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Effect Analysis of Banking Sector Reform and Gross Manufacturing Output in Nigeria: Implications for Achieving Sustainable Development Goal 9

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Abstract

No doubt, structural transformation lies at the heart of economic progress of any nation. Most significantly, the industrial sector, especially manufacturing, is a key engine of growth and development. Unfortunately, manufacturing development in Nigeria, over the years have not improved despite the banking sector reforms. This paper empirically investigated the shock effects of the banking sector reform on gross manufacturing output in Nigeria between the period 1970-2018. The variables used in the paper include gross manufacturing output, bank credit to the manufacturing sector, interest rate spread, nominal exchange rate, market capitalization, manufacturing capacity utilization and a dummy variable. The data were sourced from the Central Bank of Nigeria Statistical Bulletin, International Monetary Fund Financial Reports and the World Bank Development Indicator (2019). The Vector Autoregressive Model (VAR) estimation techniques were employed to achieve the objective of the paper. The results showed that gross manufacturing output responded negatively to bank credit during all the reforms phases. It further revealed that it responded negatively to a unit shock in exchange rate during the pre-SAP and bank recapitalization periods, but positively during the deregulation, regulation and liberalization periods. It showed also that gross manufacturing output responded negatively to shock in interest rate spread during all reform phases in Nigeria. The policy implication of these findings attested to the fact that the linkage between the banking sector and real sector is weak in Nigeria. Hence for Sustainable Development Goal 9, in particular 9.2, to be achieved, the linkage between both critical sectors must be integrated and strengthened via improving on the banking sector fundamentals and introduction of shock measures from the reform.

Background to the Study

It is not doubtful that structural transformation underscores the economic development of any nation, Nigeria included. The industrial sector is the real sector and unarguably, a key engine of growth in the development process. This is evidenced from China and India among other countries that have increased productivity, quality of job and livelihood for its teeming populations. The industrial sector is also an essential mechanism for diversifying an economy and building resilience to external and internal shocks (UNCTAD, 2011, 2013; KPMG, 2014; Anyanwu, 2015). The banking sector is the financial sector and the banking sector reform is predicated on the need to increase risk management procedures and enhance corporate governance while strengthening and repositioning the banking industry for efficiency and effectiveness towards engineering the real (manufacturing) sector. The Nigerian economy since independence in 1960 has implemented several reforms in the banking sector. Five distinct phases/stages of these reforms have been identified in the literature: the SAP reform (1970-1985); the deregulation/post-SAP period (1986-1993); the regulation period (1994-1998); the liberalization period (1999-2003) and the recapitalization period (2004-to date).

From the liberation to the recapitalization period, for example, the gross manufacturing output in Naira millions ranged from 13,958 in 2000 to 46,779 million in 2018Q4 while manufacturing sector contribution to gross domestic product (GDP) in percentage terms ranged from 12 percent in 2000 to 8.8 percent in 2018Q4, a reduction in contribution to growth. Similarly, manufacturing value-added ranged from 17.51 percent in 2000 to 9.43 percent in 2015. It deepened further to 8.68 percent in 2018. Manufacturing capacity utilization in percentages ranged from 36.1 percent in 2000 to 66.2 percent in 2018. To further buttress the emerging trend, the manufacturing sector output recorded about 481843 in the pre-SAP period, 14034.47 in the structural adjustment programme (SAP)/deregulation period, 13887.43 in the regulation period, 15239.51 in the liberalization and about 34168 in the recapitalization and post-consolidation periods, this is as manufacturing capacity utilization recorded 61.62 value-added in the pre-SAP period, declined to 41 value-added in the deregulation period and declined further to 31 value- added in the regulation period. It however, peaked highest in the recapitalization and post-consolidation periods to about 60.06. On the other hand, bank credit to manufacturing sector, interest rate spread, exchange rate, and market capitalization recorded a dynamic performance. Bank credit for example ranged from 1373.79 in the pre-Sap period to about 15,264,05 value-added in the pre-capitalization/post consideration period (CBN, 2019). The emerging trend from the industrial sector and indicators have reflected in the pattern of the economy characterized by shocks that prevent the development of the Nigerian real sector. This is compounded by the rising unemployment rate among Nigerian graduates, high and soaring inflation rate, high poverty rate and household inequality, poor development prospects, depreciating exchange rate vis-à-vis other major trading currencies, low per capita income and low investment and productivity of the manufacturing sector.

Sustainable Development Goal (SDG 9) is the first stand-alone development goal that includes industrialization envisioned by SDG 9 is "inclusive and sustainable". Specifically, Goal 9.2 aims at promoting inclusive and sustainable industrialization and, by 2030, significantly, promote industry's share of employment and gross domestic product. The United Nations Industrial Development Organization (UNIDO) Industrial Development Report notes that countries experiencing faster structural change tend to experience faster economic growth. Among different types of structural change, industrialization/manufacturing has been the engine of growth for developing countries (UNIDO, 2016a)

This paper is novel in some different ways and dimensions. First, it considers the structural breaks of the variables, reflecting the reform phases, a method that is of direct use in practice. Two, unlike related previous papers (Omolare and John, 2016; Ikeora et al, 2016; Ogbeide and Rotimi, 2016) among others, the paper considered the different phases banking sector reforms in Nigeria (pre-SAP period ,1958-1985; deregulation period,1986-1993; regulation period, 1994-1998; liberalization period 1999-2003; recapitalization period 2004-2018 and the post-recapitalization period. This becomes expedient for comparative purposes. Third, the paper presents some stylized facts about manufacturing and banking sector developments in Nigeria. Four, the paper empirically investigates the shocks of banking sector reform on gross manufacturing output in Nigeria. Five, we offer policy suggestions in light of the evidence that would help Nigerian policy-makers to effectively tackle the shocks hindering manufacturing development in Nigeria.

The research questions of the paper are as follows:

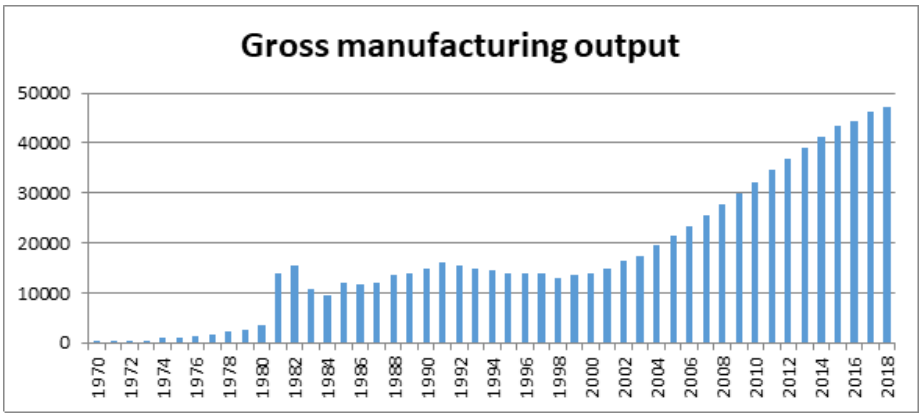
1. Does the shock transmission of banking sector reform have any effect on manufacturing output in Nigeria?
2. What are the responses of gross manufacturing output to banking sector reform in Nigeria?
3. What policy prescription can mitigate these shocks from banking sector reform for manufacturing sector development in Nigeria?
4. How manufacturing sector development does relates to sustainable development?.

Stylized Facts on Banking Sector Reform and Manufacturing in Nigeria

The sub-section presents some stylized facts on the interested variables. The trends, no doubts add to understanding the subject matter.

Figure 1 shows the output of Nigeria's manufacturing sector for the period 1970 – 2018.

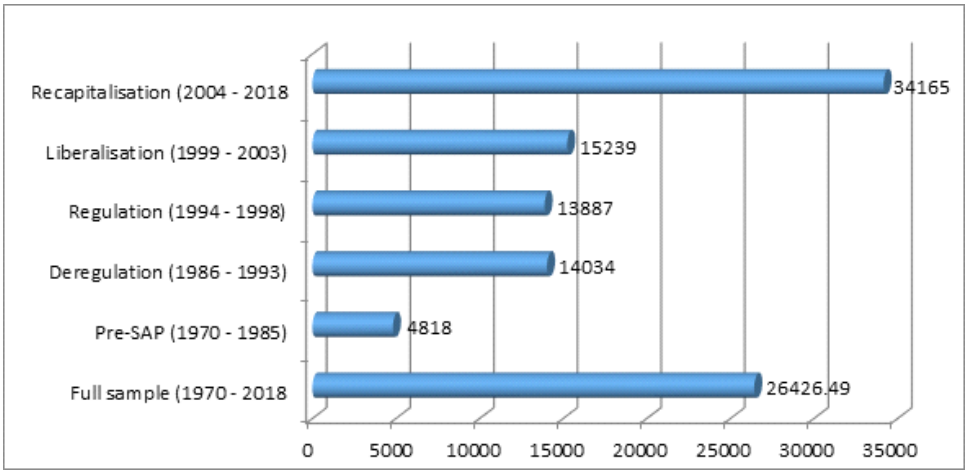
Figure 1: Output of the Manufacturing Sector in Nigeria (1970 – 2018)



Source: WDI (2018)

The trend shows that except in the 1970s, the output of the manufacturing sector has significantly low, though, there were periods when output fell below the previous value. This is compared with the next figure 2. Generally, except during the recapitalization period, the average manufacturing output during any other reform period was less than the full sample average. On the other hand, the average manufacturing outputs during the pre-SAP period (1970 – 1985), deregulation period (1986 – 1993), regulation period (1994 – 1998) and liberalization periods (1999 – 2003) were about 72 percent, 19 percent, 20 percent and 12 percent lower than the full sample average.

