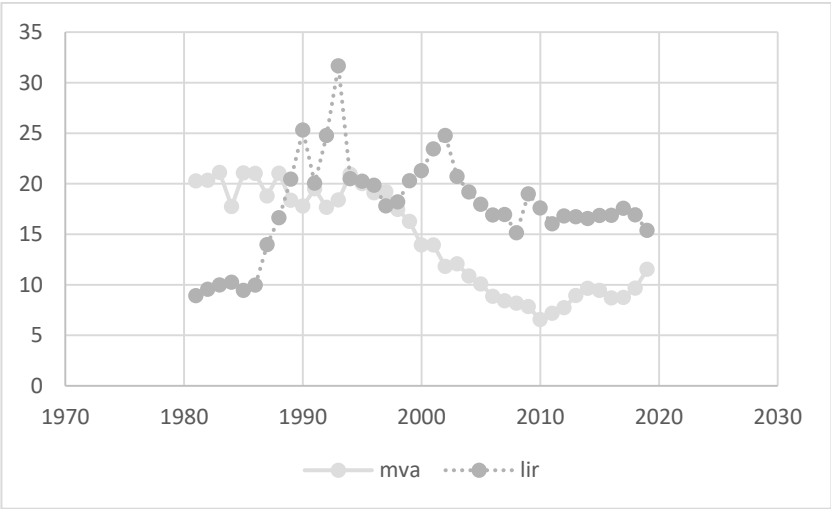

Figure 1c: MVA and LIR

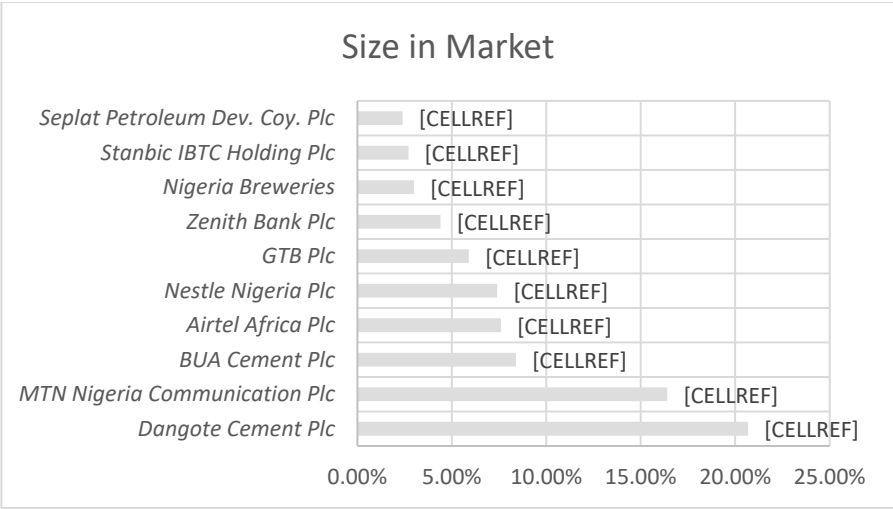

Figure 1d: Financing fragmentation in the non-bank financial institutions

2 Review of Related Literature

2.1 Conceptualising Financial Deepening (FD)

In explicating financial deepening, three concepts are paramount: liquidity, the financial system, and the extent of its development. As pointed out by

Rakesh (2006), these concepts go a long way towards defining various economic outcomes within a country. Several studies (Ogbuagu & Ewubare, 2017; Okafor, Onwumere, & Chijindu, 2016) explain financial deepening as the ease with which economic agents access liquidity and other services offered by financial intermediaries and regulators. Kolawole, Ijaiya, Sanni and Aina (2019) describe financial deepening as the development of a fair financial system that covers all sectors and income groups within the economy, as it relates to the money supply, credit and the interactions between financial intermediaries (arbitrators) and other economic agents. Ogbonna and Ejem (2020) opine that financial intermediaries, which contribute heavily to the financial system, were essential for economic activities within agents.

2.2 Conceptualising the Real Sector

CBN (2013) defines the real sector as the contributing effects of economic agents in the production of goods and services, which does not directly involve financial intermediaries and institutions, with a focus on meeting the aggregate demand and consumption of the economy. Gottschalk (2015) explains the real sector breaks by categorising it into two broad objectives. The first objective focuses on the output level within the economy, which ultimately contributes to critical macroeconomic variables such as employment, investment, income and consumption. The second objective focuses on prices, which determine equilibrium levels and finally determine output.

CBN (2014) report on the real sector in Nigeria provides a candid understanding into the components that make up this sector, such as aggregate demand and supply, levels of consumption, investment and price determination within the economy. The report indicates that the real sector has been a contributing driver of economic growth for decades. Some of the major sub-sector contributors are: natural resource sectors (mainly oil and gas), broader non-oil industry made up of telecommunications, technology, construction firms, retail services, etc. The real sector, a significant growth engine, while not made up of the financial sectors, requires a healthy coexistence with financial intermediaries and the financial system. A healthy financial system ensures proper liquidity to support output levels and general stability, and this has lasting effects on the

contribution of this sector to economic growth (Yusuf, 2012; Khalil & Chaisrisawatsuk, 2018).

2.3 Empirical Review

Body of literature is filled with various attempts to understand the relationship existing between the levels of financial deepening on the output levels in an economy. However, the results are inconclusive. Kolawole et al. (2019), using the vector error model, found a highly significant relationship between financial deepening and economic performance in Nigeria. The study also discovered that financial depth, based on capital and stock market in Nigeria, significantly contributes to the level of economic growth. Similarly, Efanga, Ogochukwu and Ugwuanyi (2020) found not only a significant relationship but also a positive correlation between financial deepening and output growth in Nigeria. Using the Johansen cointegration technique and FMOLS model, the study proved that there is the presence of a significant relationship between money supply, credit and market capitalisation on economic performance. The study found that improving money supply and creating favourable credit and investment policies will have lasting effects on real output. Likewise, Nwafor and Yomi (2016) studied how financial deepening impacted on the growth of the Nigerian economy. The findings of the study indicate that financial deepening significantly influenced the Nigerian economy and economic growth in Nigeria has also contributed to increase in financial depth in Nigeria.

However, other studies have seen insignificant, zero causal nexus, and/or negative relationships between financial deepening and the growth in output (Ndebbio, 2004; Ahmed, 2013; Ahmed & Mmolainyane, 2014). Amaefula (2019), using the ARDL model, found no significant relationship between financial deepening and economic growth in Nigeria in both the short run and long run for the 35-year time series dataset used to perform the analysis. The study posits that the government and relevant authorities need to create policies that would significantly and positively boost the level of economic growth within the country. Furthermore, Pramesti (2018) examined the causal relationship between financial deepening on economic growth in Indonesia. Performing the Granger causality test for causality and the vector error correlation model, the study found no causality between money supply, proxy for financial deepening and economic growth in

Indonesia. The study concluded that wrong policy measures being implemented in Indonesia were responsible for the poor relationships among the variables.

