International Journal of Economics, Commerce and Management
United Kingdom ISSN 2348 0386 Vol. VIII, Issue 12, Dec 2020

http://ijecm.co.uk/

FINANCIAL SECTOR DEEPENING AND MANUFACTURING OUTPUT GROWTH IN NIGERIA

Mbah, Catherine Chidinma
Department of Economics, NnamdiAzikiwe University, Awka, Anambra State. Nigeria
cc.mbah@unizik.edu.ng, cmbahcatherine@gmail.com

Okoli, Kingsley Chike
Department of Economics, NnamdiAzikiwe University, Awka, Anambra State. Nigeria
chikeokoli24@yahoo.com

Abstract

This study was an empirical examination of the nexus between financial sector deepening and manufacturing output growth in Nigeria covering the period of 1986 to 2019. The study explored the pass-through role of domestic investment as a channel of transmission between financial sector deepening and growth of manufacturing output in Nigeria. The study was modelled around structural vector autoregressive models (SVAR). Toda-Yamamoto test of causality was used to analyse the existence or not of a feedback mechanism between deepening of the financial sector and Nigeria's manufacturing output growth. The study found that financial sector deepening and manufacturing output growth are capable of affecting each other. Also, the broad money supply ratio and the ratio of credit to the private sector better determine manufacturing output in Nigeria compared to market capitalisation ratio as indicators of financial deepening. In the long-run, financial deepening has a positive effect on domestic investment, which in turn has a negative long-run effect on the growth of manufacturing output. The study recommends that to raise domestic investment through financial deepening, broad money supply ratio and credit to private sector ratio present best options. In contrast, financial deepening does not necessarily increase manufacturing output growth in Nigeria.

Keywords: Financial sector deepening, Manufacturing Output Growth, Market capitalisation, Broad money supply, Domestic Investment

Licensed under Creative Common

INTRODUCTION

One of the most important sectors of an economy in the world is the financial sector. As noted by Adeyefa and Obamuyi (2018), financial deepening is an all-inclusive process which concentrates the interface of primary markets, secondary markets and retail market, instruments (deposits, bonds, loans, debt securities and foreign exchange). Financial deepening also concentrates other stakeholders such as companies, banks and other deposit-taking institutions. King and Levine (1993) and Levine (2005) recognise financial deepening as the process in which institution and financial markets aid the exchange of goods and services, savings mobilisation from investors, acquisition of information from the companies and the prospective investment and hence, the allocation of available savings for production. Economic theory expects a deepened financial system to expand the level and rate of growth of output which does not exclude manufacturing output.

The world has generally perceived the manufacturing sector (as a subset of the industrial sector) to be the primary force that drives the modern economy in both developed and developing countries. Many benefits that are crucial to the transformation of the economy are associated with the sector. The manufacturing industry is the medium for the manufacture of goods and services, employment generation and incomes boosting, and an avenue for various spillovers to other sectors (Olorunfemi, Tomola, Felix and Ogunleye, 2013). Hence, the industry is often described by economists as the hub of every economy of the world.

In Nigeria, the manufacturing sector has underperformed. Manufacturing sector output which accounted for about 19.9% of the gross domestic product in 1986 and 20.12% in 1994 fell drastically to 7.05% in 2008 and 11.64% in 2019. Overall, the manufacturing sector could not account for over 20% of Nigeria's GDP during the period under study. The poor performance of this sector in Nigeria is linked to a lack of adequate support from the financial industry (Mesagan, Olunkwa& Yusuf, 2018). This link is necessitated by the fact that the financial sector provides the funds needed for investment. It has been observed that a well-functioning financial industry increases economic efficiency, investment and growth as it plays an essential role of intermediation by redirecting funds from savers to investors, thereby releasing funds in the process for cost-effective manufacturing activities. This suggests that domestic investment is the most crucial channel through which funds made available by the financial sector transmit to output growth in the manufacturing industry.

Concerning the vital role that financial sector deepening plays in the economy, the Nigeria government has over time given great attention to improving the financial market. Research has shown notable attempts to strengthen the financial market via the banking sector consolidation, continuous bank lending interest rates and exchange rate regulation, use of credit

Licensed under Creative Common

and debit cards at an accelerated speed, upsurge in the use of payment technologies (such as Automated Teller Machines (ATM), Point of Sale (POS) services and implementation of cashless policy), establishment of the Nigerian Deposit Insurance Corporation (NDIC), regulatory and supervisory institutions strengthening, the introduction of indirect monetary policy instruments and capital market deregulation (Ojo, 2010; CBN, 2017). These reforms were introduced to limit restrictions on the financial sector, stimulate a diversified, resilient and robust banking industry in the country, to increase their ability to support the real sector to enable manufacturing firms to access the required funds to finance production. Therefore, a significant positive effect of a deepened financial system on the performance of the manufacturing firms is an obvious expectation.

However, notwithstanding the several financial sector reforms introduced over the years, Nigeria's manufacturing output has been lacking. A review of Nigeria's manufacturing sector indicated that the industry has performed below capacity, resulting to declining in the index of manufacturing production, and contributing less than 5% to the GDP (Mesagan, Olunkwa and Yusuf, 2018). With domestic investment serving as a channel through which financial sector deepening impacts on manufacturing output, the effectiveness of the transmission mechanism has been questioned. Is domestic investment the best channel of transmission between financial sector deepening and growth of manufacturing output in Nigeria? Does financial sector deepening have a direct link with Manufacturing output growth? What effect does financial sector deepening have on manufacturing output growth in Nigeria? These are the issues addressed in this study.

On empirical and methodological grounds, previous researches on financial sector deepening and manufacturing output growth failed to recognise the vital role of domestic investment as the channel of transmission of financial sector deepening effect to manufacturing output growth. Also, the indicators of financial deepening used by other studies such as broad money supply, credit to the private sector, and market capitalisation have been questioned. This study considers the use of broad money, credit to the private sector, and market capitalisation as used by previous studies without credence to GDP an empirical error that requires immediate fixing.