Figure 2: Average Manufacturing Output in Nigeria during Reform Phases



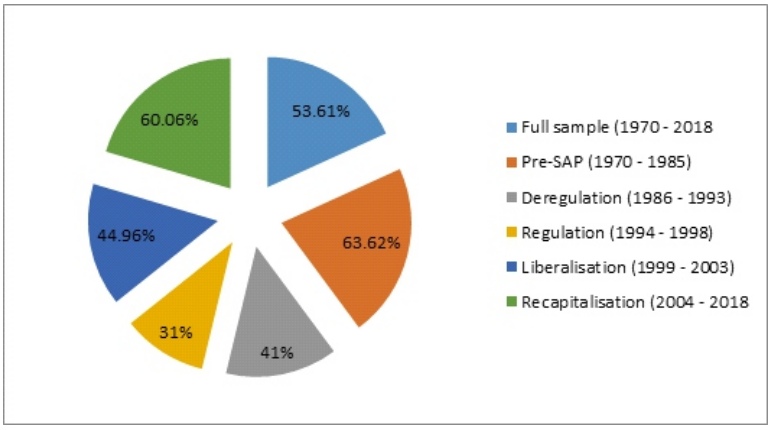
Source: WDI (2019)

The average rate of capacity utilization in the manufacturing sector was very high in the 1960s up till early 1980s. It was over 78.0 percent between 1960 and 1970 and over 74.0 percent between 1970 and 1980. However, in the late 1980 to 1990 period, average capacity

utilization fell drastically to about 49.0 percent and declined further to about 36.0 percent in the late 1990s and early 2000s. It can be said therefore, that average capacity utilization was very high during the period of the implementation of import substitution strategy but became relatively low during the period of the adoption of export-oriented strategy. During the recapitalization period (2004 – 2018) average capital utilization rose again.

Figure 3 shows the rate of capital utilization in Nigeria during various reforms phases.

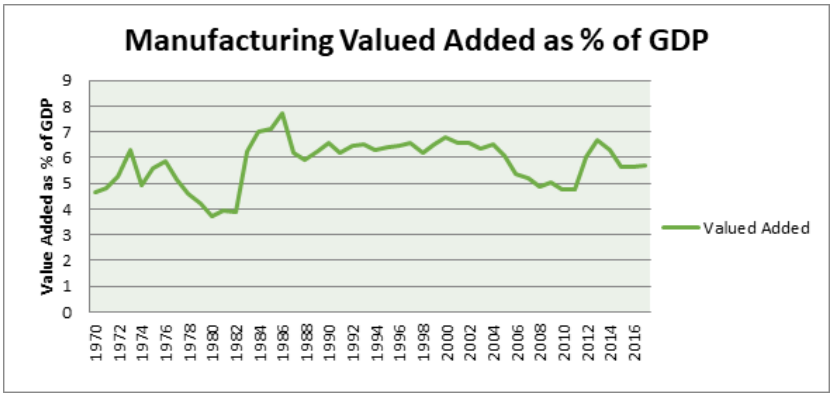
Figure 3: Rate of capital utilization in Nigeria during banking sector reforms



Source: WDI (2019)

The contribution of manufacturing sector to the overall output of the economy (GDP) has not been substantial over time as in Figure 4. It was a little above 7.0 percent in 1970 and declined to 5.6 and 5.4 percent in 1975 and 1980 respectively. It rose and reached a peak of about 11.0 percent in 1985. However, it fell to about 8.0 percent in 1990 and to about 6.0 percent in late 1990s and 2000s. Similarly, the contribution of the sector to total export is nothing to reckon with. The share of manufacturing in total export which was 7.4 percent in 1970, fell to 1.1 per cent in 1975. It has been less than l.0 percent in the l980s and 1990s except in 1998 when it was 1.7 percent. This shows that, irrespective of industrialization strategies adopted in Nigeria, manufacturing sector did not perform well in terms of its contributions to GDP and export (Adewuyi, 2005).

Figure 4: Manufacturing Sector Contribution to GDP over time



Source: WDI (2019)

Some policy responses of the Government need re-emphasising. In the Economic Recovery Growth Plan (ERGP) (2017-2020), the government highlights the following policies complimented by robust financial system to boost manufacturing. It aims to "provide incentives to support industrial hubs, review local fiscal and regulatory incentives to support the development of industrial cities, parks and clusters, especially around existing ports and transport corridors". Furthermore, the government plans to "revitalise export processing zones by reviewing local fiscal and regulatory incentives, rationalise tariffs and waivers on the equipment and machinery imports required for agro-industry, establish special economic zones (SEZs) to provide dedicated infrastructure to support hub productivity and acquire suitable premises for SEZs". Other highlights of the ERGP specifically targeted at the manufacturing sector around SEZs are as follows: The authorities would ensure connection to power and water infrastructure, facilitate technology acquisition and transfer in the SEZs by making available research output from local research institutes, ensure connection and access to critical ICT facilities.

The Nigerian government is also promoting local content by encouraging the sourcing of raw materials and spare parts locally, leveraging public procurement of locally manufactured goods (with targets for MSME participation), and via a "Made in Nigeria" campaign. For the promotion of innovation and technology-led industries, the government's plan includes the provision of fiscal incentives for private investment in research and development (R&D), improvement of intellectual property enforcement procedures, promotion of science parks and innovation hubs, encouragement of private equity and venture capital players through an attractive fiscal and regulatory framework, and the promotion of youth entrepreneurship and innovation through the "You-Win-Connect" programme. Controversy recently trailed the YouWiN Connect programme, though, with participants complaining about not getting the funding that was promised for their businesses.

Empirical Literature Review

Obamuyi, Edun and Kayode (2010), investigated the effect of bank lending and economic growth on the manufacturing output in Nigeria. Times series data covering a period of 36 years (1973-2003) were employed and tested with the cointegration and vector error correction model (VECM) technique. The study was specifically interested in answering the following questions: has bank lending to the manufacturing sector improved significantly since the introduction of the financial sector reforms? Is there a significant relationship between bank lending and the output of the manufacturing sector in Nigeria? The study regressed the index of manufacturing production on bank lending to the manufacturing sector, inflation, maximum lending rate, the lagged value of index of manufacturing production, manufacturing capacity utilization, financial deepening (proxy for the relative size of the financial system), exchange rate, gross domestic product and a dummy shift in financial policy from regulation to deregulation of interest rate.

The time series properties were tested using the Augmented Dickey-Filler (ADF) and the Philips-Perron (P-P) tests. The Johansen cointegration test is performed to determine if the group of non-stationary series is cointegrated or not. Therefore, a Vector Error Correlation model was specified for the analysis of the short-run dynamics. The results show that bank lending to the manufacturing sector, inflation rate and the gross domestic product were stationary at level. Further analysis was carried out on the non-stationary variables using the first difference. The regression equation was estimated using the Engle-Granger two step procedure and the Ordinary Least Squares (OLS). The result showed that there exists a co-integrating relationship in the long-run. The vector error correlation model (VECM) the finding of the paper showed that manufacturing capacity utilization and the bank lending rates significantly affect manufacturing output in Nigeria. However, the relationship between manufacturing output and economic growth could not be established in Nigeria. The paper calls for a concerted effort by the government, manufacturers and the lending institutions to review the lending and growth and growth policies and provide appropriate macroeconomic environment, in order to encourage investment-friendly lending and borrowing by the financial institution.

Ehikioya and Mohammed (2014), examined the impact of monetary policy on Nigerians manufacturing sector performance for the period 1986-2012. Data were collected from the Statistical bulletin and Annual Report and Statement of Accounts of the central bank of Nigeria and Annual Abstracts of National Bureau of statistics. Unit root test, Granger causality test, co-integration and VAR were used for data estimation. The individual variables: external reserve, exchange rate, and inflation rate were statistically significant to manufacturing sector output in the previous and current year. However, interest rate, exchange rate and external reserve impacted negatively on the sector output but broad money supply and inflation rate affect the sector positively. The pair-wise Granger causality result suggest that real exchange rate and external reserves granger cause Nigeria's manufacturing output to each other unidirectional. The paper also found that the manufacturing sector contribute insignificantly to the Nigerian economy. The paper

concluded that the monetary authority should create and implement monetary policies that favored efficient provider of favourable investment climate by facilitating the emergence of market based interest rate and exchange rate regimes that attract both domestic and foreign investment to the manufacturing industrial sector that are currently operating far below installed capacity. The Central Bank should also introduce more monetary instruments that are flexible enough to meet the supply and demands needs of the manufacturing sector.

Udoh and Ogbuagu 92012), using an aggregate production framework and auto regression distributed lag (ARDL) cointegration technique for Nigerian time series data covering the period 1970 to 2009. The policy implications of the findings can be drawn: the most important task for government of Nigeria is to introduce further financial sector reforms to improve the efficiency of the domestic financial sector which is a pre-requisite for the achievement of industrial development. The inefficiency of the financial sector is responsible for the adverse impact on industrial production. Appropriate measures should be taken to eliminate the constraints and challenges facing small and medium scale enterprise (SME) funding schemes, as these enterprises from the bedrock of the Nigerian industrial sector. Furthermore, industrialization requires a lot of innovations and entrepreneurship. To achieve these, appropriate policy should be undertaken. Given the strong positive impact of labour stock on industrial production, policies should be geared towards diverting resources to develop more human capital.

Okoye, Nwakoby and Modebe (2015), examined the effects of lending rates and its determinants on the performance of the industrial sector in Nigeria. The variables were analysed using the vector error correction model (VECM). The study shows that exchange rate volatility has an insignificant positive impact on industrial performances in Nigeria. It also shows evidence of significant positive impact of lending rate and financial depth on industrial output growth. The paper in Nigeria, government and policy-makers should seek to stabilize exchange rate movement through proper diversification of sources of foreign exchange inflow as well as reduce its outflow in order to support her import-dependent industrial sector while simultaneously pursuing the development of an adequate and efficient infrastructure basely for the economy.

