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Effect of Financial Sector Development on Manufacturing Output Growth in Nigeria (1986-2012): A Vector Auto Regression Approach

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Previous studies have examined the effect of financial sector development on manufacturing output growth without examining its effect on the disaggregated manufacturing output growth in Nigeria; hence, the present study filled this gap. The study employed Vector Autoregression (VAR) analysis to test whether or not financial sector variables stimulate the growth of output in manufacturing sector of the Nigerian economy, by maintaining interactions with some key macroeconomic variables in the Nigerian economy using annual data from 1986 to 2012. The study also applied unit root and Johansen cointegration tests to examine the behaviour of the macro data. The result suggests that relaxing financial development constraints and deepening the financial sector are crucial to boosting the manufacturing output growth in Nigeria.

***Key words**: Manufacturing sector, Economic growth, VAR, Cointegration, Variance Decomposition and Impulse Response*

1. Introduction

The Nigerian financial system can be broadly divided into two sub-sectors namely; the informal and formal sector. The informal sector comprises the local money lenders, the thrifts, saving associations, etc. This component is poorly developed, limited in reach, and not integrated into the formal financial system. The formal financial system on the other hand can be further sub-divided into capital and money market institution. It is made up of the banks and non-bank financial institutions. The regulatory institutions for the financial system are the Federal Ministry of Finance (FMF), Central Bank of Nigeria (CBN), Nigeria Deposit Insurance (NDIC), Securities and Exchange Commission (SEC), National Insurance Commission (NIC), Federal Mortgage Bank of Nigeria (FMBN) and the National Board for Community Banks (defunct) (Olofin and Afengideh, 2008).

Financial sector development in Nigeria is usually associated with the Structural Adjustment Programme (SAP) of 1986.The SAP attempted to move the country away from government direct control of economic activities to indirect control (i.e. free market economy). Thus, all sectors of the economy were deregulated i.e. trade, exchange, finance,

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industry etc. Prior to the deregulation of the economy, the financial sector had been the most highly regulated. The reason being that financial development funds were needed for government to have a good grip over the sector (Adegbite, 2005).

In order to boost the economy, National Economic Empowerment and Development Strategy (NEEDS) was introduced in 2003. One of the objectives of NEEDS was to build and promote comprehensive and healthy financial system to support economic development. The imperative of this reform also manifested in the banking sector with CBN recapitalisation policy of July 2004 mandating all banks to raise their capital base from the mandatory minimum of #2billion to #25billion, an increase of over 1000%. The need for such financial sector reform deriving largely from the spate of distress in the banking sector and the possibility of leading to disintermediation, demonetization, a collapse of the payment system and a serious depression of the economy (Adegbite, 2005).

Manufacturing sector is an important engine of growth, an antidote for unemployment, a creator of wealth, and a channel for sustainable development capable of promoting industrialisation in the economy (Kaldor, 1967 and Mike, 2010). Despite all attempts in developing the manufacturing sector, the situations of manufacturing sector in Nigeria revealed that manufacturing sector has not improved appreciably. The available statistics have shown that the number of registered manufacturing firms with the Manufacturers' Association of Nigeria (MAN) dropped from 4850 in the 1980s to 2000 in 2010. Capacity utilization was 70.1% in 1980, 52.8% in 2005 and 48.0% in 2009. The share of manufacturing in the aggregate GDP declined from 5.3% in 1981 to 4.1% in 1993, 3.4% in 2005, and 4.1% in 1993, 3.4% in 2005 and 4.1% in 2009 (CBN Statistical Bulletin, 2012). Similarly, direct manufacturing employment declined over the years. 2,752,832 people were engaged by manufacturing sector in 2001, 1,043,982 in 2005 and 1,026,305 in 2008 (Mike, 2010).

The linkage between financial sector development and economic growth has long been a subject of intense debate among scholars in Nigeria (Udoh and Ogbuagu, 2012). Odeniran and Udeaja (2010), examined the relationship between financial sector development and economic growth in Nigeria and found that there is causal relationship between financial sector development and economic growth in Nigeria. Nzotta and Okereke (2009), Olofin and Afengideh (2008), Adekunle, Salami and Adedipe (2013), and Kolawole (2011) have all examined differing linkages between financial sector development and economic growth. Kolawole (2011), examined the causal linkage between open market, financial sector development and economic growth in Nigeria and found that financial sector development is not a specific factor determining the rate of economic growth in Nigeria. Nzotta and Okereke (2009), examined financial deepening and economic development in Nigeria and found that financial structure had enhanced the level of financial saving and thus affected the level of financial deepening positively.

The existing empirical studies in Nigeria have focussed on addressing the effect of financial sector development on economic growth (Nzotta and Okereke, 2009, Olofin and Afengideh, 2008, Adekunle, Salami, and Adedipe, 2013, and Kolawole, 2011). Few empirical studies have also addressed effect of financial sector development on manufacturing sector (Udah and Obafemi, 2011). The gap in the literature surveyed shows that none of the Nigerian specific case studies have extensively addressed the effect of financial sector development on the components of manufacturing sector output.

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The need to address this issue of the effect of financial sector development on the components of manufacturing sector output is pertinent for the following reasons; firstly, it will show the specific impact of financial sector development on each component of manufacturing sector output. This has the implication of revealing the component that best respond to financial sector development initiative in Nigeria. Secondly, it will contribute to the existing empirical literature in the area of specific analysis of the impact of financial sector development on real sector subsectors output growth in Nigeria. The real sector represents a critical sector capable of inducing economic growth and alleviating poverty level in Nigeria. The objective of the study is to empirically investigate the effect of financial sector development on the components of manufacturing output growth in Nigeria.