LITERATURE REVIEW

Several theories can be utilised in understanding the financial deepening-manufacturing sector nexus. For instance, the supply-leading theory (propounded by Schumpeter, 1911) suggests that financial deepening spurs manufacturing sector and stimulates growth in the manufacturing industry through a significant financial intermediation process. This theoretical view was

Licensed under Creative Common

supported by Calderon and Liu (2003), Gurley and Shaw (1967), King and Levine (1993), and McKinnon (1973). The existence of the financial market and its development draw higher savings and investment, enhancing capital accumulation efficiency. Based on this hypothesis, overall economic efficiency is a positive function of well-functioning financial institutions. Which also create and expand liquidity, enhance savings mobilisation, promote capital accumulation, transfer the limited resources from surplus units to deficit units, for efficient allocation of resources. On the other hand, the demand-following theory suggests that financial markets development in the present period is merely a response to economic growth in the previous period (i.e. demand for financial products is generated by evolution). This means that the financial system exerts positive response to economic growth, implying that an increase in demand for financial services is likely to the spontaneous expansion of the financial system which is the real sector (manufacturing being a sub-sector) of the economy grows. This hypothesis is found in the works of Goldsmith (1969), Jung (1986) Kar and Pentecost (2000), Lucas (1988), Ndlovu (2013), Omotor (2007), and Robinson (1952). Thus, as the economy grows, this increases financial services demand as consequently leads to more remarkable economic development. This suggests the existence of a feedback mechanism between financial sector deepening and manufacturing output growth.

The connection between financial deepening and manufacturing sector performance are well documented in the literature. For instance, Kayode, Owoputi and Nwakoby (2020) used the Autoregressive Distributed Lag Model (ARDL) to examine the nexus between financial deepening and manufacturing sector productivity from 1986 to 2017. The study suggested that financial deepening undermines Nigeria's manufacturing section productivity. Conversely, Akinmulegun and Akinde (2019) utilised Error Correction Mechanism (ECM) and found among other things that financial deepening drives the performance of Nigeria's manufacturing sector using data ranging from 1981 to 2017.

Another study investigating the response of the performance of manufacturing firms from financial deepening using Nigerian data from 1970 to 2016 was conducted by Adeyefa and Obamuyi (2018). Results obtained from ARDL model revealed that in the long run, the relationship between broad money supply and index of manufacturing production is direct and significant, there is a straightforward and meaningful relationship between credit to the private sector and index of manufacturing production, while an indirect and significant relationship was found between the index of manufacturing production and market capitalisation. In the short-run, broad money supply has an indirect and insignificant relationship with the index of manufacturing production, credit to the private sector has a direct and negligible impact on index

Licensed under Creative Common

of manufacturing production, while market capitalisation has an indirect and insignificant relationship with the index of manufacturing production.

Similarly, Mesagan (2018) found that although both credit to the private sector and money supply insignificantly affected capacity utilisation and output, it negatively affected the manufacturing sector value-added in the short run between 1981 and 2015. The results were, however, not the same in the long run as both money supply and credit to private sector empirically exerted positive impact on manufacturing output.

Maxwell and Oluwatosin (2012) adopted vector autoregression (VAR) and Least Square techniques to analyse the influence of financial deepening on the output of the manufacturing sector in Nigeria from 1970 to 2010. Their results revealed that the coefficients of financial deepening indicators included in the study do not exert a significant effect on manufacturing output in Nigeria.

Several other examinations on financial sector deepening and manufacturing output growth in Nigeria exists in the empirical literature. These studies include Raphael and Gabriel (2015), Asaleye, Isoha, Asamu, Inegbedion, Arisukwu and Popoola (2018), Aiyetan and Aremo (2015), Aminu, Raifu and Oloyede (2019), Ekor and Adeniyi (2018), and Udoh and Ogbuagu (2012). At the international scale, Nuesser and Kugler (1998), Wang (2000), Xu and Pal (2011), Dabla-Norris, Kersting&Verdier (2012), Ahmad, Dar and Imran (2017), Topcu and Coban (2017), Kumarasamy& Singh (2018), Svilokos, Vojinić&ŠumanTolić (2019), Daway-Ducanes and Gochoco-Bautista (2019), and Akinlo (2020) have examined the relationship between financial sector deepening and manufacturing output growth. However, the major weakness of these studies lies in their failure to recognise the vital role that domestic investment plays in serving as the channel of transmission between financial deepening and manufacturing sector output. As stated in the supply-leading hypothesis, the developed financial market brings about an increase in investment, resulting in a rise in manufacturing output growth. The failure to recognise the vital role of investment in the transmission of financial sector deepening to manufacturing output growth is an empirical error that needs to be fixed. Findings from such studies may therefore be misguided. Consequent upon the neglect of the vital role of investment in the financial sector deepening – manufacturing output growth nexus, the previous studies fell short on appropriate methodology. The use of ARDL, OLS and standard VAR are not enough to adequately expose the empirical underpinnings between financial sector deepening and manufacturing output growth. This study addressed the gap by conspicuously introducing domestic investment as a pass-through variable, and formulating a structural VAR model which overlooks the shortcomings of the previous models used by other empirical studies.

Licensed under Creative Common

Also, many previous studies used seemingly wrong proxies for financial sector deepening, which this study considers inappropriate. For instance, Adeyefa and Obamayi (2018) used broad money supply, credit to the private sector, and market capitalisation as proxies for financial sector deepening without credence to the gross domestic product. This study considers these as capital market variables and not financial sector deepening variables. This gap was filled by using these variables as ratios to GDP as suggested by Nwanekpe, Uche and Nnamani (2019) as indicators of financial depending.

METHODOLOGY

This study employs annual time-series data from 1986 to 2019 obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin, and World Development Indicators from the World Bank. Apart from 1986 being the year in which the structural adjustment programme (SAP) became effective in Nigeria and led to many economic reforms, the study period of 1986 to 2019 was chosen on the basis of data availability. Moreso, the study employed Structural Vector Autoregression (SVAR) estimation technique in examining the nexus between financial sector deepening and manufacturing output growth in Nigeria and in obtaining the numerical estimates of the coefficients in the models. Also, this study used SVAR because it provides a strong link between economic theory and multivariate time series regression analysis in determining the dynamic response of variables to various or shocks within the economy (Breitung, Bruggemann and Lutkepohl, 2004). Furthermore, it can describe, clearly, the interactions and interrelationships that take place between economic variables in the model while keeping theoretical perspectives in view. The existence or not of the feedback mechanism between financial sector deepening and manufacturing output growth was examined with the aid of the Toda-Yamamoto Test of Granger Causality. Augmented Dickey-Fuller Unit Root test was also used to check if the series under consideration had unit root problem.