Oludele (2019), conducted an assessment of the effects of financial sector reforms on industrialization in Nigeria using an annual time series data over 1981-2015. Using an autoregressive distributed lag (ARDL) model. The finding showed that financial reforms have a positive and significant effect on industrialization in Nigeria. The paper concluded that financial reforms can be seen as medium through which the government could actualize its goal of enhancing the performance of the industrial sector.

Ume, Oleka, Nwadike and Okoyeuzu (2017), examined the impact of bank credit on the output of the manufacturing sector in Nigeria. The study adopted the autoregressive distributed lag (ARDL) bound cointegrating test approach and error correlation representations. The variables used are output of the manufacturing sector (OMS), the

dependent variable. The explanatory variables are volume of bank credit, interest rate, ratio of credit to the private sector to GDP and exchange rate. The policy implication of the result showed that banks are veritable financier of manufacturing, and therefore, there should be policies to promote the manufacturing sector in Nigeria and other developing countries. This will exploit and explore funding options in area of granting of credits that catalysis growth.

Asakye, Adama and Ogunjobi (2018), examined the casual effect shock effect and impact of financial sector and manufacturing sector performance in Nigeria using Granger non-causality, vector Error correlation Model and Dynamic Ordinary Least Square method respectively between the period 1981 to 2016. The variables used are manufacturing sector contribution o gross domestic product (GDP), employment in manufacturing sector (MEMP), market capitalization ratio to GDP (MCP), broad money stock ratio to GDP (FMI), credit to private sector ratio to GDP (FCP), prime interest rate (FDI) and deposit liability ratio to GDP (FDI). The data were obtained from Central Bank of Nigeria (CBN) statistical bulletin and National Bureau of Statistics (NBS). The evidence showed that output in manufacturing sector is positively and significantly related with credit in manufacturing sector is positively and significantly related with credit to private sector to GDP, prime interest rate, market capitalization and employment in manufacturing sector. Broad money stock to GDP ratio is not significant and deposit liability to GDP ratio has a significant long run negative relationship. Using employment in manufacturing sector as dependent variable, it has a significant positive relationship with output is manufacturing sector and deposit liability to GDP ratio, and negative significant long run relationship with prime interest rate and market capitalization to GDP ratio. Broad money stock to GDP ratio and credit to private sector ratio to GDP were not statistically significant at the 5 percent. The paper concluded that any change in financial indicators represented by prime interest rate, market capitalization and credit to private sector will significantly increase output in the manufacturing sector, so government policies should be channeled towards adopting efficient policies that enhance the performance of the financial sector in order to improve the performance in the manufacturing sector.

Omolara and Asaleye (2016) examined the effect of financial sector reforms on output growth of the manufacturing sector in Nigeria between the periods 1986 to 2012. The (VAR) paper adopted the vector autoregressive model and the variables are output of the manufacturing sector as percentage of total GDP (dependent variable), credit to the private sector, broad money supply to GDP, interest rate, and market capitalization. The result showed that financial deepening indicated by market capitalization is negatively related to the ratio of manufacturing sector to GDp. The result of the paper also suggests that the developments in the manufacturing sector under financial reforms in Nigeria have not been impressive. The paper concluded that Nigeria experienced increase in GDP but with minimal contribution from the manufacturing sector. This implies that the increase in GDP does not imply growth of the manufacturing sector which can help reduce the unemployment problem in the country. To achieve this, the financial sector,

both the capital and money markets have vital role to play. Thus, the financial indicators need to be integrated into the manufacturing sector as most of the financial indicators have low co-efficient in relation to the manufacturing sector indicator. Therefore, the government should create incentives to attract both local and foreign investors into the manufacturing sector through the promotion of foreign direct investment.

Theoretical Framework and Methodology

Theoretical Framework

The theoretical basis establishing the linkage between the financial sector and the real sector has been well established in the development literature of the endogenous growth model. This is under the assumption that technology is non-excludedable and that all producers have the same access to factor inputs. This potential for endogenous technological progress may allow an escape from diminishing returns at the aggregate level. The key property of this class of endogenous-growth model is the absence of diminishing returns to capital. The simplest version of a production function without diminishing returns is the AK function[1].

Y=AK, where A is a positive constant that reflects the level of technology. The global absence of diminishing returns may seen unrealistic, but the idea becomes more plausible if we think of K in a broad sense to include human capital (Knight, 1994[2]). The AK model has been extensively used to examine manufacturing sector performance and economic indicators relationship (Acemoglu et *al.* 2006); Acemoglu and Zilibott, 1997; Benciverga et *al.*1995); Allen and Gale, 1997; Levin, 1997, 2005; Bencivenga and Smith, 1991; Greenwood and Jovanovic, 1990; Romer 1986; Lucas, 1988 and Diamond and Dybvig, 1983).

Model Specification

To examine the effect of banking sector reform on gross manufacturing output in Nigeria, the paper adopted with modification, the model structure of Campbell and Asaleye (2016) as follows:

$$MI = F(CRPSY, BM2Y, SMCY, IRS, LLY) \quad (1)$$

Where M1 is the output of the manufacturing sector as a percentage of the total gross domestic product(GDP), CRPSY is credit to the private sector, BM2Y is the ratio of broad money supply to GDP. SMCY is the ratio of market capitalization to GDP while IRS is the prime interest rate and LLY is the ratio of reserve money to deposit. Following the model of equation (1), the model specification of this paper is stated in its mathematical form as thus:

$$GMOt = F(BCM, EXR, IRS, MCAP, MCU) \quad (2)$$

Expressed in econometric specification form, equation (2) is thus expressed as

$$LnFMOt = \beta_0 + B_1LnBCMt + \beta_2LnEXRt + \beta_3LnIRSt + \beta_4LnMCAPt + \beta_5LnMCU + DUM \quad (3)$$

AK model was firstly used by Von Newman (1937).

Knight (1944) stressedthe idea that diminishing returns might not apply to a broad concept capital.

Where GMO is gross manufacturing output, BCM is bank credit to the manufacturing sector; EXR is the exchange rate, IRS is the interest rate spread, MCAP is the market capitalization, MCU is the manufacturing capacity utilization and DUM is the various banking sector reform policies in Nigeria. Equation (2) and (3) is different from equation (1) is the following ways: First, this paper used the gross manufacturing output that is inflation-adjusted value of output produced by manufacturers in factories or plants for a specific time period. Two, credit to the manufacturing sector was specifically used as against the entire private sector credit used in the previous paper. Three, this paper used the manufacturing capacity utilization were used to reflect the sector. Four, the previous paper did not take into account the policy/regime shifts and structural breaks characterized by the various policy development phases of pre-Sap, deregulation, regulation, liberalization and recapitalization periods. The current paper accounted for these policy regimes via the dummy variable and regime shifts.

The Vector Autoregressive model (VAR) of equation (3) is as follows:

$$GMO_t = G_o + \sum_{i=1}^{n} b_1 GM_{ot-1} + \sum_{i=1}^{n} b_2 BCM_{t-i} + \sum_{i=1}^{n} b_3 EXP_{t-i} + \sum_{i=1}^{n} b_4 IRS_{t-i} + \sum_{i=1}^{n} b_5 MCAP_{t-i} + \sum_{i=1}^{n} b_6 MCU_{\square} + DUM$$

VAR models are the best methods for investigating shock transmission among variables as it allows for and gives the ability to describe the dynamic structure of the variables. VAR models serves as a flexible approximation to the reduced form of any wide variety of simultaneous structural models (Adebiyi, 2006; Mordi, 2009). Two results obtainable from VARs, which are useful for analyzing the transmission mechanisms, are the impulse response function (IRF) and forecast error variance decompositions (FVD). The impulse response function tells us how the variables respond to shocks in the policy variables while the variance decompositions shows the magnitude of the variations in the variables due to the policy variables.

Scope and Data Sources

The paper employs annual time series data aspanning the period 1970 to 2018. The description and definitions of variables, including the sources, are explained in Table 1.

Table 1: Description and Sources of Variables

Variables	Description	Sources
Gross Manufacturing Output (GMO)	Gross manufacturing output refers to the total inflation-adopted value of output produced by manufacturers in factories or plants for a specific time period	CBN Statistical Bulletin/CBN Annual Report and Statement of Accounts (various years).
Bank Credit to Manufacturing sector (BCM)nominal exchange rate, EXR	This is the total amount of funds which the banking -financial institutions provide to the manufacturing sector for productive activities.	CBN Statistical Bulletin, Reports of the Manufacturers Association of Nigeria (MAN).
Nominal exchange rate (EXR)	The exchange rate is the nominal exchange rate between the naira and the dollar. This variable has become an important policy variable in that CBN has been intervening in the foreign exchange market (EX)	CBN Statistical Bulletin/International Monetary Fund Financial Statistics.
Interest rate spread, IRS	The difference between the average yield banking financial institutionsrecieves from loans and other interest-accruing activities and the average rate it pays on deposits and borrowings.	CBN Statistical Bulletin and CBN Annual Statement of Accounts (various years)
Market capitalization MCAP	The market values. The share price times the number of shares outstanding for listed domestic companies	Reports and Annual Statements of the Nigerian Stock Exchange (NSE).
Manufacturing capacity utilization (MCU)	It measures the proportion of the potential output that is actually realized by the manufacturing sector. It is calculated as actual output divided by potential output, multiplied by 100.	Reports and Annual Statements of the Manufacturing Association of Nigeria
Dummy variable. DUM	The policy shifts and regime phases of the banking sector reform in Nigeria.	

Source: Researcher's Compilation (2020).