Several researchers have also attempted to observe the relationships that exist between financial deepening on domestic and foreign direct investment to see if financial deepening attracts or repels foreign direct investments. Liu, Islam, Khan, Hossain and Pervaiz (2020) studied this relationship among One Belt One Road (OBOR) countries and found a positive relationship between financial deepening and foreign direct investments. This implies that certain levels of financial deepening in OBOR countries attracted foreign direct investment in these countries. Specifically, the study discovered that countries with an FDI threshold below 0.1803 attracted less foreign investments than their higher counterparts. Similarly, Adeniyi et al. (2012) studied the nexus between financial development, foreign direct investment and output in five SSA countries, Côte d'Ivoire, Gambia, Ghana, Nigeria and Sierra Leone. The study employed the use of VECM and found that FDI had an effective and efficient impact on economic output, indicating that the financial system in the countries analysed must have been developed to some extent.

Obafemi, Oburota and Amoke (2016) show that a unidirectional and significant relationship existed between financial deepening and domestic direct investment after employing the Johansen cointegration technique and Granger causality tests. Similarly, Uchenna, Odey and Effiong (2017) describe financial deepening as having significant impacts on household savings. However, some studies found a somewhat insignificant relationship between financial deepening and domestic investment, which is a testament to the weak financial system within Nigeria, and Africa (Maduka, 2012; Sakyi, Boachie, & Immurana, 2016).

On firm levels (real sector economic agents), some studies attempted to understand the nature of relationships existing between the real sector and financial deepening. Ademola and Marshal (2018) studied the impact of financial deepening on manufacturing firms in Nigeria, using money supply (M2), credit and market capitalisation. They found M2 to have a direct and significant nexus with manufacturing firms, while both credit and market capitalisation revealed an insignificant relationship. The study found that, when there are financial system reforms, the subsequent periods will see manufacturing firm performances improve, and therefore advocate favourable financial sector reforms.

Similarly, John and Ibenta (2017) studied financial deepening on the growth of entrepreneurship in Nigeria, using the Pearson correlation matrix to ascertain the levels of linear associations between financial deepening and entrepreneurship. The study found that both money supply and credit to the private sector had positive, albeit insignificant, relationships with entrepreneurial growth – which makes up the real sector. The study ascertained that improved money supply could cater for capital needs. Therefore, more efforts to increase investment for entrepreneurs should be encouraged. Also, Stephen and Olufemi (2015) studied the impacts of financial development on the real sector in Nigeria in the 21st century and found positive relationships existing between the financial development and the real sector in Nigeria.

This review above shows that, although the extent to which economic output growth and financial deepening impact is somewhat inconclusive, there have been numerous studies on this relationship. While one can argue that the real sector determines growth outcomes, the output in the economy is the combination of all sectors – real and financial. It is, therefore, pertinent to understand the nexus financial deepening has on the real sector in Nigeria, and this study covers this gap extensively.

3. Methodology

The paper examined the long-run relationship between real sector performance and bank and non-bank financial deepening in Nigeria. This present examination, contrary to the extant studies, analysed the effect of bank and non-bank financial deepening on the real sector performance in Nigeria. In achieving this, the paper adopted the ARDL bounds test proposed by Pesaran, Shin and Smith (2001). The choice of the ARDL bounds testing cointegration approach is premised on the condition of mixed order of integration attained by the variables in the model. The procedures adopted in this section include: first, the time series properties of the variables of interest were examined. This is followed by ascertaining the short-run dynamics or causal relationship between the output variable and the regressors. Finally, the ARDL bounds testing approach was conducted to assess the long-run relationship between the variables in the model; and diagnosis tests were conducted to ascertain the reliability and the stability of the parameter coefficients.

3.1 Data and Variables

The data used for the empirical investigation were obtained from the World Development Indicators of the World Bank publication 2019 covering the period of 1981-2019. The choice of variables follows the procedure adopted by Iyoboyi (2013) with relevant argumentation needed to address the inadequacy of the erstwhile studies. In addition to the two measures of financial deepening in extant literature, this investigation accounts for external financing (foreign capital inflow) in the form of foreign direct investment in explaining the development of the real sector (proxied by manufacturing value-added). Moreover, this study addresses the attractiveness of the banking sector credit to the firm, especially in an economy with infrastructural deficiencies and high transaction cost. The attractiveness represents the capacity of the firm to generate adequate returns above the cost of capital and proxied, using the prevailing lending interest rate.

Three measures of financial deepening were employed in the analysis. Two are based on domestic bank and non-banks sources (Iyoboyi, 2013) while the last is based on foreign capital inflow into the real sector. The financial depth in the banking sector was captured, using total banking credit to the economy as a proportion of GDP while the non-bank sources were captured, using the domestic companies stock market capitalisation as a proportion of GDP. Thirdly, the external inflow source was proxied, using foreign direct investment inflow as a proportion of GDP. Other explanatory variables include: gross fixed capital formation, labour force, trade openness, and lending interest rate. The outcome variable – real sector performance – is proxied, using the manufacturing value added. All data for the empirical analyses were obtained from the World Development Indicators of the World Bank publication 2019.

The summary statistics for the variables are presented in Table 1. The statistics included are the mean, median, maximum and standard deviation value. The manufacturing value added has a mean of 14.35%, implying that the manufacturing sector contributes about 14% of the GDP value. The maximum contribution across the years observed is 21.09%, representing about one fifth of the GDP. The minimum value and the standard deviation of about 5.2% shows a sluggish uptrend in the past 39 years considered. Similarly, domestic credit to private sector (indicator of bank financial deepening) has a mean of 9.1%, a minimum of 4.9% and

maximum of 19.6%. Though slight improvement has been witnessed considering the deviation, for a developing economy, a considerable flow is required to stimulate the real sector development. Furthermore, the market capitalisation has an historic peak of 30.8% of GDP. This reflects the considerable number of firms operating within the market space but not listed on the Nigerian Stock Exchange. Considering the statistics for foreign direct investment, the inflow is low with an all-time maximum of 5.97% into the biggest market in Africa. The dismal performance could be associated with the social and economic uncertainties that characterised the Nigerian business climate. Finally, the lending interest rate (cost of capital) has a maximum of 31.65% and has not dropped beneath 17.7% in 39 years observed in this study. The high cost of capital is an impediment to the real sector development. The cost actually surpassed the evidence portrayed by the statistics when the economic realities bordering on socio-economic uncertainties and infrastructural deficiencies are considered. The high cost of capital and complexities in doing business makes venturing unattractive, hence mitigating the real sector growth.