From the supply-led hypothesis, domestic investment (DI) was identified as the necessary channel through which financial sector deepening impacts manufacturing output growth. This transmission can is represented as follows:

$FSD \longmapsto DI \longmapsto MNQR$

Where; FSD is financial sector deepening, DI is a domestic investment, and MNQR is manufacturing output growth rate.

Nwanekpe, Uche and Nnamani (2019) identified three measures of financial sector deepening in their model. The model of Nwanekpe, Uche and Nnamani (2019) was expressed as;

$$EPS_t = \beta_0 + \beta_1 M_{2t}/GDP_t + \beta_2 CPS_t/GDP_t + \beta_3 MCAP_t/GDP_t + \varepsilon_t \quad \text{---------} 1$$

Licensed under Creative Common

Where; EPS = Earnings per share of the selected pharmaceutical firms, M_2/GDPt = Ratio of the broad money supply to GDP, CPS/GDP_t = Ratio of Credit to the private sector to GDP and MCAP/GDP_t = Ratio of market capitalisation to GDP.

This model is reformulated as follows:

$$EPS_t = \beta_0 + \beta_1 M_2R_t + \beta_2 CPSR_t + \beta_3 MCAPR_t + \varepsilon_t \text{ - - - - - - - - - - } 2$$

Where; EPS is earnings per share, M2R is the ratio of the broad money supply to GDP, CPSR is the ratio of credit to the private sector to GDP, and MCAPR is the ratio of market capitalisation to GDP.

Following from the Nwanekpe, Uche and Nnamani (2019) model, the three measures of financial deepening used in this study are M_2R_t (Ratio of the broad money supply to GDP), $CPSR_t$(Ratio of Credit to the private sector to GDP), and $MCAPR_t$ (Ratio of market capitalisation to GDP).

Based on this disaggregation, this study explores three channels of transmission of financial sector deepening to manufacturing output growth in Nigeria.

Channel one: broad money supply channel

$$M_2R_t \longmapsto DI_t \longmapsto MNQR_t$$

Using (2) as optimal lag length, a generic SVAR(2) model can be expressed as:

$$A_0Y_t = A_1Y_{t-1} + A_2Y_{t-2} + \varepsilon_t \text{ - } 3$$

Where A_0 is a matrix of contemporaneous coefficients, $A_1 - A_2$ are coefficient matrices at lags 1, 2, Y_t is the matrix of endogenous variables at current value, and $Y_{t-1} - Y_{t-2}$ are matrices of endogenous variables at lags 1 to 2.

The SVAR(2) model can be specified as follows to capture the contemporaneous effect,

$$MNQR_t = \Pi_{11}^1 MNQR_{t-1} + \Pi_{12}^1 DI_{t-1} + \Pi_{13}^1 M_2R_{t-1} + \Pi_{11}^2 MNQR_{t-2} + \Pi_{12}^2 DI_{t-2} + \Pi_{13}^2 M_2R_{t-2} + \varepsilon_{1t} \text{ …….. …. .} 4$$

$$DI_t = \Pi_{21}^1 MNQR_{t-1} + \Pi_{22}^1 DI_{t-1} + \Pi_{23}^1 M_2R_{t-1} + \Pi_{21}^2 MNQR_{t-2} + \Pi_{22}^2 DI_{t-2} + \Pi_{23}^2 M_2R_{t-2} + \varepsilon_{2t} \text{ …….. .} 5$$

$$M_2R_t = \Pi_{31}^1 MNQR_{t-1} + \Pi_{32}^1 DI_{t-1} + \Pi_{33}^1 M_2R_{t-1} + \Pi_{31}^2 MNQR_{t-2} + \Pi_{32}^2 DI_{t-2} + \Pi_{33}^2 M_2R_{t-2} + \varepsilon_{3t} \text{ …….. …….. .} 6$$

Equations 4, 5, and 6 are rearranged to obtain equations 7-9 as stated below.

$$MNQR_t - \Pi_{12}^0 DI_t - \Pi_{13}^0 M_2R_t = \Pi_{11}^1 MNQR_{t-1} + \Pi_{12}^1 DI_{t-1} + \Pi_{13}^1 M_2R_{t-1} + \Pi_{11}^2 MNQR_{t-2} + \Pi_{12}^2 DI_{t-2} + \Pi_{13}^2 M_2R_{t-2} + \varepsilon_{1t} \text{ …….. …. .} 7$$

Licensed under Creative Common

$-\Pi_{21}^{0}MNQR_t + DI_t - \Pi_{23}^{0}M_2R_t$
$= \Pi_{21}^{1}MNQR_{t-1} + \Pi_{22}^{1}DI_{t-1} + \Pi_{23}^{1}M_2R_{t-1} + \Pi_{21}^{2}MNQR_{t-2} + \Pi_{22}^{2}DI_{t-2} + \Pi_{23}^{2}M_2R_{t-2}$
$+ \varepsilon_{2t}$ ………………………………………………….. .8

$-\Pi_{31}^{0}MNQR_t - \Pi_{32}^{0}DI_t + M_2R_t$
$= \Pi_{31}^{1}MNQR_{t-1} + \Pi_{32}^{1}DI_{t-1} + \Pi_{33}^{1}M_2R_{t-1} + \Pi_{31}^{2}MNQR_{t-2} + \Pi_{32}^{2}DI_{t-2} + \Pi_{33}^{2}M_2R_{t-2}$
$+ \varepsilon_{3t}$ ………………….. ………………………….. .9

The matrix form of the SVAR(2) model for the broad money supply model channel is given below.