Result Presentation and Analyses

Data Presentation

The results of the correlation matrix are presented in Table 2

Table 2: Correlation Matrix Results

Correlation Probability	LGMO	LBCM	EXR	IRS	LMCAP	MCU
LGMO	1.000000					

LBCM	0.454305	1.000000				
	0.0000	-----				
EXR	0.642167	0.540076	1.000000			
	0.0000	0.0000	-----			
IRS	0.659152	0.564629	0.595073	1.000000		
	0.0000	0.0000	0.0000	-----		
LMCAP	0.345210	0.676797	0.659251	0.497004	1.000000	
	0.0000	0.0000	0.0000	0.0000	-----	
MCU	-0.260669	-0.118763	0.221410	0.035517	-0.139676	1.000000
	0.0002	0.0973	0.0018	0.6212	0.0509	-----

Source: Researchers' Computation using E-View 10.0

The result reveals that all the variables are not correlated going by the standard measure of less than 0.95. However, it was found that no pair-wise correlation coefficient between any two regressors was up to the stipulated benchmark of 0.8. Therefore, we conclude that no serious problem of multicollinearity exists in the sample.

Stationarity Test

The result of the unit root/ stationarity test is presented in Table 3. The result showed that the variables are stationary and significant at first difference at both the ADF and PP criteria.

Table 3: Augmented Dickey Fuller (ADF and PP Unit Root Tests Results

Variables	Level		First difference		I(d)
	ADF	**PP**	**ADF**	**PP**	
LGMO	-2.6359	-2.7176	-14.4079***	-14.4021***	I(1)
	(0.0875)	(0.0728)	(0.0000)	(0.0000)	
LBCM	-1.0106	-4.0370***	-10.0177***	-19.4337***	I(0)
	(0.7494)	(0.0091)	(0.0000)	(0.0000)	
EXR	0.9818	2.0377	-4.6489***	-14.4823***	I(1)
	(0.9964)	(0.9999)	(0.0002)	(0.0000)	
IRS	-0.3442	-3.8969**	-11.6257***	-26.0962***	(0)
	(0.9145)	(0.0139)	(0.0000)	(0.0000)	
LMCAP	-0.5977	-0.5900	-15.0900***	-15.1922***	I(1)
	(0.8670)	(0.8687)	(0.0000)	(0.0000)	
MCU	-1.5954	-1.2866	-4.4994***	-14.2222***	I(1)
	(0.4830)	(0.6358)	(0.0003)	(0.0000)	
Critical values:	@level		@difference		
1%	-3.4639		-3.4641		
5%	-2.8762		-2.8763		
10%	-2.5747		-2.5747		

*** and *** denote significant at 5% and 1% level of significance respectively.*
Source: Researchers' Computation Using EVIEW 10.0

Cointegration Test

Table 4.3 present the cointegration test result. The aim of the cointegration is test is to support the unit root test and to ensure that the preliminary results are free from spurious coefficients. The cointegration test was carried out using the ARDL Bound test. The ARDL Bound test approach has a number of features that enables flexibility over similar approaches to cointegration. First, it can be used with a mixture of I(0) and I(1) data, that is, it can be used whether the variables are mutually co integrated or not, unlike the Johansen co-integration approach. Second, it involves just a single-equation set-up, making it simple to implement and interpret. Third, different variables can be assigned different lag-lengths as they enter the model. And, the cointegration model can be tested by using the OLS (Ordinary Least Square) once the order of ARDL has been recognized (Pesaran and Shin 1999; Pesaran et *al.* 2001). In addition, the technique addresses the problem of endogeneity.

Table 4: Summary of ARDL Bound Testing Cointegration

Reform Phases	I(0) bound	I(1) bound	F-Statistic
1. Full Sample (1970 – 2018)	2.39	3.38	4.05**
2. Pre –SAP Period (1970 – 1985)	2.39	3.38	14.39* *
3. Deregulation period (1986 – 1993)	2.39	3.38	1.020
4. Regulation Period (1994 – 1998)	2.39	3.38	4.92**
5. Liberalization Period (1999 – 2003)	2.39	3.38	5.56**
6. Recapitalization Period (2004 – 2018)	2.39	3.38	6.16**

Note: ** denotes significant at 5% significant level
Source: Researchers' Computation using E-View 10.0

The results show that there is cointegration relationship among the variables as the coefficient of the variables is greater that lower bound and upper bound levels at the 5 percent significant level Based on this, we conclude that long-run relationship exists between manufacturing output and its modeled fundamentals (credit to manufacturing sector, exchange rate, interest rate spread, market capitalization and manufacturing capacity utilization) in each of the various phases of reforms except during the deregulation period.

Table 5: Summary of unrestricted ARDL Estimates

Variable	1 (1970 – 2018)	2 (1970 – 1985)	3 (1986 – 1993)	4 (1994 – 1998)	5 (1999 – 2003)	6 (2004 – 2018)
LGMO(-1)	0.998***	0.967***	0.942***	0.971***	-0.004	0.907***
	(0.006)	(0.016)	(0.037)	(0.071)	(0.154)	(0.031)
	[181.3]	[60.18]	[25.23]	[12.32]	[-0.023]	[29.26]
LBCM	0.113***	0.131***	0.634***	-0.327***	-0.007	0.308***
	(0.013)	(0.020)	(0.028)	(0.012)	(0.008)	(0.010)
	[8.457]	[6.691]	[22.77]	[-27.23]	[-0.929]	[30.74]
LBCM(-1)	-0.116***	-0.123***	-0.601***	0.285***	0.007	-0.280***
	(0.013)	(0.020)	(0.033)	(0.028)	(0.010)	(0.014)
	[-8.649]	[-6.557]	[-17.95]	[10.090]	[0.619]	[-20.42]
EXR	-0.00005	5.110	-0.042***	0.001	-0.001	0.0003***
	(0.00009)	(0.609)	(0.002)	(0.012)	(0.004)	(0.0001)
	[-0.541]	[8.390]	[-23.31]	[0.083]	[-0.171]	[4.188]
EXR(-1)		-5.123	0.040***		-0.069***	-0.0003***
		(0.609)	(0.002)		(0.004)	(0.0001)
		[-8.425]	[17.38]		[17.0]	[-3.612]
IRS	-0.006***	0.116***	0.008***	0.129***	-0.062***	0.001
	(0.003)	(0.027)	(0.001)	(0.006)	(0.012)	(0.001)
	[-2.050]	[4.314]	[14.29]	[20.505]	[-5.213]	[1.001]
IRS(-1)	0.005	-0.117***	-0.007***			
	(0.003)	(0.027)	(0.001)			
	[1.605]	[-4.288]	[-12.19]			
LMCAP	0.083***	0.279***	-0.001	0.001	0.0002	0.060***
	(0.023)	(0.053)	(0.006)	(0.006)	(0.012)	(0.004)
	[3.593]	[5.207]	[-0.202]	[0.101]	[0.020]	[14.084]
LMCAP(-1)	-0.078***	-0.235***			0.0004	-0.054***
	(0.023)	(0.055)			(0.004)	(0.005)
	[-3.388]	[-4.252]			[0.103]	[-11.24]
MCU	0.018***	0.051***	0.002***	0.013***	0.007***	-0.003***
	(0.002)	(0.005)	(0.001)	(0.001)	(0.0001)	(0.001)
	[8.271]	[10.318]	[3.268]	[19.29]	[50.08]	[-2.596]
MCU(-1)	-0.018***	-0.049***	-0.002**	-0.012***	-0.006***	0.003**
	(0.002)	(0.005)	(0.001)	(0.001)	(0.001)	(0.001)
	[-8.003]	[-10.035]	[-2.580]	[-8.756]	[-5.775]	[2.294]
Constant	-0.017	-0.081	0.264	1.424	0.885	0.490***
	(0.039)	(0.310)	(0.164)	(0.781)	(0.754)	(0.159)
	[-0.443]	[-0.261]	[1.609]	[1.822]	[1.540]	[3.086]
Adj. R^2	**0.998**	**0.996**	**0.997**	**0.996**	**0.994**	**0.993**
F-stat	**24.69*** **	**37.06*** **	**26.94*** **	**51.31*** **	**39.68*** **	**42.10*** **
Durbin W.	**2.05**	**2.09**	**2.05**	**1.94**	**2.02**	**1.95**

*Note: *** denotes significant at 5% significant level; standard error in and t-statistics in ( ) and [ ] respectively.*

Source: Researchers' Computation Using E-VIEW 10.0

In table 4 (first column), we present the estimates for the full sample covering the period (1970M01 – 2018M12). The result shows that the value of gross manufacturing output (GMO) in the current period is driven by its previous value. The impact of previous gross

manufacturing output [GMO (-1)] on the current gross manufacturing output is positive and significant. Current gross manufacturing output would increase by about 0.99 units following a unit rise in one- period lag of gross manufacturing output. Bank credits to the manufacturing sector (GMO), market capitalisation (MCAP) and manufacturing capacity utilisation (MCU) in the current period exert positive and statistically significant impact on current gross manufacturing output (GMO). Their impacts on gross manufacturing output (GMO) persist after the current period up to the first period with negative but significant effect.

In the current period, a unit rise in bank credits to the manufacturing sector (GMO), market capitalisation (MCAP) and manufacturing capacity utilisation (MCU) would cause the gross manufacturing output (GMO) to rise by 0.11 units, 0.08 units and 0.02 units respectively. On the other hand, a unit rise in the previous values of bank credits to the manufacturing sector, market capitalisation and manufacturing capacity utilisation, that is, [GMO(-1)], [MCAP(-1)] and [MCU(-1)] would cause current gross manufacturing output to decline by 0.12 units, 0.08 units and 0.02 units respectively. Exchange rate (EXR) and interest rate spread (IRS) in the current period affects gross manufacturing output negatively. While the effect on exchange rate on gross manufacturing output does not last beyond the current period, the effect of interest rate spread on gross manufacturing output persists after the current period, and it is positive, though not significant. The results indicate that one unit rise in exchange rate and interest rate spread would lead to 0.00005 units and 0.006 units fall in gross manufacturing output. Again, a unit rise in the previous value of interest rate spread [IRS (-1)] would cause current gross manufacturing output to increase by 0.005 units.