Table 1: Data sources, description and summary statistics

variable	Description	Measurement	source	Summary statistics				
				Obs.	mean	median	Std. dev	max
Mva	Manufacturing value added	Proportion of GDP	WDI, 2019	39	14.35	13.93	5.16	21.09
Dcfs	Domestic credit to private sector by banks	Proportion of GDP	WDI, 2019	38	9.14	8.15	3.55	19.60
Mcap	Market capitalisation of listed domestic companies	Proportion of GDP	WDI, 2019	24	12.92	11.34	6.44	30.80
Opns	Trade openness	Total trade divided GDP	WDI, 2019	38	0.48	0.44	0.13	0.92
Lbf	Labour force	Number	WDI, 2019	30	45.86M	46.12M	8.49M	59.87M
Gfcf	Gross fixed capital formation	Constant 2010 US$	WDI, 2019	38	50.65b	50.4b	1.32b	105.0b
Fdi	Foreign direct investment	Net inflow, percent of GDP	WDI, 2019	38	1.57	1.27	1.24	5.79
Lir	Lending interest rate	Rates	WDI, 2019	39	17.70	17.55	4.79	31.65

3.2 Model Specification and Data Estimation Procedure

Following the empirical study of Iyoboyi (2013) and evidences from theory and extant studies, the growth equation for the Nigerian economy can be specified in the following form:

$$MVA = A.LBF^{\alpha_1}\ GFCF^{\alpha_2}\ DCFS^{\alpha_3}\ MCAP^{\alpha_4}\ OPNS^{\alpha_5}\ FDI^{\alpha_6}\ LIR^{\alpha_7}\ V_t \quad 1$$

The log-linearised form of equation 1 can be represented as follows:

$$logMVA = \alpha_0 + \alpha_1 logLBF + \alpha_2 logGFCF + \alpha_3 logDCFS + \alpha_4 logMCAP + \alpha_5 logOPNS + \alpha_6 logLIR + \mu_t \quad 2$$

From equation 2, the intercept term is α_0, MVA is the manufacturing value added, LBF is total labour force, GFCF is gross fixed capital formation, DCFS is bank financial deepening, MCAP is the non-bank financial deepening, OPNS is the degree of openness, FDI is foreign direct investment and μ_t is a white-noise disturbance term.

The procedure adopted in the empirical analysis of long-run relationships and dynamic assessment of the interaction between the real sector performance and the regressors are described as follows: the analysis begins by ascertaining the time series properties of the variables employed in the study. The study explored four unit-root tests, which include: the Augmented Dickey Fuller, Ng-Perron, Kwiatkowski-Phillips-Schmidt-Shin (KPSS) and the Phillips-Perron (PP) unit root tests. Having ascertained the order of integration of the time series, the study assessed the existence of a cointegrating relationship. The econometric methods and procedure for assessing cointegrating relationships abound in the literature, among which include: the Johansen and Joselius (1990), Phillips and Hansen (1990), full information maximum likelihood-based approach and the two-step procedure of Engle and Granger (1987). These approaches are suitable for sufficiently large samples and require that variables in the model be integrated of order one [i.e. I(1)]; hence the need for an alternative approach capable of handling the combination of I(0) and I(1) order of integration and equally small sample observations.

The Pesaran et al.'s (2001) bounds testing approach possesses a number of advantages over other approaches. Apart from being able to handle combination of I(0) and I(1) series, it also possesses small sample statistical properties, which are superior to others; the former likewise produces more robust estimates in small sample sizes. In determining the cointegrating

relationship, using Pesaran et al. (2001), two steps were adopted. First was the determination of the long-run relationship, using the Wald test. Second was the determination of the short-run coefficients via the error correction representation of the ARDL specification. The latter also enabled establishing the speed of error adjustment in the long-run equilibrium path.

The specification of equation 2 in the ARDL model is presented as follows:

$$\begin{aligned}\Delta\log(MVA)_t = \alpha_0 &+ \sum_{i=1}^{k} \alpha_{1i}\Delta\log(MVA)_{t-i} \\ &+ \sum_{i=0}^{k} \alpha_{2i}\Delta\log LBF_{t-i} \\ &+ \sum_{i=0}^{k} \alpha_{3i}\Delta logGFCF_{t-i} \\ &+ \sum_{i=0}^{k} \alpha_{4i}\Delta logDCFS_{t-i} \\ &+ \sum_{i=0}^{k} \alpha_{5i}\Delta logMCAP_{t-i} \\ &+ \sum_{i=0}^{k} \alpha_{6i}\Delta logOPNS_{t-i} \\ &+ \sum_{i=0}^{k} \alpha_{7i}\Delta logFDI_{t-i} + \sum_{i=0}^{k} \alpha_{8i}\Delta logLIR_{t-i} + \mu_t\end{aligned}$$

From equation 3, k is the lag length and Δ is the first difference operator. The next is to specify the unrestricted error correction model (ECM) following the ARDL specification of MVA.

$$\Delta \log(MVA)_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta \log(MVA)_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta \log LBF_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta logGFCF_{t-i} + \sum_{i=0}^{k} \alpha_{4i} \Delta logDCFS_{t-i} + \sum_{i=0}^{k} \alpha_{5i} \Delta logMCAP_{t-i} + \sum_{i=0}^{k} \alpha_{6i} \Delta logOPNS_{t-i} + \sum_{i=0}^{k} \alpha_{7i} \Delta logFDI_{t-i} + \sum_{i=0}^{k} \alpha_{8i} \Delta logLIR_{t-i} + \sum_{i=0}^{k} \gamma_1 logMVA_{t-i} + \sum_{i=0}^{k} \gamma_2 logLBF_{t-i} + \sum_{i=0}^{k} \gamma_3 logGFCF_{t-i} + \sum_{i=0}^{k} \gamma_4 logDCFS_{t-i} + \sum_{i=0}^{k} \gamma_5 logMCAP_{t-i} + \sum_{i=0}^{k} \gamma_6 logOPNS_{t-i} + \sum_{i=0}^{k} \gamma_7 logFDI_{t-i}$$

$$+\sum_{i=0}^{k}\gamma_8 logLIR_{t-i}+\mu_t$$

In equation 4, the short-run dynamic coefficients are represented as parameters α_i where $i = 1-8$. The underlying ARDL model has its long-run multipliers denoted with parameter γ_i where $i = 1-8$. The equations 1 and 2 represent ARDL specification and unrestricted ECM representation of the ARDL model respectively. Theoretically, we expect a positive relationship between manufacturing value added and bank and non-bank indicators of financial deepening. The a priori expectation of the interaction among the variables in the model is as follows: $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6 > 0$; $\alpha_6, \alpha_8 < 0$. In ascertaining the long-run relationships in the model, we obtained the Wald test and the decision criteria are stated as follows:

$H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = 0$

$H_1: \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq 0$

3.3 Causality Test Procedure

The Granger procedure was adopted due to its simplicity (Granger, 1986; Iyoboyi, 2013). Prior to the estimation of causality test, the properties of the times series were ascertained, using the unit root test and the bounds test for existence of a long-run relationship. The study adopted a standard Granger-type causality with lagged error-correction augmentation. The existence of cointegration would infer causality in at least a direction in equations 5-11. In the presence of a long-run relationship, the ECM in the VAR model would indicate the existence of short-run causality. This is achieved by the statistical significance of the lagged differences of the variables. However, in the long-run, the causal relationship is determined when the error term is statistically significant.