$[1 - \Pi_{12}^{0} - \Pi_{13}^{0} - \Pi_{21}^{0} 1 - \Pi_{23}^{0} - \Pi_{31}^{0} - \Pi_{32}^{0} 1][MNQR_t DI_t M_2R_t]$
$= [\Pi_{11}^{1}\Pi_{12}^{1}\Pi_{13}^{1}\Pi_{21}^{1}\Pi_{22}^{1}\Pi_{23}^{1}\Pi_{31}^{1}\Pi_{32}^{1}\Pi_{33}^{1}][MNQR_{t-1}DI_{t-1}M_2R_{t-1}]$
$+ [\Pi_{11}^{2}\Pi_{12}^{2}\Pi_{13}^{2}\Pi_{21}^{2}\Pi_{22}^{2}\Pi_{23}^{2}\Pi_{31}^{2}\Pi_{32}^{2}\Pi_{33}^{2}][MNQR_{t-2}DI_{t-2}M_2R_{t-2}]$
$+ [\varepsilon_{1t}\varepsilon_{2t}\varepsilon_{3t}]$ ……… 10

Following the recursive approach, which is prominently applied in the empirical literature, $-\Pi_{12}^{0}$, $-\Pi_{13}^{0}$ and $-\Pi_{23}^{0}$ will be restricted to zero for the SVAR(2) model to be identified. Thus, the recursive SVAR(2) model can be stated below;

$MNQR_t = \Pi_{11}^{1}MNQR_{t-1} + \Pi_{12}^{1}DI_{t-1} + \Pi_{13}^{1}M_2R_{t-1} + \Pi_{11}^{2}MNQR_{t-2} + \Pi_{12}^{2}DI_{t-2} + \Pi_{13}^{2}M_2R_{t-2}$
$+ \varepsilon_{1t}$ ………………………….. …. . 11

$-\Pi_{21}^{0}MNQR_t + DI_t$
$= \Pi_{21}^{1}MNQR_{t-1} + \Pi_{22}^{1}DI_{t-1} + \Pi_{23}^{1}M_2R_{t-1} + \Pi_{21}^{2}MNQR_{t-2} + \Pi_{22}^{2}DI_{t-2} + \Pi_{23}^{2}M_2R_{t-2}$
$+ \varepsilon_{2t}$ …………………………………………. . 12

$-\Pi_{31}^{0}MNQR_t - \Pi_{32}^{0}DI_t + M_2R_t$
$= \Pi_{31}^{1}MNQR_{t-1} + \Pi_{32}^{1}DI_{t-1} + \Pi_{33}^{1}M_2R_{t-1} + \Pi_{31}^{2}MNQR_{t-2} + \Pi_{32}^{2}DI_{t-2} + \Pi_{33}^{2}M_2R_{t-2}$
$+ \varepsilon_{3t}$ ………………….. ………………………….. . 13

In matrix form, the recursive model is expressed as:

$[100 - \Pi_{21}^{0} 10 - \Pi_{31}^{0} - \Pi_{32}^{0} 1][MNQR_t DI_t M_2R_t]$
$= [\Pi_{11}^{1}\Pi_{12}^{1}\Pi_{13}^{1}\Pi_{21}^{1}\Pi_{22}^{1}\Pi_{23}^{1}\Pi_{31}^{1}\Pi_{32}^{1}\Pi_{33}^{1}][MNQR_{t-1}DI_{t-1}M_2R_{t-1}]$
$+ [\Pi_{11}^{2}\Pi_{12}^{2}\Pi_{13}^{2}\Pi_{21}^{2}\Pi_{22}^{2}\Pi_{23}^{2}\Pi_{31}^{2}\Pi_{32}^{2}\Pi_{33}^{2}][MNQR_{t-2}DI_{t-2}M_2R_{t-2}]$
$+ [\varepsilon_{1t}\varepsilon_{2t}\varepsilon_{3t}]$ ……. … … … … … … … … … … … ….. 14

To avoid cross-error correlations or spill-over shocks, and remove the possibility of autocorrelations, we set

$A_0Y_t = BU_t$ - 15

Where; Y is the matrix of endogenous variables, B is variance matrix, and U is the matrix of error terms. This can be presented in matrix form as follows;

$[100 - \Pi_{21}^{0} 10 - \Pi_{31}^{0} - \Pi_{32}^{0} 1][MNQR_t DI_t M_2R_t] = [\delta_1 000 \delta_2 000 \delta_3][U_{1t}U_{2t}U_{2t}]$ …………… 16

Licensed under Creative Common

This implies that

$A_0 E_t = BU_t$ - 17

Where; E is the matrix of initial impulses (i.e., initial shocks in the endogenous variables). This can be represented in matrix form as stated in equation 18.

$[100 - \Pi_{21}^0 10 - \Pi_{31}^0 - \Pi_{32}^0 1]\left[e_t^{MNQR} e_t^{DI} e_t^{M_2R}\right] = [\delta_1 000 \delta_2 000 \delta_3][U_{1t} U_{2t} U_{2t}] \ldots\ldots\ldots\ldots 18$

Thus, to compute initial responses, we can set

$E_t = A_0^{-1} BU_t$ - 19

That is;

E = SU - 20

Where S = $A_0^{-1} B$

This can be presented in matrix form as;

$\left[e_t^{MNQR} e_t^{DI} e_t^{M_2R}\right] = [a00bc0def][U_{1t} U_{2t} U_{3t}]$ - 21

Where;

a = initial response of MNQR to own shock;

b = initial response of DI to MNQR shock;

c = initial response of DI to own shock;

d = initial response of M_2R to MNQR shock;

e = initial response of M_2R to DI shock; and

f = initial response of M_2R to own shock.

Following the same recursive approach, the SVAR(p) models for channel two (Credit-to-private sector) and channel three (market capitalisation) are expressed in matrix forms below:

$$[100 - \theta_{21}^0 10 - \theta_{31}^0 - \theta_{32}^0 1][MNQR_t DI_t CPSR_t]$$
$$= [\theta_{11}^1 \theta_{12}^1 \theta_{13}^1 \theta_{21}^1 \theta_{22}^1 \theta_{23}^1 \theta_{31}^1 \theta_{32}^1 \theta_{33}^1][MNQR_{t-1} DI_{t-1} CPSR_{t-1}]$$
$$+ [\theta_{11}^2 \theta_{12}^2 \theta_{13}^2 \theta_{21}^2 \theta_{22}^2 \theta_{23}^2 \theta_{31}^2 \theta_{32}^2 \theta_{33}^2][MNQR_{t-2} DI_{t-2} CPSR_{t-2}] + [\varepsilon_{1t} \varepsilon_{2t} \varepsilon_{3t}] \ldots\ldots\ldots 22$$

$$[100 - \lambda_{21}^0 10 - \lambda_{31}^0 - \lambda_{32}^0 1][MNQR_t DI_t MCAPR_t]$$
$$= [\lambda_{11}^1 \lambda_{12}^1 \lambda_{13}^1 \lambda_{21}^1 \lambda_{22}^1 \lambda_{23}^1 \lambda_{31}^1 \lambda_{32}^1 \lambda_{33}^1][MNQR_{t-1} DI_{t-1} MCAPR_{t-1}]$$
$$+ [\lambda_{11}^2 \lambda_{12}^2 \lambda_{13}^2 \lambda_{21}^2 \lambda_{22}^2 \lambda_{23}^2 \lambda_{31}^2 \lambda_{32}^2 \lambda_{33}^2][MNQR_{t-2} DI_{t-2} MCAPR_{t-2}]$$
$$+ [\varepsilon_{1t} \varepsilon_{2t} \varepsilon_{3t}] \ldots\ldots\ldots 23$$