The paper is therefore arranged as follows: following the introductory Section, Section 2 reviews the literature. Section 3 presents the methodology of the study. Section 4 presents the analysis and discussions of result. Section 5 concludes the study and offers some pertinent policy prescription.

2. Literature Review

The theoretical foundation for this work is anchored on Schumpeter (1912) and the subsequence enormous scholarly works stemming out from the debate of McKinnon (1973) and Shaw (1973) on financial sector development and economic growth. They contended that there is positive relationship between financial sector development and economic growth. The view of Robinson (1962) and stiglitz (1994) questioning the role of the financial system in promoting economic development remain valid as manufacturing sector also create demand for additional financial services which in turn will lead to more develop financial sector.

McKinnon (1973) and Shaw (1973) explained the notion of financial repression theoretically that economic growth and development can be accomplished by effective financial system through effective capital allocation. The argument was historically proved that government in most developed and especially developing countries have intervened through regulation to restrict all forms of competition in the financial sector. Thus, the argument was concluded that saving and investment are discouraged through repressed financial sector as what could be obtained in a competitive market is greater than the rate of returns. Financial intercessors in this system function at low capacity thereby hindering saving, investment and development in the economy. Roubini and Sala-i-Martin (1992) supported McKinnon and Shaw that repressed financial system causes ineffective allocation of capital, low rate of returns to savers and increase cost of financial intermediation. Hence, (Adegite, 2005) was of the opinion that repressed financial system stamps down growth and he explicated that interest ceiling, liquidity ratio requirement, capital control, restrictions in market entry into the financial sector, credit ceilings or restrictions on direction of credit allocation and government ownership or domination of banks are polices that cause financial repression. Both McKinnon and Shaw advocated that financial liberalization through interest deregulation is the antidote for a financial repressive policy of developing countries.

Williams and Mahar (1998) argued along the line of McKinnon and Shaw that if the financial sector is free it can provide the necessary fillip for economic growth and development. They argued that there are reforms that need to be put in place in order to free a repressed financial system, so that it can take the initiative to pull up the real sector. The reforms includes the deregulation or liberalisation of interest rates, removal of credit controls, relaxation of entry-rules into the financial sector especially the banking subsector, bank

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autonomy, freeing banks from bureaucratic controls, privatising the ownership of banks and deregulating international capital flows.

Kaminsky and Schumkler (2002) disagreed with Williams and Mahar and suggested that an economy should not automatically adopt laissez-faire economic system on financial development and stop all forms of government regulations that create financial repression due to the negative implication of repressed financial system on economic growth. They argued that financial liberalization create crises in most developing countries because of the external shock its introduced. Also removing all public financial regulation may leads to market imperfection, asymmetric information and hinder financial development environment. They suggested new set of regulation that ensures market competition as well as prudential regulation and supervision as an alternative to a financial repressive regime.

Overall the McKinnon and Shaw financial repression hypothesis suggest the critical role of interest rate liberalisation as a significant factor in inducing economic growth. The hypothesis signals the crucial role of interest rate along with other control variables in driving economic growth in an economy of which manufacturing sector development represents an important component.

McKinnon's model:

$$(M/P)^d = L(Y/P, I/Y, r^e) \quad \text{.....1}$$

Where M/P = real stock of money (M_2)
Y/P = real gross national product
I/Y = ratio of gross investment to GNP
r^e = Adjusted *ex ante* real interest rate

Shaw's model:

$$(M/P)^d = L(Y/P, v, r^e) \quad \text{.....2}$$

Where v = vector of opportunity cost in real terms of holding money which can be proxied by $b - p^e$

Where b = nominal yield on government bonds (or short- term loan rate if government bonds are unavailable) and p^e = expected interest rate.

Experience from empirical review left us with conflicting results. Udoh and Ogbuagu (2012), used autoregressive distributed lag (ARDL) to examine the relationship between financial sector development and industrial production in Nigeria. They found that financial depth has a negative sign contrary to McKinnon (1973) and Shaw (1973) debate. Hachicha (2005), used structural error correction model to examine banking sector controls and financial deepening in Tunisia. He found that financial policy variables i.e. financial repression and interest rate (FR and R) enter the first cointegrating vector, which indicates that these variables have long-run effect on financial development. It also show that financial repression in Tunisia has had a negative long-run effect on financial deepening which confirms traditional literature on financial liberalization and contrasts with the prediction of financial market imperfection model. Moreover, long-run financial deepening is positively

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affected by the level of real per capital income and real interest rate. Hachicha (2005) result is broadly in line with McKinnon (1973) and Shaw (1973). Aug (2007), used ARDL bound procedure to examine the extent in which financial development contribute to output expansion in Malaysia, found that financial development positively influence economic development in Malaysia.

Udah and Obafemi (2011), used variance decomposition and impulse response to examine the impact of financial sector reform on agricultural and manufacturing sectors in Nigeria and found that an unexpected increase in the ratio of private sector credit to GDP has a positive effect on manufacturing output, agricultural output and capacity utilization. Adegbite (2004), used the ratio of broad money supply (M2) to GDP as her measure of financial sector growth and deepening, found a positive correlation between financial sector growth and real sector growth in Nigeria. This result support Hachicha (2005) and McKinnon (1973) and Shaw (1973).

In our literature, care has been taken to critically examine finance-growth nexus in Nigeria and other countries. But recent work on financial sector development does not address the effect of the development on the components of manufacturing output. The present study examines the effect of financial sector development on manufacturing output growth in Nigeria by decomposing manufacturing sector output into components.