Pre-SAP Period (1970 – 1985)

Table 4.5 (second column), shows the estimates for the pre-SAP model covering the period (1970M01 – 1985M12). The result shows that the value of gross manufacturing output (GMO) in the current period is driven by its previous value. The impact of previous gross manufacturing output [GMO(-1)] on the current gross manufacturing output is positive and significant. Current gross manufacturing output would increase by about 0.97 units following a unit rise in one- period lag of gross manufacturing output. Bank credits to the manufacturing sector (BCM), exchange rate (EXR), interest rate spread (IRS), market capitalisation (MCAP) and manufacturing capacity utilisation (MCU) in the current period exert positive and statistically significant impact on current gross manufacturing output (GMO). Their impacts on gross manufacturing output (GMO) persist after the current period up to the first period with negative but significant effect. In the current period, a unit rise in bank credits to the manufacturing sector (BCM), exchange rate (EXR), interest rate spread (IRS), market capitalisation (MCAP) and manufacturing capacity utilisation (MCU) would cause the gross manufacturing output (GMO) to rise by 0.13 units, 5.11 units, 0.12 units, 0.28 units and 0.05 units respectively. These indicators would have reverse impact on gross manufacturing output after the current period. Specifically, a unit rise in the previous values of bank credits to the manufacturing sector, exchange rate, interest rate spread, market capitalisation and

manufacturing capacity utilisation, that is, [BCM(-1)], [EXR(-1)], [IRS(-1)], [MCAP(-1)] and [MCU(-1)] would cause current gross manufacturing output to decline by 0.123 units, 5.123 units, 0.12 units, 0.24 units and 0.05 units respectively. The effects of all the modelled fundamentals on gross manufacturing output persist beyond the current period during the pre-SAP period.

Deregulation Period (1986 – 1993)
In Table 4.5 (third column), we present the estimates deregulation model covering the period (1986M01 – 1993M12). The result shows that the value of gross manufacturing output (GMO) in the current period is driven by its previous value. The impact of previous gross manufacturing output [GMO (-1)] on the current gross manufacturing output is positive and significant. The estimate indicates that current gross manufacturing output would increase by about 0.94 units following a unit rise in one-period lag of gross manufacturing output.

Bank credits to the manufacturing sector (BCM), interest rate spread (IRS) and manufacturing capacity utilisation (MCU) in the current period exert positive and statistically significant impact on current gross manufacturing output (GMO). Their impacts on gross manufacturing output (GMO) persist after the current period up to the first period with negative but significant effect. In the current period, a unit rise in bank credits to the manufacturing sector (BCM), interest rate spread (IRS) and manufacturing capacity utilisation (MCU) would cause the gross manufacturing output (GMO) to rise by 0.63 units, 0.008 units and 0.002 units respectively. On the other hand, a unit rise in the previous values of bank credits to the manufacturing sector, interest rate spread and manufacturing capacity utilisation, that is, [BCM(-1)], [IRS(-1)] and [MCU(-1)] would cause current gross manufacturing output to decline by 0.60 units, 0.007 units and 0.002 units respectively.

Exchange rate (EXR) and market capitalisation (MCAP) in the current period exert contractionary effects on gross manufacturing output. While the effect on exchange rate on gross manufacturing output lasts beyond the current period, the effect of market capitalisation on gross manufacturing output is short lived. The results indicate that one unit rise in exchange rate and market capitalisation would cause gross manufacturing output to decrease by 0.042 units and 0.001 units respectively. On the other hand, a unit rise in the previous value of interest rate spread [EXR (-1)] would cause current gross manufacturing output to increase by 0.04 units. The effects of all the modelled fundamentals on gross manufacturing output, except market capitalisation, persist beyond the current period during the deregulation period.

Regulation Period (1994 – 1998)
In Table 4.5 (fourth column), we present the estimates regulation model covering the period (1994M01 – 1998M12). The result shows that the value of gross manufacturing output (GMO) in the current period is driven by its previous value. The impact of previous gross manufacturing output [GMO(-1)] on the current gross manufacturing

output is positive and significant. The estimate indicates that current gross manufacturing output would increase by about 0.97 units following a unit rise in one-period lag of gross manufacturing output.

Bank credits to the manufacturing sector (BCM) in the current period and previous value of manufacturing capacity utilisation [MCU(-1)] exert negative and statistically significant impact on current gross manufacturing output (GMO), while the current values of exchange rate (EXR), interest rate spread (IRS), market capitalisation (MCAP), manufacturing capacity utilisation (MCU) and the previous value of bank credits to the manufacturing ([BCM(-1)] affect gross manufacturing output positively. While the impacts of bank credits to the manufacturing sector (BCM) and manufacturing capacity utilisation (MCU) on gross manufacturing output (GMO) persist after the current period up to the first period, the effects exchange rate (EXR), interest rate spread (IRS), market capitalisation (MCAP) on the gross manufacturing output neutralise after the current period. In the current period, a unit rise in bank credits to the manufacturing sector (BCM) would cause gross manufacturing output to fall by 0.33 units. On the other hand, a unit rise in exchange rate (EXR), interest rate spread (IRS), market capitalisation (MCAP) and manufacturing capacity utilisation (MCU) would cause the gross manufacturing output (GMO) to rise by 0.001 units, 0.13 units, 0.001 units and 0.013 units respectively. Further, a unit rise in the previous values of bank credits to the manufacturing sector [BCM(-1)] would cause current gross manufacturing output to increase by 0,29 units, while a unit rise in the previous values of manufacturing capacity utilisation [MCU(-1) would cause current gross manufacturing output to decrease by 0.012.

Liberalization Period (1999 – 2003)

In Table 4.5 (fifth column), we present the estimates deregulation model covering the period (1999M01 – 2003M12). The result shows that the value of gross manufacturing output (GMO) in the current period is not driven by its previous value. The impact of previous gross manufacturing output [GMO(-1)] on the current gross manufacturing output is negative but not significant. The estimate indicates that current gross manufacturing output would decrease by about 0.004 units following a unit rise in one-period lag of gross manufacturing output.

Bank credits to the manufacturing sector (BCM), exchange rate (EXR) and interest rate spread (IRS) in the current period exert negative impact on current gross manufacturing output (GMO) with the effect of interest rate spread being statistically significant. Similarly, market capitalisation (MCAP) and manufacturing capacity utilisation (MCU) in the current period exert positive impact on current gross manufacturing output (GMO) with the effect of manufacturing capacity utilisation being statistically significant. The effects of these fundamentals on gross manufacturing output excepts that of interest rate spread persist after the current period up to the first period with exchange rate and manufacturing capacity utilisation exerting negative but significant effects on gross manufacturing output.

In the current period, a unit rise in bank credits to the manufacturing sector (BCM) exchange rate (EXR) and interest rate spread (IRS) would cause the gross manufacturing output (GMO) to decrease by 0.007 units, 0.001 units and 0.06 units respectively. Similarly, a unit rise in market capitalisation (MCAP) and manufacturing capacity utilisation (MCU) in the current period would cause current gross manufacturing output (GMO) to rise by 0.0002 units and 0.007 units respectively. On the other hand, a unit rise in the previous values of bank credits to the manufacturing sector [(BCM (-1)] and market capitalisation [MCAP(-1)] would cause current gross manufacturing output to increase by 0.007 units and 0.0004 units respectively. Similarly, a unit rise in the previous values of exchange rate [EXR(-1)] and capacity utilisation [MCU(-1)] would cause current gross manufacturing output to decrease by 0.069 units and 0.006 units respectively. The effects of all the modelled fundamentals on gross manufacturing output, except that of interest rate spread, persist beyond the current period during the liberalisation period.

Recapitalization Period (2004 – 2018)

In Table 4.5 (third column), we present the estimates deregulation model covering the period (2004M01 – 2018M12). The result shows that the value of gross manufacturing output (GMO) in the current period is driven by its previous value. The impact of previous gross manufacturing output [GMO(-1)] on the current gross manufacturing output is positive and significant. The estimate indicates that current gross manufacturing output would increase by about 0.91 units following a unit rise in one-period lag of gross manufacturing output.

Bank credits to the manufacturing sector (BCM), exchange rate (EXR), interest rate spread (IRS) and market capitalisation (MCAP) in the current period exert positive and statistically significant impact on current gross manufacturing output (GMO), while manufacturing capacity utilisation (MCU) in the current period exert negative and impact on current gross manufacturing output (GMO). The impacts of all the variables, except interest rate spread are statistically significant. The effects of these fundamentals on gross manufacturing output excepts that of interest rate spread persist after the current period up to the first period with exchange rate and manufacturing capacity utilisation exerting negative but significant effects on gross manufacturing output.

In the current period, a unit rise in bank credits to the manufacturing sector (BCM), exchange rate (EXR), interest rate spread (IRS) and market capitalisation (MCAP) would cause the gross manufacturing output (GMO) to rise by 0.31 units, 0.0003 units, 0.001 units and 0.06 units respectively, while a unit rise in manufacturing capacity utilisation (MCU) in the current period would cause current gross manufacturing output (GMO) to decline by 0.003 units. On the other hand, a unit rise in the previous values of bank credits to the manufacturing sector [BCM (-1)], exchange rate [EXR(-1)], and market capitalisation [MCAP(-1)] would cause current gross manufacturing output to decrease by 0.280 units, 0.0003 units and 0.05 units respectively. Similarly, a unit rise in the previous values of capacity utilisation [MCU(-1)] would cause current gross manufacturing output to increase by 0.003 units. The effects of all the modelled fundamentals on gross manufacturing output, except that of interest rate spread, persist beyond the current period during the liberalisation period.