Toda-Yamamoto VAR model will be used to test for Granger causality. The Toda-Yamamoto form- assuming *k* optimal lags- of the model is stated in compact form as follows;

Licensed under Creative Common

$$[MNQR_t DI_t FSD_t]$$
$$= [\varphi_1^0 \varphi_2^0 \varphi_3^0] + [\varphi_{12}^1 \varphi_{12}^1 \varphi_{13}^1 \varphi_{21}^1 \varphi_{22}^1 \varphi_{23}^1 \varphi_{31}^1 \varphi_{32}^1 \varphi_{33}^1][MNQR_{t-1} DI_{t-1} FSD_{t-1}]$$
$$+ [\varphi_{12}^2 \varphi_{12}^2 \varphi_{13}^2 \varphi_{21}^2 \varphi_{22}^2 \varphi_{23}^2 \varphi_{31}^2 \varphi_{32}^2 \varphi_{33}^2][MNQR_{t-2} DI_{t-2} FSD_{t-2}] + [\cdots \ \ddots \ \cdots]$$
$$+ \left[\varphi_{12}^k \varphi_{12}^k \varphi_{13}^k \varphi_{21}^k \varphi_{22}^k \varphi_{23}^p \varphi_{31}^k \varphi_{32}^k \varphi_{33}^p\right][MNQR_{t-k} DI_{t-k} FSD_{t-k}]$$
$$+ \left[\varphi_{12}^j \varphi_{12}^j \varphi_{13}^j \varphi_{21}^j \varphi_{22}^j \varphi_{23}^j \varphi_{31}^j \varphi_{32}^j \varphi_{33}^j\right]\left[MNQR_{t-j} DI_{t-j} FSD_{t-j}\right]$$
$$+ [\varepsilon_{1t} \varepsilon_{2t} \varepsilon_{3t}] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 24$$

Where; j = k+1, k+2, …, k+dmax, and dmax is the maximum order of integration

RESULTS AND DISCUSSIONS

The results of the investigations in this study are presented in this section. The data series considered in this study include manufacturing output growth (MNQR), domestic investment (DI), the ratio of the broad money supply to GDP (M_2R), cash to the private sector to GDP ratio (CPSR), and market capitalisation to GDP ratio (MCAPR). First, pre-estimation analysis is presented to ascertain the level of stationarity of the series under study. In addition, VAR optimal lag selection is carried out in order to identify the parsimonious model for the study. On the theoretical basis of a case of feedback mechanism, as expressed in the demand-following hypothesis, the relationship between financial sector deepening and manufacturing output growth in Nigeria is explored in this study with the aid of a Toda-Yamamoto vector autoregressive model (VAR). Proceeding the results in this section are discussions of the results based on economic theory and institutional occurrences in Nigeria.

Test for Unit Root

Augmented Dickey-Fuller (ADF) test was applied to ascertain whether the series has a unit root problem. Results of the test for the unit are presented in Table 1.

Table 1: Results of Unit Root Test using ADF (Eviews 10 output)

Series	Level ADF Statistic	Probability @ Level	ADF Prob. @ 1st Diff.	Order of Integration	Remark
MNQR	-0.973964	0.2883	0.0000***	I(1)	Stationary at 1st Diff.
DI	-7.588153	0.0000***		I(0)	Stationary at level
M_2R	0.864258	0.8917	0.0000***	I(1)	Stationary at 1st Diff.
CPSR	0.436210	0.8028	0.0000***	I(1)	Stationary at 1st Diff.
MCAPR	-0.702688	0.4047	0.0000***	I(1)	Stationary at 1st Diff.

*** indicate significance at 1% and 5% respectively.

Licensed under Creative Common

Table 1 indicates that the only domestic investment achieved stationarity at levels and was integrated of order zero. This suggests that domestic investment has no unit root problem. However, all the other series did not achieve stationarity at the level. As a result, they were integrated of order one. Based on the outcome of the unit root test, MNQR, M_2R, CPSR, and MCAPR were estimated at the first difference so as to achieve stationarity at levels. To this end, the use of a structural vector autoregressive model (SVAR) at levels for explaining the relationship between financial deepening and manufacturing output growth in Nigeria is justified. Toda-Yamamoto VAR test of causality was carried out to ascertain if the feedback mechanism between financial deepening and manufacturing output growth, as indicated in the demand-following theory, can be verified for Nigeria. The parsimonious model was estimated at the optimal lag of 2s as selected by the Akaike information criterion (AIC).

Analysis of VAR estimates

Toda-Yamamoto VAR Causality Test

The Toda-Yamamoto VAR causality results are summarised in Table 2.

Table 2: VAR Granger Causality Test (Eviews 10 output)

Causality	Chi-square	Df	Probability	Remark
DI→MNQR	1.857908	2	0.3950	No causality
MNQR→DI	0.874530	2	0.6458	
M2R→DI	2.314393	2	0.3144	Uni-causality
DI→M_2R	7.039970	2	0.0296	
CPSR→DI	1.671089	2	0.4336	No causality
DI→CPSR	2.020211	2	0.3642	
MCAPR→DI	1.333352	2	0.5134	No causality
DI→MCAPR	5.574209	2	0.8736	

The summary of causality results presented in Table 2 indicates a uni-causal relationship running from domestic investment to broad money supply to GDP ratio in Nigeria. This confirms the demand following theory which stipulates a surge in demand for money as a result of an increase in the production of goods and services.No another form of causality was identified among the series under study. In as much as we cannot establish empirical interdependence among the series being investigated, the feedback mechanism theoretically shown is brought to bear. This forms the basis for the examination of the transmission effect of financial deepening

Licensed under Creative Common

to manufacturing output growth in Nigeria using structural vector autoregressive (SVAR) approach.