3. Data And Methodology

Annual time series data on manufacturing output growth (MOG), broad money supply in ratio of GDP (M2/GDP), credit to private sector as a ratio GDP (CPS/GDP) and total saving as a ratio of GDP (TS/GDP) from 1986 to 2012 are used in this study. The data are obtained from Central Bank of Nigeria statistical bulletin 2012.

3.1 Model Specification

Following the McKinnon and Shaw hypothesis the manufacturing model is specified thus:

$$MOG_t = f\left((M2/GDP)_t, (CPS/GDP)_t, (TS/GDP)_t\right) \quad \text{.....3}$$

Log-linearizing equation (3) and adding the error term, we obtain an explicit estimable econometric model as follows;

$$LMOG_t = \alpha + \beta L(M2/GDP)_t + \psi L(CPS/GDP)_t + \lambda L(TS/GDP)_t + \varepsilon_t \quad \text{.....4}$$

Where:

$LMOG_t$ is log of manufacturing output growth at period t

$L(M2/GDP)_t$ is log of financial development measure by the ratio of broad money supply to GDP at period t.

$L(CPS/GDP)_t$ is log of financial development measure by the ratio of credit to private sector to GDP at period t.

$L(TS/GDP)_t$ is log of total savings as ratio of GDP at period t.

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Note: MOG_t is decomposed into oil refining output (ORF_t), cement output (CMT_t) and other manufacturing output (OM_t)

Equation 2 can be expressed in a VAR model based on the work of Arestis and Demetriades, 1996 and Odeniran and Udeaja, 2010 that there is causal link between finance and growth which is determined by the nature and operation of financial institutions and policies pursued in each country.

$$MOG_t = \alpha + \sum_{i=k}^{n} \phi_i MOG_{t-k} + \sum_{i=j}^{n} \beta_i (M2/GDP)_{t-j} + \sum_{i=m}^{n} \psi_i (CPS/GDP)_{t-m} + \sum_{i=p}^{n} \lambda_i (TS/GDP)_{t-p} + \varepsilon_{1t} \text{.....5}$$

$$(M2/GDP)_t = \alpha + \sum_{i=k}^{n} \phi_i MOG_{t-k} + \sum_{i=j}^{n} \beta_i (M2/GDP)_{t-j} + \sum_{i=m}^{n} \psi_i (CPS/GDP)_{t-m} + \sum_{i=p}^{n} \lambda_i (TS/GDP)_{t-p} + \varepsilon_{2t} \text{..6}$$

$$(CPS/GDP)_t = \alpha + \sum_{i=k}^{n} \phi_i MOG_{t-k} + \sum_{i=j}^{n} \beta_i (M2/GDP)_{t-j} + \sum_{i=m}^{n} \psi_i (CPS/GDP)_{t-m} + \sum_{i=p}^{n} \lambda_i (TS/GDP)_{t-p} + \varepsilon_{3t} \text{.....7}$$

$$(TS/GDP)_t = \alpha + \sum_{i=k}^{n} \phi_i MOG_{t-k} + \sum_{i=j}^{n} \beta_i (M2/GDP)_{t-j} + \sum_{i=m}^{n} \psi_i (CPS/GDP)_{t-m} + \sum_{i=p}^{n} \lambda_i (TS/GDP)_{t-p} + \varepsilon_{4t} \text{.....8}$$

Where, $\phi, \beta, \psi, \lambda$ are coefficients and α is the constant, $\varepsilon_{1t}, \varepsilon_{2t}, \varepsilon_{3t}$ and ε_{4t} are the random disturbances, *n* is the number of optimal lag length, and other variables are as earlier defined.

The components of equations 5 to 8 i.e. the VAR model can be expressed explicitly in matrix form below:

$$\begin{bmatrix} MOG_t \\ (M2/GDP)_t \\ (CPS/GDP)_t \\ (TS/GDP)_t \end{bmatrix} = \begin{bmatrix} \alpha \\ \alpha \\ \alpha \\ \alpha \end{bmatrix} + \begin{bmatrix} \phi_i & \beta_i & \psi_i & \lambda_i \\ \phi_i & \beta_i & \psi_i & \lambda_i \\ \phi_i & \beta_i & \psi_i & \lambda_i \\ \phi_i & \beta_i & \psi_i & \lambda_i \end{bmatrix} \begin{bmatrix} MOG_{t-k} \\ (M2/GDP)_{t-j} \\ (CPS/GDP)_{t-m} \\ (TS/GDP)_{t-p} \end{bmatrix} + \begin{bmatrix} \varepsilon_{MOGi,t} \\ \varepsilon_{(M2/GDP)i,t} \\ \varepsilon_{(CPS/GDP)i,t} \\ \varepsilon_{(TS/GDP)i,t} \end{bmatrix} \text{.....9}$$

Equation 9 was estimated to verify the interactions among manufacturing output growth (MOG), money supply as ratio of GDP (M2/GDP), credit to private sector as ratio of GDP (CPS/GDP) and total savings as ratio of GDP (TS/GDP) in Nigeria.

3.2 TECHNIQUES OF DATA ANALYSIS

3.2.1 UNIT ROOT TEST

The Augmented Dickey filler (ADF) and the Phillips-Perron test are used to test for unit root in the following equation

ADF model: $\Delta Y_t = C_t + bY_{t-1} + C_{2t} + \sum_{k-1}^{p} d_k \Delta Y_{t-k} + V_t; H_0 : b = 0; H_1 : b > 0$.....10

PP model: $\Delta Y_t = \mu_t + pY_{t-1} + \varepsilon_t; H_0 : p = 0; H_1 : p > 0$.....11

Y_t = relevant time series.