Whenever cointegration is attained in the bounds test procedure, the Granger causality is better estimated under the vector error correction model. The procedure involves the determination of the error correction mechanism (capturing the extent of long-run equilibrium restoration following a short-run distortion). The study adopted the foregoing approach by testing the Granger causality on the VECMs of the long-run cointegrating vectors. This is represented as follows:

$$\begin{aligned}\Delta(MVA)_t = {} & \psi_{0MVA} + \psi_{1MVA}(MVA)_{t-1} + \psi_{2MVA}(LBF)_{t-1} \\ & + \psi_{3MVA}(GFCF)_{t-1} + \psi_{4MVA}(DCFS)_{t-1} \\ & + \psi_{5MVA}(MCAP)_{t-1} + \psi_{6MVA}(OPNS)_{t-1} \\ & + \psi_{7MVA}(FDI)_{t-1} + \psi_{9MVA}(LIR)_{t-1} \\ & + \sum_{i=0}^{p} \psi_{10MVA}\Delta(MVA)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{11MVA}\Delta(LBF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{12MVA}\Delta(GFCF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{13MVA}\Delta(DCFS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{14MVA}\Delta(MCAP)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{15MVA}\Delta(OPNS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{16MVA}\Delta(FDI)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{17MVA}\Delta(LIR)_{t-i} + \mu_{tMVA}\end{aligned}$$

$$\begin{aligned}\Delta(LBF)_t = {} & \psi_{0LBF} + \psi_{1LBF}(MVA)_{t-1} + \psi_{2LBF}(LBF)_{t-1} \\ & + \psi_{3LBF}(GFCF)_{t-1} + \psi_{4LBF}(DCFS)_{t-1} \\ & + \psi_{5LBF}(MCAP)_{t-1} + \psi_{6LBF}(OPNS)_{t-1} \\ & + \psi_{7LBF}(FDI)_{t-1} + \psi_{9LBF}(LIR)_{t-1} \\ & + \sum_{i=0}^{p} \psi_{10LBF}\Delta(MVA)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{11LBF}\Delta(LBF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{12LBF}\Delta(GFCF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{13LBF}\Delta(DCFS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{14LBF}\Delta(MCAP)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{15LBF}\Delta(OPNS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{16LBF}\Delta(FDI)_{t-i} + \sum_{i=0}^{p} \psi_{17LBF}\Delta(LIR)_{t-i} + \mu_{tLBF}\end{aligned}$$

$$\begin{aligned}\Delta(GFCF)_t = {} & \psi_{0GFCF} + \psi_{1GFCF}(GFCF)_{t-1} + \psi_{2GFCF}(LBF)_{t-1} \\ & + \psi_{3GFCF}(MVA)_{t-1} + \psi_{4GFCF}(DCFS)_{t-1} \\ & + \psi_{5GFCF}(MCAP)_{t-1} + \psi_{6GFCF}(OPNS)_{t-1} \\ & + \psi_{7GFCF}(FDI)_{t-1} + \psi_{9GFCF}(LIR)_{t-1} \\ & + \sum_{i=0}^{p} \psi_{10GFCF}\Delta(MVA)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{11GFCF}\Delta(LBF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{12GFCF}\Delta(GFCF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{13GFCF}\Delta(DCFS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{14GFCF}\Delta(MCAP)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{15GFCF}\Delta(OPNS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{16GFCF}\Delta(FDI)_{t-i} \\ & + \sum_{i=0} \psi_{17GFCF}\Delta(LIR)_{t-i} + \mu_{tGFCF}\end{aligned}$$

$$\begin{aligned}\Delta(DCFS)_t = {} & \psi_{0DCFS} + \psi_{1DCFS}(DCFS)_{t-1} + \psi_{2DCFS}(LBF)_{t-1} \\ & + \psi_{3DCFS}(GFCF)_{t-1} + \psi_{4DCFS}(MVA)_{t-1} \\ & + \psi_{5LBF}(MCAP)_{t-1} + \psi_{6LBF}(OPNS)_{t-1} \\ & + \psi_{7LBF}(FDI)_{t-1} + \psi_{9DFCS}(LIR)_{t-1} \\ & + \sum_{i=0}^{p} \psi_{10DFCS}\Delta(MVA)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{11DFCS}\Delta(LBF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{12DFCS}\Delta(GFCF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{13DFCS}\Delta(DCFS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{14DFCS}\Delta(MCAP)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{15DFCS}\Delta(OPNS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{16DFCS}\Delta(FDI)_{t-i} \\ & + \sum_{i=0} \psi_{17DFCS}\Delta(LIR)_{t-i} + \mu_{tDFCS}\end{aligned}$$

$$\Delta(MCAP)_t = \psi_{0MCAP} + \psi_{1MCAP}(MCAP)_{t-1} + \psi_{2MCAP}(LBF)_{t-1} + \psi_{3MCAP}(GFCF)_{t-1} + \psi_{4MCAP}(DCFS)_{t-1} + \psi_{5MCAP}(MVA)_{t-1} + \psi_{6MCAP}(OPNS)_{t-1} + \psi_{7MCAP}(FDI)_{t-1} + \psi_{9MCAP}(LIR)_{t-1} + \sum_{i=0}^{p} \psi_{10MCAP}\Delta(MVA)_{t-i} + \sum_{i=0}^{p} \psi_{11MCAP}\Delta(LBF)_{t-i} + \sum_{i=0}^{p} \psi_{12MCAP}\Delta(GFCF)_{t-i} + \sum_{i=0}^{p} \psi_{13MCAP}\Delta(DCFS)_{t-i} + \sum_{i=0}^{p} \psi_{14MCAP}\Delta(MCAP)_{t-i} + \sum_{i=0}^{p} \psi_{15MCAP}\Delta(OPNS)_{t-i} + \sum_{i=0}^{p} \psi_{16MCAP}\Delta(FDI)_{t-i} + \sum_{i=0}^{p} \psi_{17MCAP}\Delta(LIR)_{t-i} + \mu_{tMCAP}$$

$$\begin{aligned}\Delta(OPNS)_t = {} & \psi_{0OPNS} + \psi_{1OPNS}(OPNS)_{t-1} + \psi_{2OPNS}(LBF)_{t-1} \\ & + \psi_{3OPNS}(GFCF)_{t-1} + \psi_{4OPNS}(DCFS)_{t-1} \\ & + \psi_{5OPNS}(MVA)_{t-1} + \psi_{6OPNS}(MVA)_{t-1} \\ & + \psi_{7OPNS}(FDI)_{t-1} + \psi_{9OPNS}(LIR)_{t-1} \\ & + \sum_{i=0}^{p} \psi_{10OPNS}\Delta(MVA)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{11OPNS}\Delta(LBF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{12OPNS}\Delta(GFCF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{13OPNS}\Delta(DCFS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{14OPNS}\Delta(MCAP)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{15OPNS}\Delta(OPNS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{16OPNS}\Delta(FDI)_{t-i} \\ & + \sum_{i=0} \psi_{17OPNS}\Delta(LIR)_{t-i} + \mu_{tOPNS}\end{aligned}$$