The Money Supply to GDP Ratio Channel

Structural VAR Estimates

Based on theoretical postulations, restrictions were recursively imposed on the upper elements of the matrix of contemporaneous effects.

Estimated A matrix:

	MNQR	DI	M_2R
MNQR	1.000000	0.000000	0.000000
DI	0.267396	1.000000	0.000000
M_2R	-0.105497	-0.034629	1.000000

The results presented in estimated matrix A revealed that due to restrictions imposed by theory, financial deepening and the ratio of broad money supply have no contemporaneous effect on manufacturing output growth in Nigeria. This is observable in the fact that funds made available by the financial sector need to be first invested. The invested funds take time before exerting a visible effect on manufacturing output. As a result, broad money supply and domestic investment have only lagged impact on manufacturing output growth in Nigeria.

The A matrix also shows that domestic investment responds negatively to current shock in manufacturing output growth, and the ratio of the broad money supply to GDP responds positively to recent shocks in manufacturing output growth and domestic investment. However, only the response of M_2R to current shock in manufacturing output growth is statistically significant. This suggests that a 1% increase in manufacturing output will lead to a recent rise in the ratio of the broad money supply to GDP by 10.5%. This is because the rise in output spurs increased demand for money such that a shock in manufacturing output growth leads to an immediate positive effect on the ratio of the broad money supply to GDP.

The estimated matrix S represents short-run impulse responses. These are the responses of manufacturing output growth, domestic investment and ratio of the broad money supply to GDP to one-time shock in each other in the short-run. Results of Matrix “S” are presented below.

Estimated S matrix:

	MNQR	DI	M_2R
MNQR	7.425857	0.000000	0.000000
DI	-1.985642	10.31149	0.000000
M_2R	0.714645	0.357080	1.908069

Matrix “S” reveals that in the first period (short-run), manufacturing output growth responds only to its own shock but does not respond to shock in domestic investment and broad

Licensed under Creative Common

money supply ratio. A 1% shock in manufacturing output growth will lead to 7.34% increase in itself in the first period. This is because changes in domestic investment and broad money supply ratio can only have lagged effects on the manufacturing sector output, as the shocks are expected to pass through channels of transmission.

In the short-run, domestic investment responds to one-time shock in manufacturing output growth and itself but does not respond to surprise in broad money supply ratio. Increase in manufacturing outgrowth is likely to elicit a negative response from domestic investment by 1.99% in the short-run. This is due to the fact that as manufacturing output increases, firms are likely to convert the surplus output, which accrues to them in the form of profit first into savings before investments. The increased priority given to savings over-investment leads to negative investment in the short-run. Thus, as manufacturing output increases in the short-run, domestic investment tends to fall. Given a positive shock in itself, domestic investment is likely to respond positively by 10.31% in the short-run. This is not surprising, though, as a positive impulse in domestic investment directly means a positive response from itself.

Broad money supply ratio is likely to respond positively to shocks due to manufacturing output growth, domestic investment and itself in the short-run. Suppose there is a 1% positive shock in manufacturing output growth, domestic investment and broad money supply ratio. In that case, the broad money supply ratio is likely to increase by 0.71%, 0.36% and 1.91% respectively in the short-run, which justifies the demand-following hypothesis, that states that as manufacturing output increases, the demand for money increases. The rise in demand for money causes an increase in broad money supply ratio, increasing broad money supply over the GDP, and resulting in increased financial deepening. Similarly, an increase in domestic investment requires an increased demand for money for speculative purposes. The increased demand for money consequently leads to rising in broad money supply ratio, increasing broad money supply over GDP, and indirectly resulting in increased financial deepening.

The long-run impulse-responses are represented in matrix “F” whose results are presented below.

Estimated F matrix:

	MNQR	DI	M_2R
MNQR	7.157549	-0.914728	-1.049068
DI	-1.535018	4.824893	-0.653284
M_2R	0.122804	0.582981	1.929345

Estimated matrix “F” indicates that manufacturing output growth, domestic investment and broad money supply ratio will all respond positively to their own shocks in the long-run. The series is likely to respond by to their own shocks in the long-run by 7.16%, 4.82%, and 1.93%

Licensed under Creative Common

respectively. A one-time shock in domestic investment and broad money supply ratio is likely to have a negative long-run effect on domestic investment and manufacturing output growth in Nigeria. This is because a high broad money supply creates inflationary tendencies in the economy, leading to a fall in the consumption of goods and services. These scenarios are likely to cause fall in domestic investment and, consequently, fall in manufacturing output growth. Shocks in manufacturing output growth and broad money supply ratio will have a negative long-run effect on domestic investment. The likely cause of this long-run negative effect has already been discussed in the preceding paragraphs. Broad money supply ratio will, however, respond positively to shocks in manufacturing output growth and domestic investment in the long-run. This scenario too, has been discussed in the previous paragraphs.

The SVAR results discussed in this section suggest that in a short-run broad money supply ratio and domestic investment are not expected to have any contemporary effects on manufacturing output growth in Nigeria. Although on the long-run, it responds negatively to both domestic investment and broad money supply ratio.

Domestic investment does not respond to shock caused by the broad money supply in the current and short-term periods. Although it reacts negatively to shock in manufacturing output growth in the present, short-run and long-run periods, while also responding negatively to the broad money supply in the long-run. The broad money supply is likely to react positively to domestic investment and manufacturing output growth across all temporal considerations under investigation in this study.

The Credit to Private Sector to GDP Ratio Channel

Similar to the broad money supply ratio channel, the SVAR estimates for the credit to private sector ratio are discussed with the aid of three matrices namely matrix A (matrix of contemporaneous effects), matrix S (matrix of short-run impulse-responses), and matrix F (matrix of long-run impulse-responses). These matrices are discussed in the proceeding paragraphs.