Δ = an operator of first difference.

t = a linear trend.

V_t and ε_t = error term.

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Failure to reject the null hypothesis leads to conducting the test on further difference of the series. Further differencing is conducted until stationarity is reached and the null hypothesis is rejected. We use the Schwarz information criterion (SIC) to determine the lag length.

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3.2.2 Cointegration Test

Cointegration regression measure the long-term relationship that exist between the dependent variable and its regressor (Johansen, 1988, Johansen and Juselius, 1990). We employ Johansen cointegration test which set up the non-stationarity time series as a vector autoregression (VAR) of order p:

$$\Delta Y_t = \sum_{t-1}^{p} \Gamma_i \Delta Y_{t-i} + \sum_{k-i}^{p} \Gamma_{k-i} \Delta Y_{t-k-i} + \prod Y_{t-1} + \mu_t \quad \text{.....12}$$

Given that Y_t is a vector of non-stationary $I(0)$ variables, then ΔY_{t-1} are $I(1)$ and $\prod Y_{t-1}$ must be $I(0)$ in order to have $\mu_t \approx I(0)$ and therefore to have a well-behaved system.

The trace test and the maximum eigenvalue test are used to test the hypothesized existence of r cointegrating vector. The trace test statistic tests the null hypothesis that the number of distinct cointegrating vector is less than or equal to r against a general alternative while the maximum eigenvalue test statistic tests the null hypothesis that the number of cointegrating vector is r against the alternative of r+1 cointegrating vectors.

3.2.3 Vector Auto Regressions (Var)

VAR was introduced by Sim (1980) and based on the idea that many macroeconomics variables and their movements are interrelated. The main advantages of VAR is that, it does not use any preconceived economic theory on which the model is built and its practical ability to capture the dynamic relationship among the economic variables of interest. A VAR model consist of a system equations that expresses each variable in the system as a linear combination of its own lagged value and lagged values of all other variables in the system and regresses each variable.

VAR is used to investigate the external shocks effects on the endogenous variables using impulse response. It also provides information about the relative importance of each random innovation in affecting the variables using variance decomposition. In VAR methodology, the focus is on variance decomposition and the impulse response functions. What VAR does is to invert the system and then innovations are generated after decomposition, which have direct economic interpretations. VAR analysis allows us to decompose from the variance into parts attributed to each set of the innovation or shock process.

4. Empirical Results And Discussions

Based on the objective of this study, the empirical analyses are summarised as shown below

4.1 Analysis Of Trends In Financial Development Between 1986-2012

The trends of the three financial development variables in the present study are presented below

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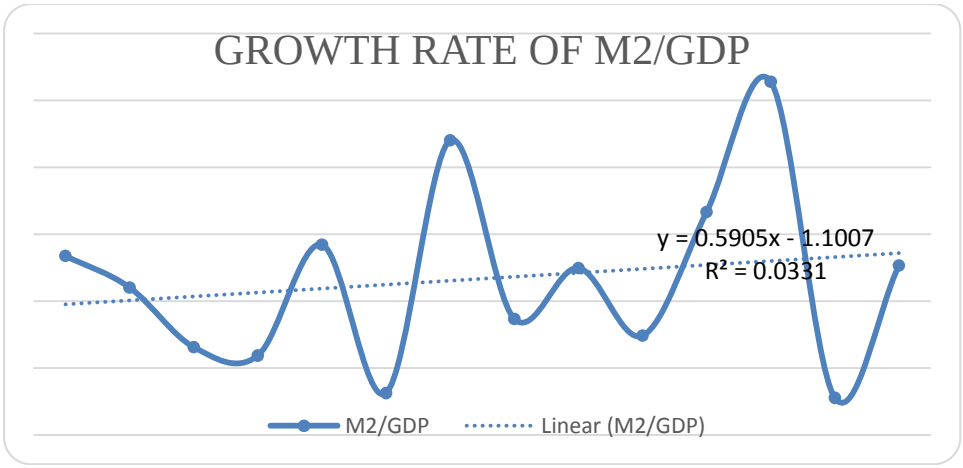

Figure 1: Growth rate of M2/GDP in Nigeria between 1986 and 2012

The growth rate of M2/GDP in figure 1 was characterised by volatility throughout the study period. There was a noticeable sharp rise between 2004 and 2008. This coincides with the periods of banks consolidation reforms. On the whole the trend line depicts an unappreciable positive trend.