$$\begin{aligned}\Delta(FDI)_t = {} & \psi_{0FDI} + \psi_{1FDI}(FDI)_{t-1} + \psi_{2FDI}(LBF)_{t-1} \\ & + \psi_{3FDI}(GFCF)_{t-1} + \psi_{FDI}(DCFS)_{t-1} \\ & + \psi_{5FDI}(MVA)_{t-1} + \psi_{6FDI}(MVA)_{t-1} \\ & + \psi_{7FDI}(OPNS)_{t-1} + \psi_{9FDI}(LIR)_{t-1} \\ & + \sum_{i=0}^{p} \psi_{10FDI}\Delta(MVA)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{11FDI}\Delta(LBF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{12FDI}\Delta(GFCF)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{13FDI}\Delta(DCFS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{14FDI}\Delta(MCAP)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{15FDI}\Delta(OPNS)_{t-i} \\ & + \sum_{i=0}^{p} \psi_{16FDI}\Delta(FDI)_{t-i} + \sum_{i=0}^{p} \psi_{17FDI}\Delta(LIR)_{t-i} + \mu_{tFDI}\end{aligned}$$

$$\Delta(LIR)_t = \psi_{0LIR} + \psi_{1LIR}(LIR)_{t-1} + \psi_{2LIR}(LBF)_{t-1} + \psi_{3LIR}(GFCF)_{t-1} + \psi_{4LIR}(DCFS)_{t-1} + \psi_{5LIR}(MVA)_{t-1} + \psi_{6LIR}(MVA)_{t-1} + \psi_{7LIR}(OPNS)_{t-1} + \psi_{9LIR}(FDI)_{t-1} + \sum_{i=0}^{p} \psi_{10LIR}\Delta(MVA)_{t-i} + \sum_{i=0}^{p} \psi_{11LIR}\Delta(LBF)_{t-i} + \sum_{i=0}^{p} \psi_{12LIR}\Delta(GFCF)_{t-i} + \sum_{i=0}^{p} \psi_{13LIR}\Delta(DCFS)_{t-i} + \sum_{i=0}^{p} \psi_{14LIR}\Delta(MCAP)_{t-i} + \sum_{i=0}^{p} \psi_{15LIR}\Delta(OPNS)_{t-i} + \sum_{i=0}^{p} \psi_{16LIR}\Delta(FDI)_{t-i} + \sum_{i=0}^{p} \psi_{17LIR}\Delta(LIR)_{t-i} + \mu_{tLIR}$$

4. Results and Discussion

Tables 2A and 2B show the result of the unit root tests. The tables show the test statistics for the variables in the model in their levels and first differences for the corresponding unit root tests adopted. Table 1 shows the test results for ADF and Ng-perron. The result shows the combination of I (0) and I (1) order of integration. The tests were conducted with the inclusion of constant, and trend and constant assumption. The result indicates that manufacturing value added, market capitalisation and lending interest rate are significant at first order integration while bank financial deepening, openness, labour force, gross fixed capital formation and

foreign direct investment were stationary at level, mostly when the constant and trend assumption applies.

Table 2B shows the KPSS and PP unit root tests. The result indicates that, for PP unit root test, all variables are integrated at order one (except gross fixed capital formation which is stationary at level). In the case of KPSS, all the variables are stationary at levels. It is necessary to note that, if a variable is stationary, it implies the rejection of the null hypothesis of the unit root for ADF, Ng-Perron and PP while the reverse is the case for KPSS (its null hypothesis is that the series is stationary).

Table 3 shows the level of collinear relationship among the explanatory variables. The extent of multicollinearity was examined in order to ensure that the unique influence of the explanatory variables on the outcome variable is guaranteed. The pairwise correlation test statistics in Table 2 shows no extreme case of collinear dependence among the explanatory variables. Hence, a linear combination of these variables can be attempted and the resulting estimates are suitable for drawing policy inferences.

Table 2A: Result of unit root tests: ADF and Ng-Perron (MPT)

variable	Level				First difference				
	ADF^{+}	MPT^{+}	ADF^{++}	MPT^{++}	ADF^{+}	MPT^{+}	ADF^{++}	MPT^{++}	Order of integration
mva	-1.1636	20.0016	1.5094	14.964	-7.6274*	1.6338*	-7.6005*	5.6156	ADF I and MPT I(1)
dcfs	-2.3072	5.3383*	-4.0400*	3.0487	-5.6826*	0.0087	-5.5893*	0.0249	ADF I and MPT I(0)
mcap	-2.8633	2.8585	0.7059	4313.2	-2.8010*	41.7881*	-2.6032	4313.2*	ADF I and MPT I(0)
opns	-4.0091*	8.8145*	-3.7144*	5.1573	-6.3754*	1.5469	-6.3995*	5.1573	ADF I and MPT I(0)
lbf	-0.1730	9.5966*	-3.3089*	8.6089	-2.9719*	2.4505	-2.9172	8.6089*	ADF I(0) and MPT I(1)
gfcf	-2.5951	12.2206*	-6.0038*	25.2235*	-4.8793*	17.0331*	-5.0688*	25.2235*	ADF I and MPT I(0)
fdi	-3.8950*	1.8151	-3.7968*	5.5769*	-7.8841*	1.5021	-7.8444*	5.5769*	ADF I and MPT I(0)
lir	-2.4928	5.3081	-2.2779	5.1028	-5.3656*	1.4035	-5.6383*	5.1028	ADF I and MPT (1)

Source: Extracted from regression output, using EViews 9.

Note: *denotes rejection of null hypothesis at 0.05 significance level. The null hypothesis is the presence of unit root (i.e. non-stationary).

PMT test is a modified version of the point optimal statistic of Elliot, Rothenberg and stock (1996).

ADF test is Augmented Dickey-Fuller.

The lag lengths are based on the AIC criterion.

[+] unit root tests with constant, [++] unit root tests with constant and trend

Table 2B: Results of unit root tests: PP and KPSS unit root tests

	Level				First difference				
variable	PP[+]	KPSS[+]	PP[++]	KPSS[++]	PP[+]	KPSS[+]	PP[++]	KPSS[++]	Order of integration
mva	-1.1327	0.6572	-1.5802	0.0991*	-7.5056*	0.1821*	-7.4814*	0.1516	KPSS I(0) and PP I(1)
dcfs	-1.7597	0.6881	-2.1036	0.1635*	-6.9491*	0.5000*	-6.8277*	0.5000*	KPSS I(0) and PP I(1)
mcap	-2.9080	0.1826*	-3.1359	0.0776*	-4.2799*	0.0853*	-4.0842*	0.0692*	KPSS I(0) and PP I(1)
opns	-4.0178	0.2584*	-3.7151	0.1029*	-4.0178*	0.2061*	-6.4019*	0.1196*	KPSS I(0) and PP I(1)
lbf	-0.1209	0.7123	-1.8777	0.1019*	-2.9728*	0.0703*	-2.9094	0.0725*	KPSS I(0) and PP I(1)
gfcf	-4.2420	0.2087*	-6.1136*	0.1378*	-5.3174*	0.3507*	-5.5824*	0.1332	KPSS and PP I(0)
fdi	-3.8177*	0.1533*	-3.7082*	0.1424	- 13.5518*	0.3503	- 17.9494	0.2747	KPSS and PP I(0)
lir	-2.4703	0.1842*	-2.1898	0.1650*	-6.8525	0.2052	-7.0490*	0.0559*	KPSS I(0) and PP I(1)

Source: Extracted from regression output, using EViews 9.