Model Stability Test

Table 6: Ramsey RESET Test Results

Test-statistic	F-Statistic	Prob.(F-stat)
Value obtained	1.493045	0.2353

From the results shown in table 6, the probability of F-statistic is more than 0.05. Accordingly, at 5% significance level, the null hypothesis that the model is rightly specified cannot be rejected. We therefore conclude that our model is rightly specified.

Serial (Auto) Correlation of the Residual

Complement to the Durbin-Watson d-statistic for autocorrelation of the residual, the Breusch-Godfrey serial correlation LM test was also used to test for serial correlation of the residual in our model and the results are reported in table 7.

Table 7: Breusch-Godfrey Serial Correlation LM Test

Test-statistic	F-Statistic	Prob.(F-stat)
Value obtained	1.771360	0.1958

From the results in Table 7, the probability of the F-statistic is more than 0.05. Following the rule outlined in the previous chapter, we cannot reject the null hypothesis of no-autocorrelation at 5% level of significance. Accordingly, we conclude that our model is not plagued by autocorrelation of any order.

Normality of the Residuals

The normality of the residual of our model was investigated using the Jarque-Bera (JB) normality test and the results are reported in Table 8.

Table 8: Jarque-Bera (JB) Normality Test Results

Test-statistic	JB Statistic	Prob.
Value obtained	2.620899	0.428718

From the results, the probability of JB statistic in our model is greater than 0.05. At 5% level of significance, we cannot reject the null hypothesis of normality of the residual. Accordingly, we conclude that the residual is normally distributed.

Heteroskedasticity Test

One of the assumptions of OLS is that the residual has constant variance or is homoskedastic. The violation of this assumption results in heteroskedasticity problem. The constancy of the residual variance was investigated using the Breusch-Pagan-Godfrey (BPG) heteroskedasticity test and the results are reported in Table 9.

Table 9: Heteroskedasticity Test

Test-statistic	F-statistic	Prob.
Value obtained	1.287738	0.2801

From the result in Table 9, the probability of the F-statistic associated with BPG F-test is greater than 0.05. Thus we cannot reject the null of homoskedastic variance of the residual at 5% level of significance. Thus, there is no problem of heteroskedasticity in our model.

Test for structural break (parameter stability)

Table 9 was estimated on the assumption that the reforms in the banking sector have occasioned some level of structural change in Nigeria. Here, we conduct a formal test to substantiate this assumption. Based on Nigeria's experience, we identified four major breaks, namely: 1986M01, 1993M01, 1998M01 and 2003M01. We incorporated these break in our estimation. The result is shown in Table 10. Under the null hypothesis of no structural break or change (parameter stability), we reject the null hypothesis if the F-calculated is greater than the F-critical.

Table 10: Summary of Structural Break Test

Chow Breakpoint Test: 1986M01 1993M01 1998M01 2003M01
Null Hypothesis: No breaks at specified breakpoints
Varying regressors: All equation variables
Equation Sample: 1970M01 2018M12

F-statistic	105.3881	Prob. F(18,564)	0.0000
Log likelihood ratio	866.2787	Prob. Chi-Square(18)	0.0000
Wald Statistic	1896.986	Prob. Chi-Square(18)	0.0000

Source: The researcher's computation

The null hypothesis of no structural change is rejected. Hence, the conclusion that there is structural change, this implies that the parameters are not stable overtime. Hence, the state of the banking sector and that of the manufacturing sector have quite asymmetric during reform regime.

VAR Impulse Response Functions (IRFs)

We use the vector autoregressive impulse response function (VAR-IRFs) to characterize the responses of gross manufacturing output (GMO) to a unit shock emanating from credit to manufacturing sector (BCM); exchange rate (EXR); interest rate spread (IRS); market capitalisation (MCAP) and manufacturing capacity utilisation (MCU) for a period of 12 months. Specifically, we examine the impulses and responses at different reform phases in Nigeria, starting from 1970 to 2018.

(a) Response of gross manufacturing output (GMO) to its own shock

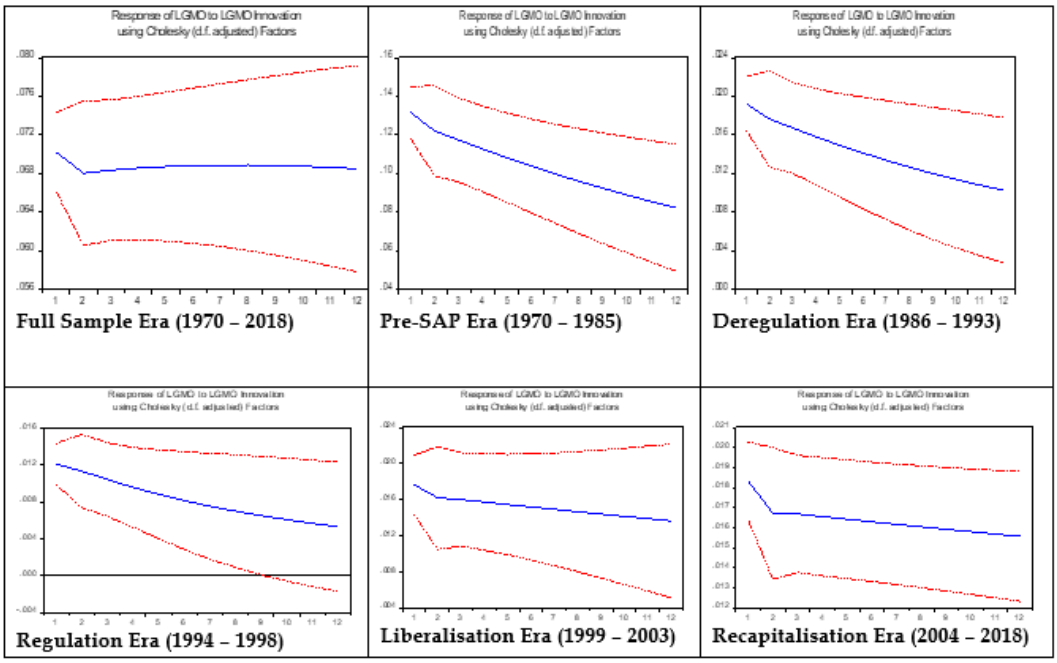


Figure 1: Response of gross manufacturing output to its own shock

In Figure 1, we present the response of gross manufacturing output (GMO) to its own shock during each phase of reform in Nigeria. The result indicated that gross manufacturing output (GMO) responded positively to its own shock within the first 12 months during all the reform phases in Nigeria. The responses of gross manufacturing output (GMO) to its own shock during pre-SAP period (1970 – 1985) and deregulation period (1986 – 1993) have been declining, though still positive up to the 12th period. The response of gross manufacturing output is significant at 95%.

(b) Response of gross manufacturing output (GMO) to a unit shock in credit to manufacturing sector (BCM)

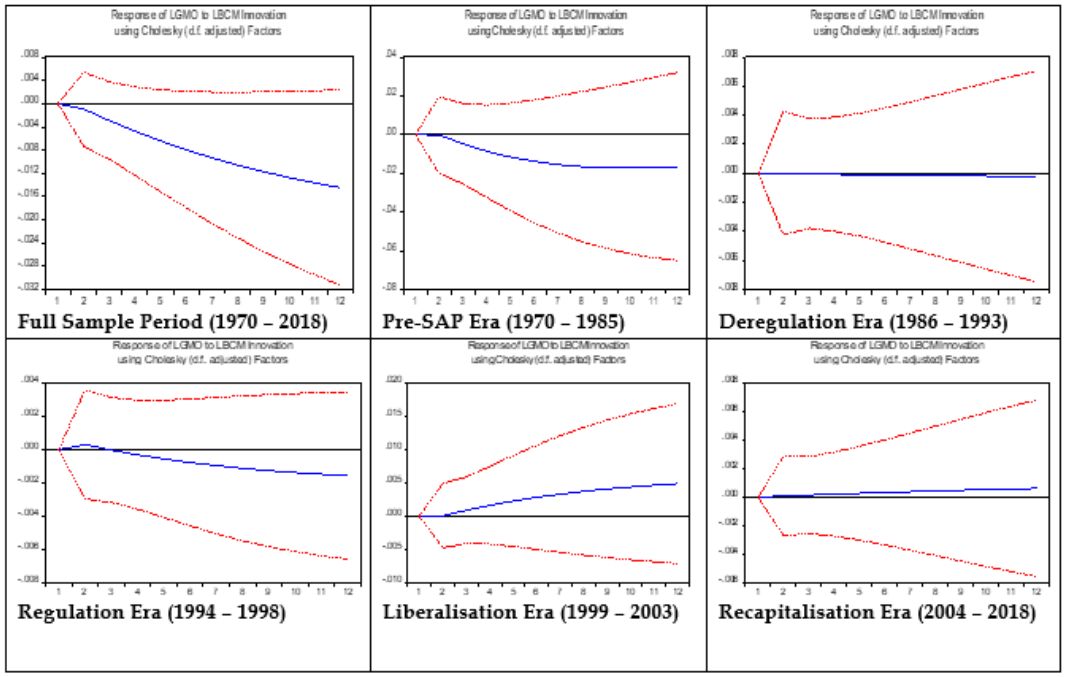


Figure 2: Response of gross manufacturing output to shock in BCM

In Figure 2, we present the response of gross manufacturing output (GMO) to a unit shock in bank credit to manufacturing sector during each phase of reform in Nigeria. The result indicated that gross manufacturing output (GMO) responded negatively to shock in bank credit to manufacturing sector (BCM) during the pre-SAP (1970 – 1985) and regulation (1994 – 1998) periods. This result is similar to that of the full sample model (1970 – 2018). On the other, during the liberalisation period (1999 – 2003) gross manufacturing output (GMO) responded negatively to shock in bank credit to manufacturing sector (BCM). The result also indicated that the response of gross manufacturing output (GMO) to a unit shock in bank credit to manufacturing sector was neutral during the deregulation (1986 – 1993) and recapitalization (2004 – 2018) periods. The response of gross manufacturing output to a unit shock in bank credit to manufacturing sector is significant at 95%.