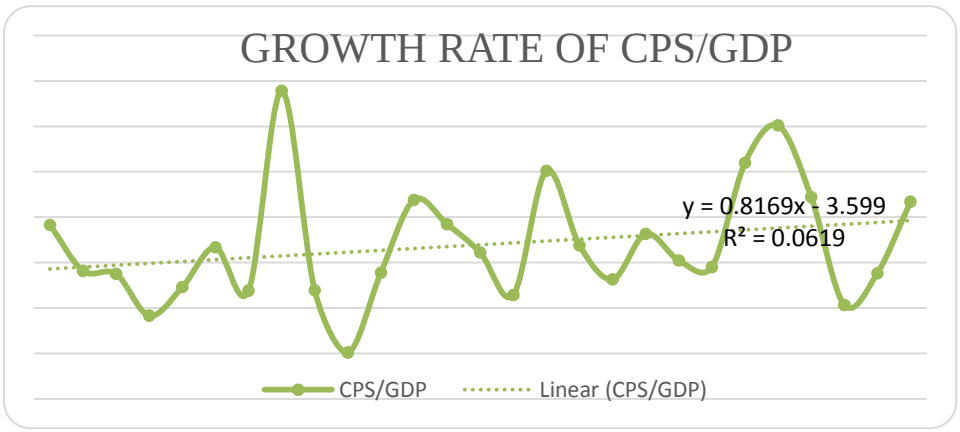

Figure 2: Growth rate of CPS/GDP in Nigeria between 1986 and 2012

Figure 2 portrays the growth rate of CPS/GDP in Nigeria within the study period. The trend graph shows that credit to private sector as ratio of GDP (CPS/GDP) fell very slowly between 1986 and 1994 and it began a steady upward increase until 1998 and thereafter declined between 1998 and 2000. However, it rose sharply between 2006 and 2008. This period shows that the bank consolidation of 2005 enhanced the financial sector development and this affects the asset of banks positively. The trend line moves in an upward direction which suggests that credit to private sector as ratio of GDP (CPS/GDP) experience some improvement within the study period.

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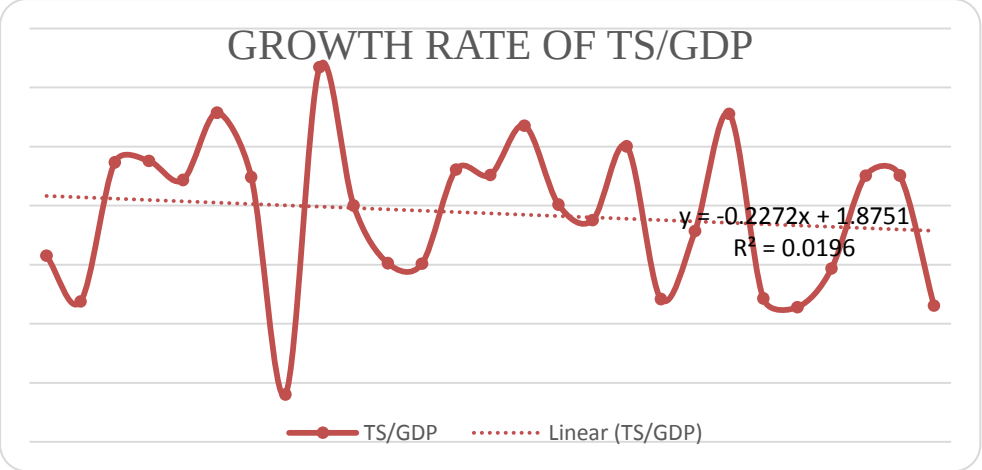

Figure 3: Growth rate of TS/GDP in Nigeria between 1986 and 2012

Figure 3 shows the growth rate of TS/GDP. The trend graph shows clearly that TS/GDP did not experience any dramatic change within the study period. The weak and terminally distress of banks accounted for the low level of total savings as ratio of GDP (TS/GDP) during the study period. The trend line shows a negative regression line which depicts that TS/GDP did not experience any improvement within the study period.

4.2 Unit Root Test

The macro-data of the study were subjected to unit root test using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP). These are presented below:

Table 1: Unit root test for data series

Variables	Augmented Dickey-Fuller (ADF) Test		Phillips-Perron (PP) Test		Order of Integration
	Prob. Value (Level)	Prob. Value (1st Difference)	Prob. Value (Level)	Prob. Value (1st Difference)	
LORF	0.7558	0.0001	0.7558	0.0001	I(1)
LCMT	0.6291	0.0011	0.6029	0.0011	I(1)
LOM	0.9894	0.0820	0.9933	0.0924	I(1)
LM2/GDP	0.8879	0.0091	0.8579	0.0020	I(1)
LCPS/GDP	0.9364	0.0016	0.9646	0.0032	I(1)
LTS/GDP	0.5517	0.0001	0.6328	0.0001	I(1)

Rejection of null hypothesis of unit root at 1% level of significant

Note: LORF, LCMT, LOM, LM2/GDP, LCPS/GDP and LTS/GDP are natural logarithm of oil refining, cement, other manufacturing, money supply (broad) as ratio of gross domestic product, credit to private sector as ratio of gross domestic product and total savings as ratio of gross domestic product.

As observed from Table 1, the data series have the same order of integration i.e. all the variables are integrated of order one. This validates that there is theoretical basis to test for cointegration using Johansen cointegration method whose validity rests on the data series having the same order of integration i.e. order one. The next step therefore is to test for cointegration using Johansen cointegration method.

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4.3 Cointegration Test

The next step is to test for cointegration using Johansen cointegration test under the assumption that the series have a linear trend and the cointegrating equations have intercepts.

Table 2: Johansen Multivariate Cointegration Test Result

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None	0.711821	31.10432	40.07757	0.3544
At most 1	0.637011	25.33454	33.87687	0.3627
At most 2	0.593344	22.49471	27.58434	0.1961
At most 3	0.479791	16.33811	21.13162	0.2057
At most 4	0.305104	9.099813	14.26460	0.2779
At most 5	0.036041	0.917656	3.841466	0.3381
Max-eigenvalue test indicates no cointegration at the 0.05 level				

* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

The Maximum Eigenvalue statistics for the model is presented in Table 2. The null hypothesis of the presence of a cointegrating relation among the variables is rejected at 5% level of significant for the statistics. The Maximum Eigenvalue statistics indicates no cointegrating equation. This validates the condition for using VAR technique.