Note: *indicates significance at 5%.

PP – Phillips-Perron test statistics; KPSS – Kwiathowski-Phillips-Schmidt-Shin test statistics

[+] unit root tests with constant, [++] unit root tests with constant and trend

Table 3: Multicollinearity test

var.	LBF	GFCF	DCFS	MCAP	OPNS	FDI	LIR
LBF	1	0.622364	0.240002	-0.44835	-0.57154	-0.61457	-0.34857
GFCF		1	0.004165	-0.3353	-0.32982	-0.65361	-0.25731
DCFS			1	0.051274	0.105735	0.241856	-0.14577
MCAP				1	0.581607	0.344831	-0.07747
OPNS					1	0.690352	-0.20341
FDI						1	0.141957
LIR							1

Source: Extracted from regression output, using EViews 9.

Table 4: Granger causality test results

	F-statistics (*p*-value)			
Null hypothesis	1 lag	2 lags	Decision	Conclusion
DCFS and MVA				
DCFS does not Granger Cause MVA	3.87483 (0.0570)	2.35069 (0.1116)	Reject	Bidirectional
MVA does not Granger Cause DCFS	6.41861 (0.0159)	6.61772 (0.0039)	Reject	
MCAP and MVA				
MCAP does not Granger Cause MVA	1.58650 (0.2239)	1.01257 (0.3884)	Accept	Unidirectional
MVA does not Granger Cause MCAP	0.46123 (0.5057)	0.30465 (0.0421)	Reject	
OPNS and MVA				
OPNS does not Granger Cause MVA	0.52826 (0.4723)	0.54570 (0.5849)	Accept	Unidirectional
MVA does not Granger Cause OPNS	0.04139 (0.8400)	4.25517 (0.0233)	Reject	

FDI and MVA				
FDI does not Granger Cause MVA	0.30364 (0.5852)	0.10122 (0.9040)	Accept	Independent
MVA does not Granger Cause FDI	0.15896 (0.6926)	1.53111 (0.2322)	Accept	
LIR and MVA				
LIR does not Granger Cause MVA	0.06662 (0.7978)	0.64381 (0.5320)	Accept	Independent
MVA does not Granger Cause LIR	1.20279 (0.2803)	0.66534 (0.5211)	Accept	
DCFS and MCAP				
DCFS does not Granger Cause MCAP	2.07015 (0.1674)	0.95184 (0.4096)	Accept	Unidirectional
MCAP does not Granger Cause DCFS	3.11515 (0.0945)	0.63806 (0.5430)	Reject	
FDI and MCAP				
FDI does not Granger Cause MCAP	3.08290 (0.0971)	2.28858 (0.1408)	Reject	Unidirectional
MCAP does not Granger Cause FDI	0.30729 (0.5866)	1.77250 (0.2086)	Accept	

Source: Extracted from regression output, using EViews 9.

Table 4 presents the results of the directions of causal relationship among variables in the study. The result, using lag length of 1 & 2, suggests a bidirectional causality between manufacturing value added and bank financial deepening. The causality runs from manufacturing value added to bank financial deepening and vice versa. The result is similar to Iyoboyi (2013) that found a mutual causality between economic growth and bank financial deepening. Also, manufacturing value added and non-bank financial deepening relationship indicate a unidirectional causality running from the former to the latter. The result also indicates the rejection of the null hypothesis that manufacturing value added does not Granger cause openness, as a unidirectional causation runs from manufacturing value added to openness. The available statistical evidence supports the finance for growth hypothesis given that causality runs from an indicator of financial deepening (bank source) to the manufacturing sector. Likewise, the causality running from manufacturing value added to openness portrays the benefits that the manufacturing sector can attract to the domestic economy. When this happens, it further integrates the domestic economy in the international space which attracts further competitiveness of the sector and foreign earnings. Furthermore, the result indicates an independent relationship between foreign direct investment and manufacturing value added, as the null hypothesis could not be rejected in either direction.

However, it is pertinent to note that a unidirectional causality runs from foreign direct investment to market capitalisation proportion in GDP (non-

bank financing deepening). The evidence supports the assertion that FDI attraction into the manufacturing sector is extremely negligible compared to the inflows into the extractive industries (Ogundipe & Ola-David, 2016). Finally, the result available in Table 4 shows no evidence of causation between lending interest rate and manufacturing value added. This implies that lending rate does not significantly stimulate growth in the manufacturing sector, a scenario that could be linked to the outrageous cost of capital in the economy.

Table 5: Bounds test for cointegration analysis

Computed Wald *(F*-statistic): 4.64 K = 7		
Critical value	Lower bound value	Upper bound value
0.01	2.96	4.26
0.025	2.6	3.84
0.05	2.32	3.5
0.10	2.03	3.13

Source: Extracted from regression output, using EViews 9 based on Pesaran et al. (2001).
K is the number of regressors in the ARDL model.

The next in the estimation procedure is to proceed to the cointegration test. We begin this by conducting the ARDL bounds test (See Table 5). The optimal lag used in the estimation was manually selected based on Akaike information criterion (AIC). From Table 5, the lower and upper bound critical values assume the series are integrated of order I (0) and I (1) respectively. An attempt to reach a decision from Table 5 revolves around three possible scenarios: first, the null hypothesis of no cointegration is not rejected if the computed F-statistics is less than the lower bound value. The existence of cointegration among the variables is affirmed when the computed F-statistic is greater than the upper bound value. Lastly, the result becomes inconclusive (revert to ECM for further evidence) if the computed F-statistic lies between the lower bound and the upper bound values. The evidence in Table 5 indicates the existence of a long-run relationship between manufacturing value added and the explanatory variables. This is based on evidence from Table 5, as the computed Wald F-statistic of 4.64 is higher than the critical values at the upper bound at 1%, 5% and 10% levels respectively. The procedure continues by estimating equation 4 which tests for the long-run elasticities and short-run parameters.