Estimated A matrix:

	MNQR	DI	CPSR
MNQR	1.000000	0.000000	0.000000
DI	0.246780	1.000000	0.000000
CPSR	0.038883	-0.002810	1.000000

Theoretical restrictions were placed on the upper elements of the contemporaneous matrix, suggesting that CPS ratio to GDP and domestic investment are not expected to have any

Licensed under Creative Common

immediate effect on manufacturing output growth in Nigeria. Similarly, CPS ratio to GDP is not likely to have any contemporaneous impact on domestic investment in Nigeria. This is because shocks due to domestic investment and CPS ratio can only have any visible effects in the economy in the next period. The contemporary impact of manufacturing output growth on domestic investment in Nigeria is, however, negative. The factors responsible for this contemporaneous negative effect have been discussed in the broad money supply ratio channel.

Estimated matrix A in this instance, indicate that an unexpected change in manufacturing output growth will likely lead to falling in domestic investment by 24.7%. This result is similar to the contemporaneous effect of manufacturing output growth on domestic investment in Nigeria, as discussed under the broad money supply ratio channel. The contemporary impact of manufacturing output growth on credit to the private sector ratio is likely to be negative. This is a possible scenario if manufacturers tend to reinvest profits made through output growth. Continual re-investment of profit limits the amount of credit flowing to the private in the form of personal debt. On the other hand, if a sudden positive change in manufacturing output growth is likely to have a negative effect on credit to the private sector ratio through government contractionary fiscal policy.

A shock in domestic investment is likely to have a positive effect on credit to the private sector ratio in the current period. A sudden increase in domestic investment serves as an incentive for more private investments. This pushes intending investors to seek funds for investments, leading to the rise in credit to the private sector, and consequently increase in credit to the private sector ratio.

Estimated S matrix:

	MNQR	DI	CPSR
MNQR	7.193651	0.000000	0.000000
DI	-1.775249	10.39290	0.000000
CPSR	-0.284697	0.029202	1.986380

Short-run impulse-responses are presented in Matrix S. Theoretically; restrictions are placed on the elements of the upper diagonal of the S matrix. This is because manufacturing output is not expected to respond to any changes in domestic investment and credit to private sector ratio in the short-run. Similarly, domestic investment is not likely to respond to impulse from credit to private sector ratio in the short-run.

Apart from responding positively to own shocks in the short-run by 7.19%, 10.39%, and 1.99% respectively for manufacturing output growth, domestic investment and credit to private sector ratio in the short-run, domestic investment is likely to respond negatively to impulse in

Licensed under Creative Common

manufacturing output growth in the short-run by -1.78%. This could be due to the failure of manufacturers to re-invest profits accruing from the increased manufacturing output.

Credit to private sector ratio is likely to respond negatively to shock in manufacturing output but positively to shock in domestic investment in the short-run. A sudden impulse in manufacturing output growth will reduce credit to private sector ratio by -28.5% in the short-run. A stimulation in domestic investment will increase credit to the private sector by 0.03% in the short-run. These circumstances have been discussed in the new matrix.

Estimated F matrix:

	MNQR	DI	CPSR
MNQR	7.194014	-0.634742	-1.034231
DI	-1.756827	5.193154	0.435349
CPSR	-0.303013	0.282376	1.918637

Estimated matrix F is the matrix of long-run impulse-responses under the credit to private sector ratio channel. Matrix F shows that in the long-run, manufacturing output growth, domestic investment and credit to private sector ratio will respond positively to their shocks by 7.19%, 5.19% and 1.92% respectively. Domestic investment and credit to the private sector will react negatively to shock in manufacturing output growth in the long-run by -1.76% and -0.30% respectively. These results are similar to the short-run circumstances discussed under matrix S. Domestic investment and credit to the private sector are likely to respond positively to shocks in each other in the long-run by 0.28% and 0.44% respectively. This is due to the interactions explained by the supply-leading and demand-following theories. Increased domestic investment triggers increased demand for credit and vice-versa.

The results of credit to private sector ratio channel discussed here suggest that manufacturing output growth has a contemporaneous negative effect on domestic investment and credit to personal sector ratio. In contrast, the contemporary impact of domestic investment on credit to the private sector ratio is positive. Similar results are observed for the short-run impulse responses. In the long-run, domestic investment and credit to the private sector will have a negative effect on manufacturing output growth in Nigeria. The impact of credit to private sector ratio on domestic investment in Nigeria in the long-run will also be negative.

Market Capitalization to GDP Ratio Channel

The SVAR results for the market capitalisation ratio channel are discussed under Matrix A (contemporaneous effects), Matrix S (short-run impulse-responses) and Matrix F (long-run impulse-responses).

Licensed under Creative Common

Estimated A matrix:

	MNQR	DI	MCAPR
MNQR	1.000000	0.000000	0.000000
DI	0.298043	1.000000	0.000000
MCAPR	0.073362	0.079404	1.000000

The recursive/theoretical restrictions imposed on the elements of the upper diagonal of the contemporaneous matrix remain the same in this case, as with the previous channels. Results of the matrix of concurrent effects suggest that manufacturing output has a contemporary negative effect on domestic investment and market capitalisation ratio. Similarly, domestic investment has a negative effect on market capitalisation ratio in the current period. A 1% increase in manufacturing output growth will lead to an immediate fall in domestic investment and market capitalisation ratio by -0.3% and -0.07% respectively. Similarly, if domestic investment increases by 1%, the market capitalisation ratio will decline by -0.08%. This is possible if manufacturers tend to prioritise investment in current assets over capital assets.

Estimated S matrix:

	MNQR	DI	MCAPR
MNQR	7.224627	0.000000	0.000000
DI	-2.153246	10.19065	0.000000
MCAPR	-0.359035	-0.809181	4.570455

In the usual recursive approach, elements of the upper diagonal are restricted to zero as manufacturing output growth is not expected to respond to domestic investment and market capitalisation in the short-run. Responses of domestic investment and market capitalisation ratio to shock in manufacturing output growth in the short-run are, however negative. The response of market capitalisation ratio to shock domestic investment also follows the same path. In this case, a 1% rise in manufacturing output growth is likely to cause domestic investment and market capitalisation to fall by -2.15% and -0.36% respectively, while in the case of a 1% increase in domestic investment, market capitalisation ratio is likely to decrease by -0.81%. Factors responsible for these circumstances have been discussed under contemporaneous results of the market capitalisation ratio channel.