4.4 [1]VAR Impulse Response And Variance Decompostion Analyses
Diagnostic Test Results

Some diagnostic tests were carried out with the aim to check the reliability of the VAR model. The following tests were carried out: VAR Residual Serial Correlation LM Tests, VAR Residual Heteroscedasticity Tests, and VAR Residual Normality Tests. The results of each of the tests accept the null hypotheses of the absence of serial correlation, heteroscedasticity and non-normality. The VAR lag order selection criteria was also checked and the result by Schwarz information criterion suggested that the variables should be lagged once. The results confirmed the assumption of ordinary least squares (OLS) and provide to a large extent evidence of robustness of the model. These various tests are reported in the Appendix.

[1] The results of the vector autoregression (VAR) model are not reported because the coefficients of VAR are of less importance. The impulse response functions and forecast error variance decomposition are results derived from VAR analysis.

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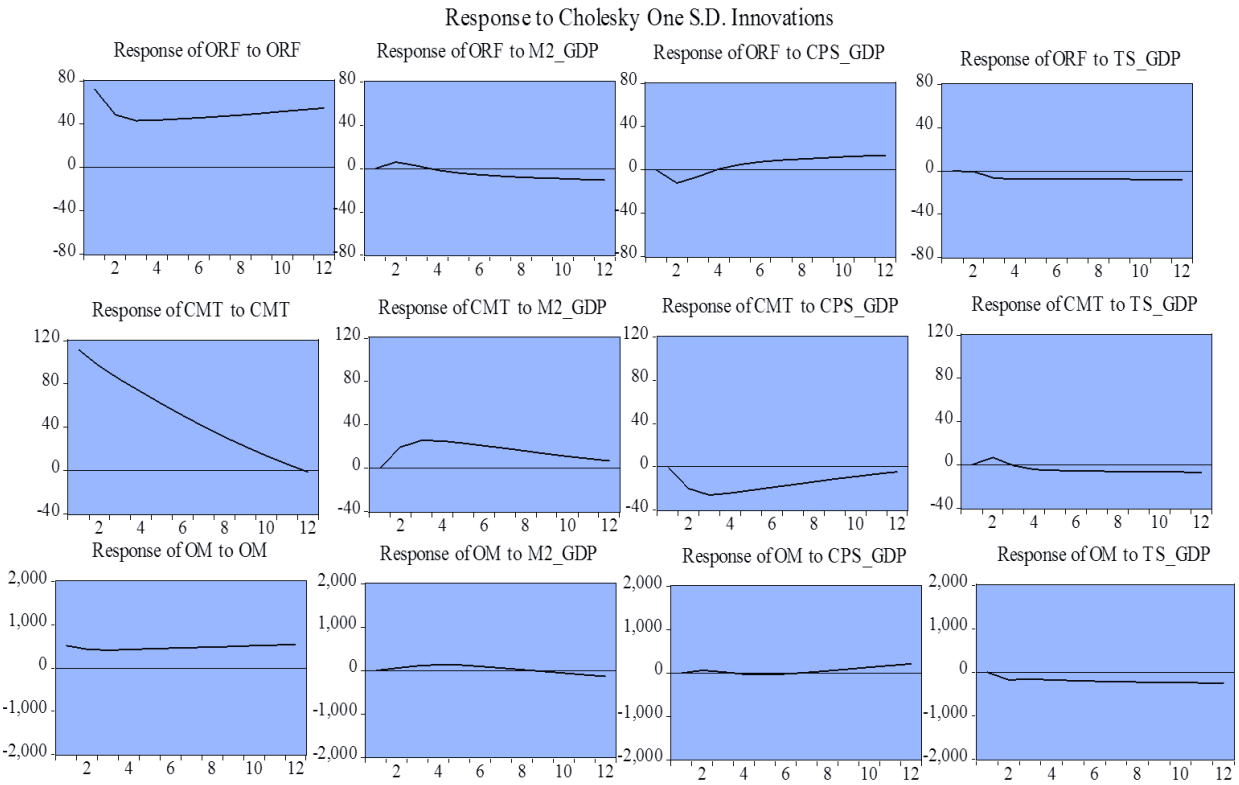

Figure 4: Impulse Response Results of The VAR Model

Figure 4 above shows the responses of each of the endogenous variables to one percent shock to oil refining output, cement output and other manufacturing output in Nigeria. The first panel in column one depicts the response of oil refining output to own shock. It has positive impact on itself in the short run and in long run. A shock to the innovation of oil refining output in column two induced positive response from money supply as ratio of GDP (M2/GDP) in the short run and negative response in the long run. This suggests that increasing in money supply rate will enhance oil refining output in the short run. On the part of credit to private sector as ratio of GDP (CPS/GDP), one percent shock in oil refining output generated a negative impact reaction from credit to private sector as ratio of GDP (CPS/GDP) in the short run and positive response in the long run. Which suggests that increase in the supply of credit to the core private sector is beneficial in the long run as it enhances oil refining output. This support the work of Udah and Obafemi (2011) which affirmed that increasing the supply of credit to the core private sector is beneficial in the long term as it enhances domestic investments. Also, the fourth column shows that a shock to oil refining output induced a marginal negative response from total savings as ratio of GDP (TS/GDP). This suggests that a marginal decrease in total saving will increase oil refining output.

The second panel in column one depicts that one percent shock to cement output (CMT) produced positive reaction in the short run and in long run. The second column shows that one percent shock in cement output induced invariant response from money supply as ratio of GDP (M2/GDP). However, a positive impact response was obtained from one percent shock to cement output. This suggests that increasing money supply rate in the short run and in long run will increase cement output. In column three, shock to cement output generated negative response from credit to private sector as ratio of GDP (CPS/GDP). This appears to suggest that decreasing the supply of credit to private sector will increase cement output in the short run and in the long run. The shock to total savings as ratio of GDP (TS/GDP) had a

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positive impact on cement output in the second quarter and negative impact thereafter till the end of the time horizon.