Table 6: Long-run and short-run estimates: Long-run estimated coefficient based on the ARDL model (2,1,1,1): Dependent variable: (LMVA)

Variable	Coefficient	*t*-values	*p*-values
constant	49.631070**	4.674762	0.0185
LLBF	0.001449**	-2.642889	0.0357
LGFCF	0.571693*	-2.436709	0.0928
LDFCS	0.145568*	3.232347	0.0056
LMCAP	-0.270632*	-2.762505	0.0700
LOPNS	0.011832	0.076532	0.0438
LFDI	-0.323744*	-6.639839	0.0070
LLIR	0.768853	1.037283	0.3759

Source: Extracted from regression output, using EViews 9.
*and ** denotes significance at 10% and 5% levels respectively.

Notes: Diagnostic statistics: $R^2 = 0.85$, adjusted $R^2 = 0.79$, F-statistic = 1912.41 [0.0000], JB = 1.7102 [0.512], $BG = (\chi^2, 2) = 2.2102$ [0.5011], $ARCH\ (\chi^2, 1) = 0.2251\ [0.62011]$, $ARCH\ (\chi^2, 2) = 0.66141\ [0.2162]$, White Heteroskadasticity $(\chi^2, 4) = 30.17041\ [0.0523]$, Ramsey RESET = 0.82144 [0.3061].
BG – Breusch-Godfrey Serial Correlation LM test, ARCH – Breuch-Godfrey heteroskedasticity ARCH test, JB – Jarque-Bera Normality test, RESET – Ramsey Regression Specification Error Test.

Table 7: Long-run and short-run estimates: Error correction representation based on the ARDLmodel (2,1,1,1): Dependent variable: (LMVA)

Variable	Coefficient	*t*-values	*p*-values
constant	0.029337	1.377531	0.1829
$\Delta LMVA_{t-1}$	0.400487*	0.569934	0.0086
$\Delta LLBF$	0.336059*	3.349276	0.0050
$\Delta LGFCF$	0.180280*	2.482821	0.0023
$\Delta LDFCS$	0.227508*	2.271785	0.0077
$\Delta LMCAP$	-0.277929**	-2.220536	0.0130
$\Delta LOPNS$	0.229149	0.412617	0.7076
$\Delta LFDI$	-0.616261*	-2.323813	0.0027
$\Delta LLIR$	0.846029	0.653828	0.5599
$ECM\ (-1)$	-0.438000*	-1.999274	0.0478

Source: Extracted from regression output, using EViews 9.
*and ** denotes significance at 10% and 5% levels respectively.
Notes: Diagnostic statistics: $R^2 = 0.76$, adjusted $R^2 = 0.69$, F-statistic = 11.2141 [0.00011], JB = 3.41621 [0.3934], $BG = (\chi^2, 2) = 6.19120$

[0.2130], $ARCH\ (\chi^2, 1) = 0.7217\ [0.3124]$, $ARCH\ (\chi^2, 2) = 4.2891\ [0.6701]$, Ramsey RESET = 0.52171 [0.6211]

Table 6 presents the long-run estimates for the relationship between the manufacturing value added and the explanatory variables adopted in the study. All variables conform to the theoretical expectation except the indicator of non-bank financial deepening and foreign direct investment. The result indicates that bank financing deepening exerts a significant positive influence on manufacturing value added which is a confirmation of the finance for growth hypothesis. On the other hand, the non-bank financial deepening, though statistically significant at 10% level, is incorrectly signed. This implies that the non-bank financing is not an important determinant of manufacturing value added. Therefore, any change in the manufacturing value added in the long run is not induced by changes in the non-bank financial deepening. The underlying evidence can be linked to the weak size of manufacturing sector in the economy and among the publicly quoted firms in the Nigerian economy. Furthermore, the indicators of labour force and capital stock exert a positive influence on manufacturing value added and are statistically significant at 5% level. However, while capital stock accounts for an appreciable positive effect on changes in manufacturing value added, the indicator of labour force exerts a negligible effect on manufacturing value added in the long run.

Moreover, manufacturing value added responds significantly to changes in openness in the long run, though the direction of relationship suggests that, as the economy progressively becomes more integrated to the world, the manufacturing sector is adversely impacted, implying an inverse relationship. This evidence has some resemblance with the reality. Increased globalisation increases dumping into the developing economies, thereby hampering the survival of the manufacturing sector. Similarly, foreign direct investment impacts negatively on the manufacturing sector. A large chuck of foreign direct investment inflow is targeted at the extractive industries serving the purpose of providing raw materials for industries in the investors' countries. Evidences of this parasitic foreign direct investment are predominant in Nigeria. These investors export mineral products and primary commodities to support the material need of their home industries, whereas the backward linkage needed in the host countries to support local industries is grossly insufficient. Finally, the indicator of lending interest rate does not significantly influence changes in the

manufacturing sector. This would not be unconnected to the unattractiveness of the interest rate as firms seek alternative arrangement for business financing.

The diagnosis statistics are presented underneath Table 6, and their outcome implies that the parameter estimates are suitable for policy consideration. First, the model is well defined, judging from the value of R^2 of 0.85 which implies that 85% of the variation in manufacturing value added is explained by the explanatory variables. The result shows a high predictive capability of the model as reflected in the goodness-of-fit. The significance of the F-statistics, judging from the p-value of 0.000, indicates the joint significance of the explanatory variables. Similarly, the assumption of residual normality held, as the insignificance of the p-value indicates, that we failed to reject the null hypothesis of residual normality. An autocorrelation test, which examines the linear dependence among the successive values of the error term, was conducted, using the Bruesch-Godfrey (BG) serial correlation LM test. The insignificance of the p-value suggests the failure to reject the null hypothesis of no autocorrelation. Also, there was no evidence of heteroskedastic variation as the statistics of the ARCH and White Heteroskedasticity indicate the failure to reject the null hypothesis of homoscedasticity. Finally, the correctness of the model specified was assessed, using the Ramsey RESET specification error test, and the insignificance of the p-value affirms that the model was specified correctly.

The result of the error correction representation is presented in Table 7. The explanatory variables conform to theoretical expectation except non-bank financial deepening and foreign direct investment. All the explanatory variables are statistically significant at 5% level except the indicator of lending interest rate. The evidence suggests that positive short-term variation in manufacturing value added is responsive to changes in the past value of manufacturing value added, labour force, capital stock, bank financial deepening and openness. It should be noted that the indicator of non-bank financial deepening is inversely related to manufacturing value added in both long-run and short-run models. This outcome is similar to Iyoboyi (2013) who found that non-bank financial deepening is adversely related to economic growth in the short-run and long-run models estimated. This outcome is due to fragmentation of the companies listed on the Nigerian Stock Exchange. Also there are a handful number of firms that are not listed on the stock exchange. For instance, due present

fragmentation in the NSE, not much benefits (in terms of financing provision), can be expected because only 10 companies account for about 80% of the market size. Moreover, the shareholding structure and the share float are highly skewed towards the promoter of these market leaders, hence not providing adequate opportunities finance inflow.