Estimated F matrix:

	MNQR	DI	MCAPR
MNQR	6.843535	-1.043572	-0.058298
DI	-1.681824	4.834789	0.758937
MCAPR	0.453001	-0.288600	3.925418

Licensed under Creative Common

The response of manufacturing output growth to domestic investment and market capitalisation ratio will be negative in the long-run. Given a 1% rise in domestic investment and market capitalisation ratio, manufacturing output growth will fall by -1.04% and -0.06% respectively. This is true to the extent that an increase in domestic investment and market capitalisation ratio is likely to raise production cost. Manufacturers will want to cut production costs by reducing the quantity of output. To this end, if there is an unexpected rise in market capitalisation ratio and domestic investment, manufacturing output growth will decline instead.
The domestic investment will respond positively to shock in market capitalisation ratio in the long-run by 0.76%. This is expected as the higher the level of market capitalisation, the higher the level of domestic investment.

CONCLUSION AND POLICY RECOMMENDATIONS

The results presented in this study indicate that through supply-leading and demand-following, both financial deepening and manufacturing output growth can exert influence on each other. Financial deepening, in whatever form is used, affects domestic investment and manufacturing output growth only in the long-run due to lag effect. Since only manufacturing output growth involves domestic investment and financial deepening in the current and short-run periods, this effect turns to be negative. Domestic investment and manufacturing output growth share a long-run negative relationship while financial deepening has a positive long-run effect on domestic investment in Nigeria.

By the findings reported in this study, the following recommendations are made. First, the ratio of the broad money supply to GDP and the percentage of credit to the private sector to GDP is a better means of financial deepening compared to market capitalisation to GDP ratio. To raise domestic investment through financial deepening, these two measures present better options. The Central Bank of Nigeria should therefore focus on monetary policies that do not increase broad money supply and credit to the private sector above the GDP to raise manufacturing output growth in Nigeria. Second, domestic investment and financial deepening are not good determinants of manufacturing output in Nigeria. Government and manufacturers should turn to other possible determinants of manufacturing output growth in Nigeria such as lending rate, labour force, foreign direct investment, and manufacturing capacity utilisation since the effect of domestic investment and financial deepening on manufacturing output in Nigeria are zero in the current period, zero in the short-run and negative in the long-run.

This study, by no means, exhausted the nexus between financial sector deepening and manufacturing output growth in Nigeria. In as much as the study was novel in the use of methodology and exploration of the role of domestic investment in the relationship between

Licensed under Creative Common

financial sector deepening and manufacturing output growth in Nigeria, it also makes empirical sense to disaggregate domestic investment according to sectors. Further studies should therefore look at domestic investment by its sectorial peculiarities and examine how manufacturing sector investment affects it output growth through financial sector deepening. Also, since investment is not limited to domestic investment alone, further studies should also consider the role of foreign investment in the nexus between financial sector deepening and manufacturing output growth in Nigeria.

REFERENCES

Adeyefa F. A, & Obamuyi T. M (2018). Financial Deepening and the Performance of Manufacturing Firms in Nigeria. *Canadian Social Science*, 14(6), 87-96.

Akinmulegun, S. O., & Akinde J. A (2019). Financial Deepening and Manufacturing Sector Performance in Nigeria. *IOSR Journal of Economics and Finance*, 10(4), 18-27.

Calderon, C. & Liu, L. (2003) The direction of causality between financial development and economic growth. *Journal of Development Economics*, 72, 371–394.

Central Bank of Nigeria (CBN) (2017). *Statistical Bulletin*, Vol. 27, December, Abuja, Nigeria.

Goldsmith, R. W. (1969). *Financial Structure and Development*. New Haven, CT, USA: Yale University Press.

Goldsmith, R.W., (1969). *Financial Structure, and Development.* Yale University Press: New Haven

Gurley J. G & Shaw E. S (1955). Financial aspects of economic development. *American Economic Review*, 45:515-538

Gurley, J. & Shaw, E. (1967). Financial structure and economic development. *Economic Development and Cultural Change*, 15, 333–346.

Jung, W. S. (1986). Financial development and economic growth: International evidence. *Economic Development and Cultural Change*, 34, 333–346.

Kar, M. & Pentecost, E. J. (2000). Financial development and economic growth in Turkey: Further evidence on the causality issue. *Economic Research Paper* No. 00/27; Loughborough, UK: Loughborough University.

Kayode, O. F., Owoputi, J. A., & Nwakoby, C. N., (2020). Financial Deepening and Manufacturing Sub-Sector Productivity in Nigeria. *IOSR Journal of Business and Management*, 22(3): 09-19.

King, R. G. & Levine, R. (1993) Finance and growth: Schumpeter might be right. *Quantitative Journal of Economics*, 108, 717–737.

King, R., & Levine, R. (1993). Finance, entrepreneurship and growth: Theory and evidence. *Journal of Monetary Economics*, 32:513–543.

Levine, R. (2005). Finance and growth: theory and evidence, In P. Aghion, & S. N. Durlauf (Eds.), *Handbook of Economic Growth*.

Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics,* 22, 3–42.

Maxwell E., & Oluwatosin A., (2012). The impact of financial development on manufacturing output: The Nigeria evidence. *Economics Bulletin*, 43(3): 2638-2645

McKinnon, R. (1973). *Money and capital in economic development*. Washington, DC, USA: Brookings Institution.

Mesagan, E., Olunkwa N., & Yusuf I., (2018). Financial development and manufacturing performance: The Nigerian case. *Studies in Business and Economics*, 13(1); 98-111

Nwanekpe, C., Uche L. O., & Nnamani, J. N., (2019). Effect of financial deepening indicators on the financial performance of pharmaceutical firms in Nigeria. *Management and Human Resource Research Journal*, 8(6): 1-16

Ojo, A. T. (2010). *The Nigerian Maladapted Financial System: Reforming Tasks and Development Dilemma*. Department of Banking & Finance, Covenant University, Ota, Nigeria.

Licensed under Creative Common

Olorunfemi, S., Obamuyi, T. M., & Adekunjo, F. O. (2013). Manufacturing performance in Nigeria: implication for sustainable development. *Asian Economic and Financial Review*, 3(9), 1195-1213.

Robinson, J. (1952). The generalisation of the general theory. *Rate of Interest and Other Essays*. London, UK: Macmillan.

Schumpeter, J. A. (1911). *The Theory of Economic Development*. Cambridge, MA, USA: Harvard University Press.

Shaw, E. (1973). *Financial Deepening and Economic Development. London:* Oxford University Press.

World Bank (1989). *World Development Report.*

Licensed under Creative Common