Furthermore, the third panel in the second column shows the response of money supply as ratio of GDP (M2/GDP) to one percent shock in other manufacturing output. This generates a positive impact reaction in the short run and in long run up till the 8th quarter. This corroborates with the work of McKinnon (1973) and Shaw (1973) which affirmed that financial deepening impact positively on economic growth. This appear to suggest that an increase in money supply rate has a positive implication on other manufacturing output. On the part of other manufacturing output, one percent own shock produce positive impact throughout the time horizon. The third column shows that other manufacturing output generate negative response from credit to private sector as ratio of GDP (CPS/GDP) in 4th, 5th and 6th quarters while other quarters were positive. The shock to total savings as ratio of GDP (TS/GDP) generate negative on other manufacturing output throughout the time horizon.

4.5 The Result of Variance Decomposition

The result of Variance Decomposition is as presented in Table 3,4,5.

Table 3: Variance Decomposition of ORF

Period	S.E.	ORF	M2/GDP	CPS/GDP	TS/GDP
1	72.36856	100.0000	0.000000	0.000000	0.000000
2	91.08616	91.56116	0.419418	1.790266	0.003356
4	121.4708	76.98266	0.296306	1.291814	0.674996
6	151.9888	66.87831	0.411587	1.155666	0.883149
8	182.7974	59.87304	0.616210	1.338484	0.937482
10	213.9367	54.97866	0.808175	1.557870	0.947588
12	245.5331	51.43628	0.969933	1.751027	0.941628

Table 4: Variance Decomposition of CMT

Period	S.E.	CMT	M2/GDP	CPS/GDP	TS/GDP
1	112.4188	98.65268	0.000000	0.000000	0.000000
2	151.1857	95.24749	1.619429	1.772467	0.202656
4	195.2789	89.31788	4.322200	4.414145	0.171366
6	217.2877	85.61822	5.524667	5.329117	0.262820
8	228.8412	82.17591	6.078561	5.702930	0.376166
10	235.9689	78.49728	6.238367	5.747913	0.503583
12	242.3381	74.48791	6.115295	5.565194	0.635779

Table 5: Variance Decomposition of OM

Period	S.E.	OM	M2/GDP	CPS/GDP	TS/GDP
1	626.0596	67.65806	0.000000	0.000000	0.000000
2	1039.214	41.83827	0.314273	0.416411	2.687957
4	1764.846	25.73430	1.083813	0.186952	2.749866
6	2457.115	19.94156	0.986275	0.125892	2.733241
8	3201.506	16.16837	0.622103	0.103120	2.544639
10	4024.409	13.37392	0.417190	0.230118	2.280935
12	4924.623	11.28443	0.390087	0.466055	2.024547

Cholesky ordering: ORF CMT OM M2/GDP CPS/GDP TS/GDP

The first panel presents the proportions of forecast error variance decomposition in oil refining output in Nigeria explained by innovation to the endogenous variables. The own shock contributed between 51 percent in 12th quarter to100 percent in the 1st quarter. Also, credit to private sector as ratio of GDP (CPS/GDP) contributed between 1 percent in the 8th quarter and 2 percent in the 2nd quarter. The contribution of credit to private sector as ratio of

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GDP (CPS/GDP) is quite marginal indicating the insignificance of credit to private sector to oil refining output in Nigeria. The shock to money supply as ratio of GDP (M2/GDP) and total savings as ratio of GDP (TS/GDP) did not significantly impact on oil refining output in Nigeria.

The second panel shows the contribution of the shocks to endogenous variables to the innovation of the cement output. The own shock ranged between 99 percent in the 1st quarter to 75 percent in the 12th quarter to the innovation of cement output. Money supply as ratio of GDP (M2/GDP) contributed between 4 percent in the 4th quarter and 6 percent in the 8th quarter. The contribution is quite substantial but indicates that money supply would improve cement output. The contribution of the shock to credit to private sector as ratio of GDP (CPS/GDP) to innovation of cement output follows the same pattern as that of money supply as ratio of GDP (M2/GDP). The shock to total savings as ratio of GDP (TS/GDP) did not significantly impact on cement output in Nigeria. The crucial observation on the shocks of money supply as ratio GDP (M2/GDP) and credit to private sector as ratio of GDP (CPS/GDP) is that their impact were felt in the long run.

The third panel presents the contribution of the shocks to the endogenous variables i.e. money supply as ratio of GDP (M2/GDP), credit to private sector as ratio of GDP (CPS/GDP) and total savings as ratio of GDP (TS/GDP) to the innovation of other manufacturing output. The contribution of total savings as ratio of GDP (TS/GDP) ranges between 2 percent in 12th quarter and 3 percent in the 2nd quarter. This represents a marginal contribution of total savings as ratio of GDP (TS/GDP) to the innovation of the other manufacturing sector in the short run and in long run. Also, the own shock contributed significantly to the innovation of other manufacturing output. However, its contribution declined gradually from 68 percent in the 1st quarter to 11 percent in the 12th quarter. Implying that significant contribution of the variable in the short run reflect than of the long run. The shock to money supply as ratio of GDP (M2/GDP) and credit to private sector as ratio of GDP (CPS/GDP) did not significantly impact on other manufacturing output in Nigeria.