(c) Response of gross manufacturing output (GMO) to a unit shock in exchange rate (EXR)

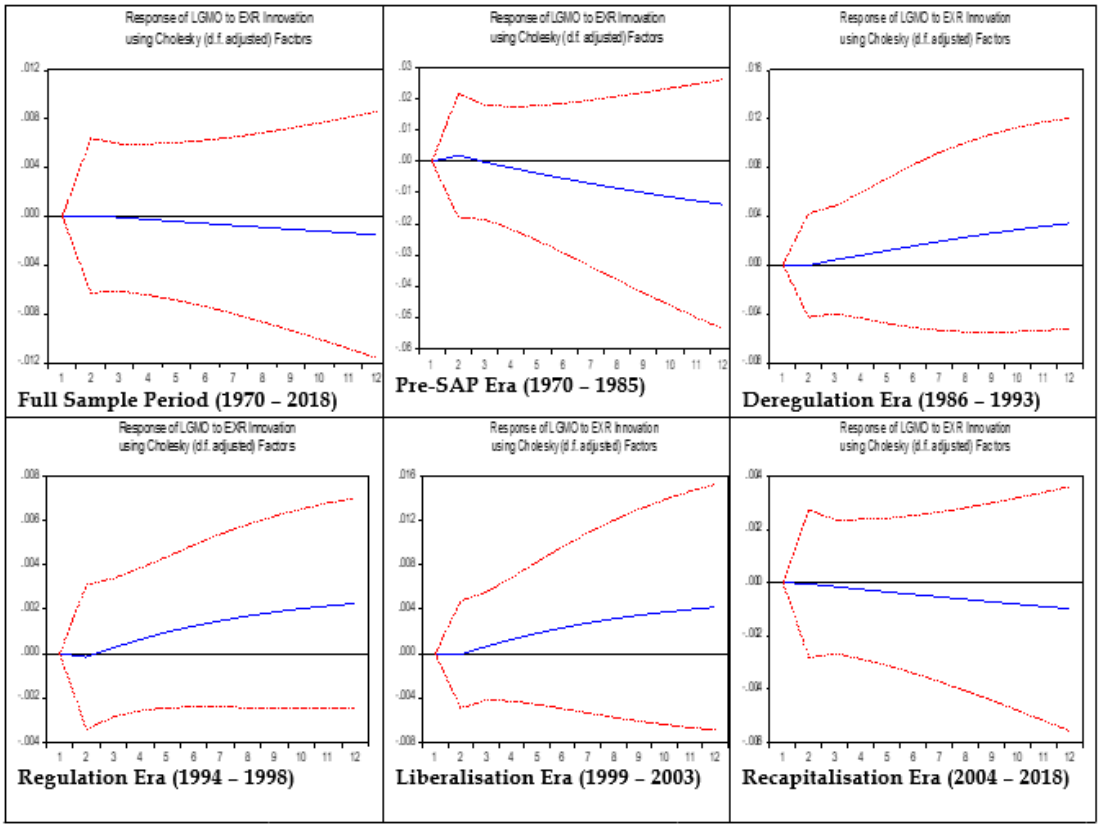


Figure 3: Response of gross manufacturing output to shock in exchange rate

In Figure 3, we present the response of gross manufacturing output (GMO) to a unit shock in exchange rate during each phase of reform in Nigeria. The result indicated that gross manufacturing output (GMO) responded negatively to a unit shock in exchange rate during the pre-SAP (1970 – 1985) and recapitalization (2004 - 2018) periods. This result follows a similar pattern to that of the full sample model (1970 – 2018). On the other, gross manufacturing output (GMO) responded positively to a unit shock in exchange rate during the deregulation (1986 – 1993), regulation (1994 – 1998) and liberalization (1999 – 2003) periods. The response of gross manufacturing output to a unit shock in exchange rate is significant at 95%.

(d) Response of gross manufacturing output (GMO) to a unit shock in interest rate spread (IRS)

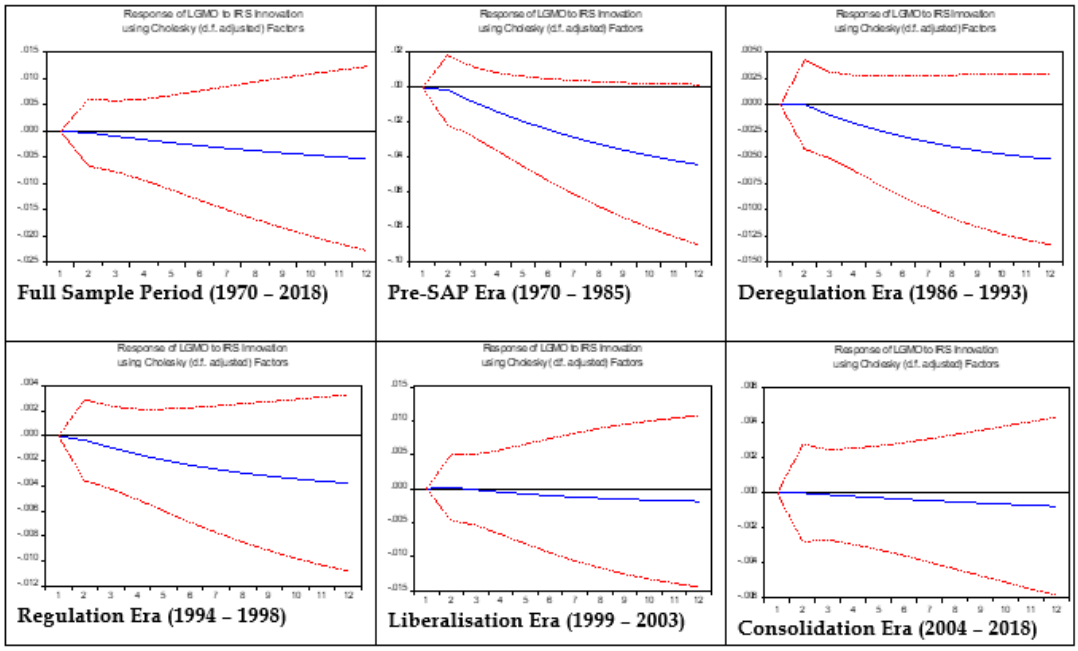


Figure 4: Response of gross manufacturing output to shock in interest rate spread

Figure 4, shows the response of gross manufacturing output (GMO) to a unit shock in interest rate spread during each phase of reform in Nigeria. The result indicated that gross manufacturing output (GMO) responded negatively to shock in interest rate spread during all the reform phases in Nigeria. However, the responses of gross manufacturing output (GMO) to a unit shock in interest rate spread are more robust the pre-SAP era (1970 – 1985), the deregulation era (1986 – 1993) and the regulation era (1994 – 1998). The response of gross manufacturing output to a unit shock in interest rate spread is significant at 95%.

(e) Response of gross manufacturing output (GMO) to a unit shock in market capitalisation (MCAP)

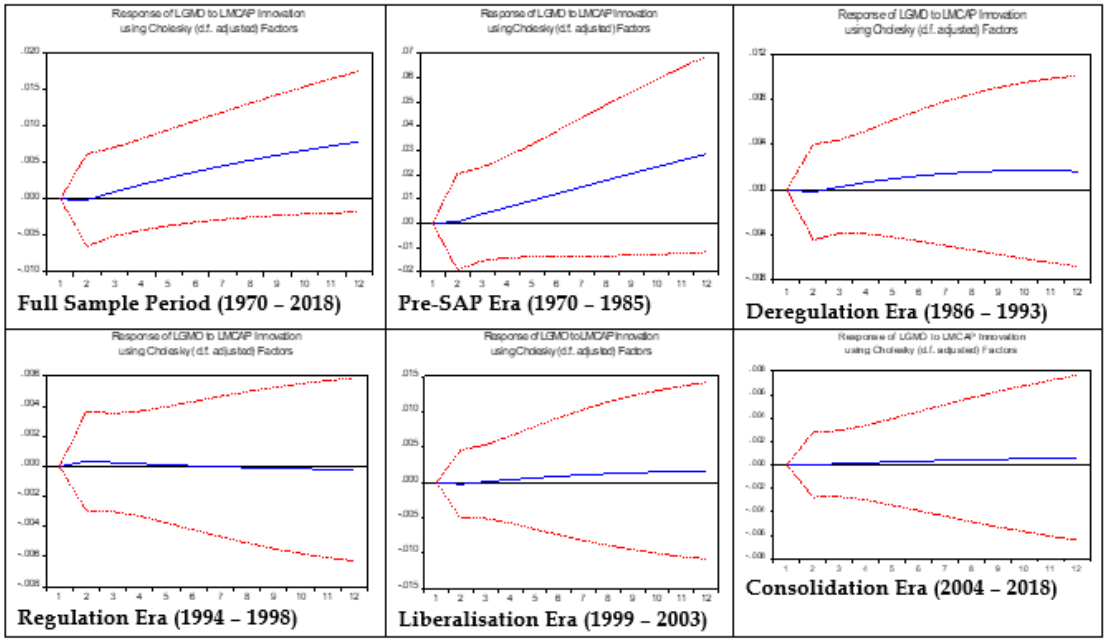


Figure 5: Response of gross manufacturing output to shock in market capitalisation

In Figure 5, we present the response of gross manufacturing output (GMO) to a unit shock in market capitalization (MCAP). The result revealed that gross manufacturing output (GMO) responded positively to shock in market capitalization during each reform regime in Nigeria, except during the regulation (1994 – 1998) era up to 12th. Though the responses of gross manufacturing output (GMO) to a unit shock in market capitalization (MCAP) appear more pronounced in during the pre-SAP era and the deregulation era, those of gross manufacturing output (GMO) to a unit shock in market capitalization (MCAP) during the liberalization and the recapitalization periods appear somehow neutral. Similarly, the response of gross manufacturing output (GMO) to a unit shock in market capitalization (MCAP) during the regulation period is negative and appears somehow neutral, especially around the 7th period to the 12th period, there is evidence of positive response in the first 6th period. The response of gross manufacturing output to a unit shock in bank credit to manufacturing sector is significant at 95%.