The short-run model incorporates the error correction model (ECM) which ensures the model restore its equilibrium path following short-term distortion. From Table 7, the coefficient of the ECM is negative; the magnitude lies between zero and one; and it is statistically significant. This implies a confirmation of the long-run convergence of the variables in the model. The negative magnitude of 0.438 implies that a deviation in manufacturing value added from the equilibrium in the current period is corrected by about 44% in the following year. It follows that a distortion in manufacturing value added on the equilibrium path automatically adjusted by 44% within the preceding year to re-attain convergence to equilibrium. The diagnosis tests conducted indicates that the coefficients were correctly estimated and suitable for drawing policy inferences.

4.1 Stability of Estimated Coefficients

The stability of model's estimated coefficients was assessed, using the cumulative sum of recursive (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) tests. These tests, developed by Brown, Durbin and Evans (1975), were performed on equation 4 and the results presented in figures 1 and 2. A careful assessment of the CUSUM plot reveals that estimated coefficients of manufacturing value added equation are stable as the plot remains within the 5% critical lines. Also, the same evidence was obtained for CUSUMSQ plot (see Figure 2).

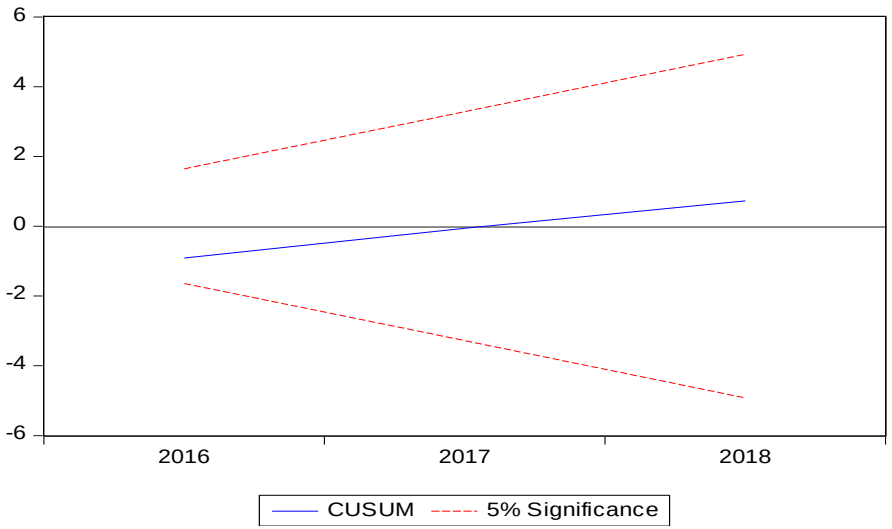

Figure 1: CUSUM test
Note: The straight line represents critical bounds at 5% significance level.
Source: Extracted from regression output, using EViews 9.

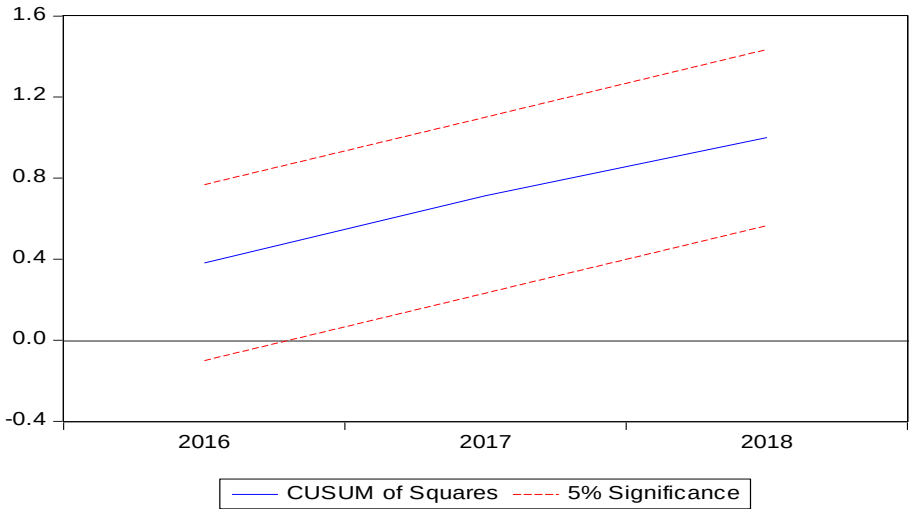

Figure 2: CUSUM squares test
Note: The straight line represents critical bounds at 5% significance level.
Source: Extracted from regression output, using EViews 9.

5. Conclusion and Policy Implication

The study examined the effect of financing deepening on the performance of the manufacturing sector, using a time series data from 1981 to 2019. The study employed the bound testing cointegration approach proposed by Peseran et al. (2001) to ascertain the existence of a long-run convergence relationship between manufacturing value added and the regressors. The result shows an existence of a long-run relationship between manufacturing sector performance and the explanatory variables (bank and non-bank financial deepening, external source financing, labour force, capital stock, openness, and lending interest rate). The result of the empirical investigation confirms the finance-growth hypothesis. The bank financial deepening significantly influences the manufacturing sector performance, whereas the non-bank financial deepening and external financing do not significantly influence the manufacturing sector performance in Nigeria.

This evidence can be linked two issues: (i) the fragmentation of the shareholding structure of few leading firms on the Nigerian Stock Exchange market and (ii) considerable number of firms operating in the market space but not listed on the stock exchange market. The preceding conditions limit finance flow via the domestic non-bank sources. Consequently, the large chunks of FDI inflow into the Nigerian economy are directed into the extractive sector, leaving the manufacturing sector with double dilemma – (i) the widening finance gap and (ii) the weak supply backward linkage as the raw materials needed to sustain domestic industrial operation are exported in their raw form to support investor's home country industrial needs.

It is vital to note that the manufacturing sector performance does not respond significantly to the lending interest rate. This situation is not unconnected to the extremely high cost of capital in the economy. The statistics employed in the study reveal 17.7% as the minimum lending rate in the past 39 years. Considering the present socio-economic realities, the lending rate is hardly operational and discourages new ventures.

The long-run and short-run coefficients estimated corroborate the results of the Granger causality tests. The evidence confirms the finance-growth hypothesis as a mutual causality exists between bank financial deepening and real sector performance. The results also indicate a unidirectional causation running from the manufacturing sector performance to non-bank financial deepening. Likewise, a unidirectional

causality runs from the manufacturing sector performance to openness. This suggests that improved performance of the manufacturing sector tends to enhance the economy's integration with the rest of the world, hence attracting more competitiveness and earnings for the Nigerian economy.

The findings of the study have useful implications: the need for deliberate policies that aim to deepen the financial sector via intermittent intervention by the monetary authority and mandating compulsory financing of the real sector by the retail commercial banks to the tune of certain proportion of their total loan creation. Also, the monetary authority needs to foster coordination among the actors in the financial space for concessional medium to long-term financing to the real sector (especially the manufacturing sector). This encourages SMEs development and the willingness to venture into productive activities, which directly lessen the burden of unemployment and poverty in the economy.

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