5. Conclusions And Policy Implications

This paper analyses the effect of financial sector development on manufacturing output growth in Nigeria over the last few decades using VAR methodology. From the findings above the following conclusion are derived. It was found that money supply as ratio of GDP and credit to private sector as ratio of GDP are critical to the enhancement of cement output in Nigeria. Also, total savings did not positively impact on the components of manufacturing output growth in Nigeria, indicating the need to mobilize more financial savings to boost the output level of the manufacturing sector in Nigeria. Besides, it was discovered that money supply as ratio of GDP impact positively on oil refining output in the short run and other manufacturing output in the short run and in long run. The implication of this findings is that money supply could influence oil refining output in the short run and other manufacturing output in the short run and in long run, indicating the need to create more money to boost oil refining and other manufacturing subsectors of the manufacturing sector in Nigeria.

The findings also revealed that credit to private sector as ratio of GDP could generate substantial improvement in other manufacturing sector output in Nigeria, indicating the improvement in providing credit to small, medium and large scale enterprises. Also, there is need to channel credit to cement subsector of the manufacturing sector in Nigeria.

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The policy implications derived from the findings suggest that government should provide a conducive investment climate and possible operations of community banks and people's bank to encourage savings habit of Nigerians. Federal government of Nigeria (FGN) through central bank of Nigeria (CBN) should enhance the financing of manufacturing sector by improving credit flow to the sector because of its strategic importance in creating and generating growth of the economy. In addition, government should reduce interest rate to barest minimum in order to increase money supply rate in Nigeria.

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Appendix

VAR Lag Order Selection Criteria
Endogenous variables: ORF CMT OM M2_GDP CPS_GDP TS_GDP
Exogenous variables: C
Date: 07/13/14 Time: 20:03
Sample: 1 27
Included observations: 25

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-772.1377	NA	4.37e+19	62.25102	62.54355	62.33215
1	-665.4447	153.6379*	1.68e+17*	56.59558*	58.64329*	57.16352*
2	-629.6007	34.41021	3.04e+17	56.60806	60.41095	57.66282

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

VAR Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)
Date: 07/13/14 Time: 20:07
Sample: 1 27
Included observations: 26

Joint test:

Chi-sq	Df	Prob.
271.5584	252	0.1897

Individual components:

Dependent	R-squared	F(12,13)	Prob.	Chi-sq(12)	Prob.
res1*res1	0.590361	1.561270	0.2182	15.34938	0.2229
res2*res2	0.683445	2.338928	0.0713	17.76957	0.1229
res3*res3	0.363214	0.617918	0.7937	9.443561	0.6646
res4*res4	0.556746	1.360714	0.2943	14.47540	0.2714
res5*res5	0.777104	3.776929	0.0122	20.20470	0.0633
res6*res6	0.504935	1.104932	0.4284	13.12832	0.3598
res2*res1	0.429038	0.814048	0.6360	11.15498	0.5157
res3*res1	0.203266	0.276384	0.9836	5.284914	0.9478
res3*res2	0.568152	1.425266	0.2673	14.77195	0.2541
res4*res1	0.587668	1.543998	0.2239	15.27936	0.2265
res4*res2	0.380055	0.664134	0.7570	9.881438	0.6264
res4*res3	0.518945	1.168662	0.3906	13.49257	0.3343
res5*res1	0.557626	1.365576	0.2921	14.49828	0.2700
res5*res2	0.171421	0.224125	0.9930	4.456933	0.9737
res5*res3	0.745890	3.179914	0.0242	19.39314	0.0795
res5*res4	0.659215	2.095605	0.1001	17.13960	0.1444
res6*res1	0.278209	0.417562	0.9297	7.233426	0.8418
res6*res2	0.215311	0.297256	0.9783	5.598081	0.9350
res6*res3	0.717900	2.756906	0.0410	18.66539	0.0969
res6*res4	0.554406	1.347881	0.2999	14.41457	0.2750
res6*res5	0.572631	1.451557	0.2570	14.88841	0.2476

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VAR Residual Normality Tests
Orthogonalization: Cholesky Lutkepohl)
Null Hypothesis: residuals are multivariate normal
Date: 07/13/14 Time: 20:08
Sample: 1 27
Included observations: 26

Component	Skewness	Chi-sq	Df	Prob.
1	1.940635	16.31961	1	0.0001
2	-0.841307	3.067125	1	0.0799
3	0.640957	1.780246	1	0.1821
4	0.361480	0.566227	1	0.4518
5	-0.125252	0.067982	1	0.7943
6	-0.092290	0.036909	1	0.8477
Joint		21.83810	6	0.0013
Component	Kurtosis	Chi-sq	Df	Prob.
1	9.869869	51.12803	1	0.0000
2	8.178437	29.05090	1	0.0000
3	3.783665	0.665308	1	0.4147
4	3.092509	0.009271	1	0.9233
5	2.291775	0.543382	1	0.4610
6	2.253738	0.603316	1	0.4373
Joint		82.00020	6	0.0000
Component	Jarque-Bera	df	Prob.	
1	67.44763	2	0.0000	
2	32.11802	2	0.0000	
3	2.445553	2	0.2944	
4	0.575498	2	0.7499	
5	0.611364	2	0.7366	
6	0.640226	2	0.7261	
Joint	103.8383	12	0.0000	

VAR Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h
Date: 07/13/14 Time: 20:05
Sample: 1 27
Included observations: 26

Lags	LM-Stat	Prob
1	36.22762	0.4580
2	23.00714	0.9541
3	46.44273	0.1140
4	31.85656	0.6660
5	44.08435	0.1668
6	42.25353	0.2189
7	24.29262	0.9313
8	44.39904	0.1589
9	36.47279	0.4467
10	22.70025	0.9587
11	47.03883	0.1030
12	27.33310	0.8501

Probs from chi-square with 36 df.

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