(f) Response of gross manufacturing output (GMO) to a unit shock in manufacturing capacity utilisation (MCU)

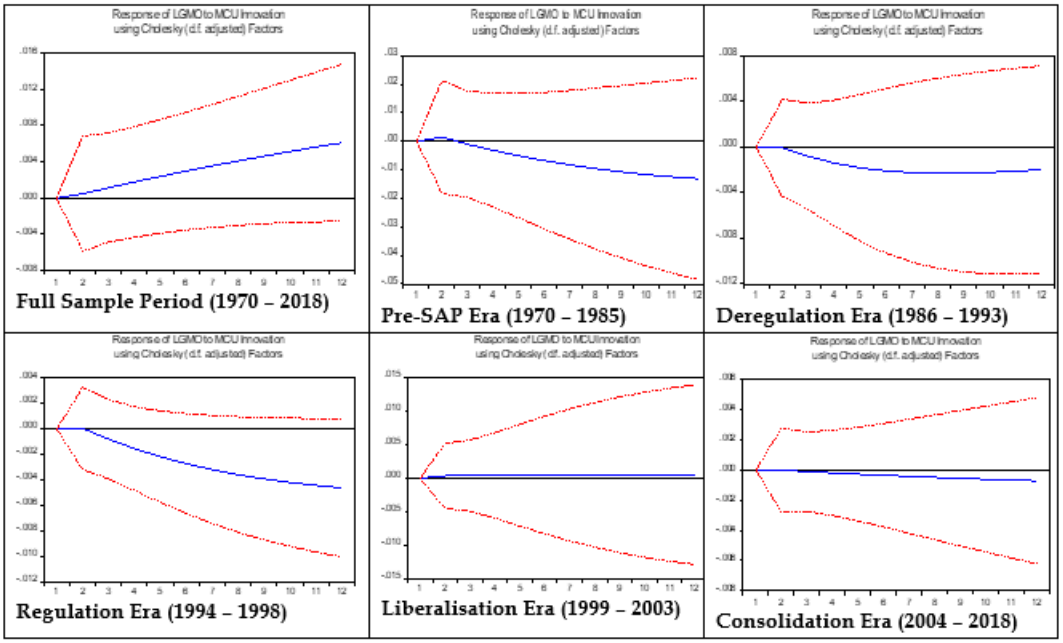


Figure 6: Response of gross manufacturing output to shock in manufacturing capacity utilisation

In Figure 6, we present the response of gross manufacturing output (GMO) to a unit shock in manufacturing capacity utilization (MCU). The result revealed that gross manufacturing output (GMO) responded negatively to unit shock manufacturing capacity utilization (MCU) during each reform regime in Nigeria, except during the liberalization period (1998 – 2003). Though the responses of gross manufacturing output (GMO) to a unit shock in manufacturing capacity utilization appear more pronounced in during the pre-SAP period, the deregulation period and the regulation period, while those of gross manufacturing output (GMO) to a unit shock in manufacturing capacity utilization during the liberalization and the recapitalization periods appear somehow neutral. The response of gross manufacturing output to a unit shock in bank credit to manufacturing sector is significant at 95%.

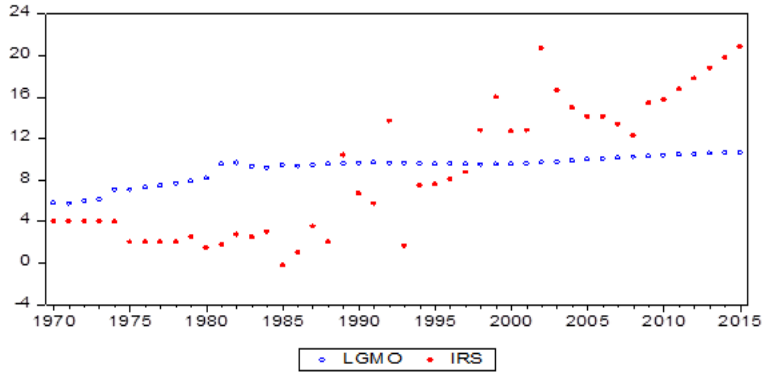
Discussion and Policy Implications of Major Findings

This paper is an investigation of the effect of banking sector reforms on manufacturing sector performance in Nigeria. In carrying out this study, three hypotheses, in line with the research questions and hypotheses were formulated and tested. The first objective was to investigate the impact of the various reforms in the banking sector on the manufacturing sector in Nigeria. We found that on the whole, manufacturing outputs are impacted significantly by the identified variables that are manipulated during banking reforms. Specifically, bank credit to the manufacturing sector exerted significant positive impact on manufacturing output during the pre-SAP period, deregulation period,

regulation period and the recapitalisation period. This is expected. As more money is made available to the manufacturing sector, output will rise. Investors have means to investment more, by investing more, more output is produced. The above findings are quite interesting and are in tandem with that of Ume et *al.* (2017). However, the impact of bank credit on manufacturing output appears negative and significant after the first period, especially during the pre-SAP, regulation and recapitalization periods.

The impact of exchange rate on gross output manufacturing has not been substantial. Except during the deregulation and recapitalization periods where exchange rate exert significant negative and positive effect on gross manufacturing output respectively, its impacts on the gross manufacturing output were insignificant for the full sample estimates and during the pre-SAP, regulation and liberalisation period. We expected rise in nominal exchange rate, which is akin to depreciation/devaluation of exchange to occasion a rise in output. We obtained there is mixed evidence on this. During the deregulation period, exchange rate depreciation/devaluation led to increase in gross manufacturing output. Nominal rise (depreciation/devaluation of exchange rate) in domestic currency vis-à-vis the foreign anchor currency makes import costly, while export becomes cheap. This will cause domestic consumers and possible the foreign consumers of goods produced in another to switch to cheaper commodities. This will lead to rise in the demand of domestically produced goods; rise in the demand of domestic goods is as good as rise in consumption of domestically produced goods. This is an incentive for firms to want to produce more, thus leading in increase in gross manufacturing output. This result is in line with that of Ukoha (2000), who found that exchange rate affects manufacturing capacity utilization positively. However, the evidence from the recapitalisation model suggests otherwise. We found exchange rate depreciation/devaluation leading to fall in gross manufacturing output. This is contrary to conventional wisdom. One of the explanations to this is that Nigerians have penchant for foreign produced goods, and globalization has made foreign produced goods easily accessible. So even with the continuous rise in nominal exchange rate, the demand for foreign produced goods is still soaring. Evidence has shown that in recent time, Nigerian's import demand has been on the increase.

Interest rate spread (IRS) exerted significant impact on gross manufacturing output during each phase of reform, except during the recapitalisation period. Though the impact is either positive or negative, on the average it is negative. Interest rate spread is the difference between lending and savings rate and its impact on gross manufacturing output is positive and significant. This goes to suggest that there is a wide gap or a mismatch between lending and savings rate, meaning that the cost of credits is very high relative to the reward for savings. This case scenario tends to discourage the manufacturers from sourcing funds from commercial banks for investment and expansion of production. This behaviour is presented in the figure below:



The study further revealed that the capital market (stock market) which is proxied by market capitalization provides a more useful long term capital for the activities of the manufacturing sector. This is informed by the fact that market capitalization has significant positive impact on the manufacturing production during most of the reform period. This means that manufacturing operators rely more on capital market for funds than the money market. Thus, any policy action taken on capital market will definitely have significant impact on the manufacturing.

Concluding Remark

The financial-real sectors relationship has received enormous attention in both theoretical and empirical literature. However, the shocks from the financial sector the real sector has received little attention in the literature. Using the banking sector reform and the gross manufacturing output in Nigeria from the period 1970 to 2018 and employing the Vector Autoregressive model (VAR), the paper provides some empirical support that indeed, the shocks from the banking sector reform did attack the manufacturing sector performance in Nigeria. The result indicated that gross manufacturing output responded negatively to bank credit during the reform phases. It further revealed that it responded negatively to a unit shock in exchange during the pre-SAP and the recapitalization but also positively during the deregulation, regulation and liberalization period. The results again indicated that gross manufacturing output responded negatively to shock in interest rate spread during all the reform phases in Nigeria. The implication is that the linkage between banking and real sectors is weak and unpredictable. This might be due to the unstable macroeconomic environment in Nigeria exacerbated by weak institutional framework. As a way forward, we note that banking sector reform must of necessity be preceded by a stable and more predictable macroeconomic policy environment so as to link-up the real sector including the manufacturing sector.

The results from the foregoing empirical investigation should be interpreted with caution. First, the paper employs analyzed time series data spanning 1970 to 2018. Hence, conducting VAR on conflicting and unreliable data as characterized by the Nigerian data pool may not reflect the ideal situation of the Nigerian economy. Again, interpreting VAR models should be done with caution because VAR coefficients have little or no economic meaning. As for agenda for further studies, we suggest a forecasting examination of banking sector reforms on manufacturing output in Nigeria.

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