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STOCK MARKET DEVELOPMENT AND THE PERFORMANCE OF THE MANUFACTURING SECTOR IN NIGERIA

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ABSTRACT

The study investigated the relationship between stock market development and the performance of the manufacturing sector in Nigeria from 1986 to 2019. The study used Structural Vector Autoregressive (SVAR) model and found that stock market development indicators namely, market capitalization, stock market liquidity and total new issues have positive impact on the manufacturing output both in the short and long-run in Nigeria. This means that if the stock market is efficient in its operations, manufacturing firms can raise long term capital for investment. The implication of this is that conscious efforts should be made to make the Nigerian Stock Exchange Market efficient so that manufacturing firms can raise long term funds for investment. This will immensely help the economy to achieve its diversification quest via the Economic Recovery and Growth Plan (ERGP). Also, improving manufacturing productivity will immensely benefit the economy following the signing of the African Continental Free Trade Area Agreement. This is because the manufacturing output will form the export base for the Nigerian economy.

KEYWORDS: *Efficient Market Hypothesis, Stock Market Development, Manufacturing Performance, Structural Vector Autoregressive (SVAR), Tobin's q-theory of Investment*

INTRODUCTION

The financial resource mobilization role of stock markets the world over has been adjudged to be germane to investment growth and economic growth of countries. Companies that engage in investment activities commonly raise capital through the stock markets. Thus, the stock market is considered a vital element in the mobilization and allocation of resources in any modern economy.According to Caporale, Howells &Soliman(2005) stock markets play key role in allocating capital to corporate sector, which in turn exerts real effect on the domestic growth of the economy. Quoted companies enjoy permanent access to capital raised through issues. That is to say that, through facilitating long term and profitable investment, liquid market improves the allocation of capital and enhances the prospect of long-term economic growth.

The mobilization of resource from various sectors in the economy to promote national development has been a crucial role in the consolidation of a national economy in general and in the development of industrial sector in particular, this is because for sustainable growth and development to take place, funds must be effectively mobilized and allocated to enable business and the economy harnesses their human, material and managerial resource for optimal output. It is against this background that every country has a financial system which serves as a mechanism for the mobilization of resources for the attainment of economic growth. According to Alile and Anao (1984) the stock market is the pivot around which every activity in the capital market revolves; its follows therefore that without the facilities provided by the stock market, it is doubtful if the capital market can efficiently perform its expected role of resource mobilization. (OlogundeElumilade&Asaolu, 2006). It is in the light of the above, that the stock market is considered a vital element in the mobilization and allocation of resources in any modern economy.

In Nigeria, 32 out of the 170 companies quoted on the Nigerian Stock market are manufacturing companies (Nigerian Stock Exchange Commission, 2019). This means that the manufacturing company constitutes 19% of the operations of the Nigerian Stock exchange. Predicated upon this premise, it is imperative to investigate the contribution of the Nigerian stock exchange market development to the performance of the manufacturing sector of the Nigerian economy. Thus, the objective of this paper is to investigate the impact of stock market development on the manufacturing output in Nigeria.

THEORETICAL FRAMEWORK

The study is hinged on the efficient market hypothesis and the Tobin's q-theory of investment.

The efficient market hypothesis was developed by Eugene Fama in 1995. The theory's framework is used for examining the efficiency of the capital market. It states that all information is reflected in the price of financial instrument (that is, bond, share, debenture etc). Thus, expectation of future price rise will bring about a rush in the current purchase of the instrument causing the cost price to increase and without taking note of the future expected increase in price. The theory also emphasizes the uncertainty of price movement, and difficulty to predicting it by virtue of its random walk. According to the EMH, three level of market efficiency are identifiable in the capital market namely; the weak form efficiency, the semi-strong form efficiency, the strong form efficiency. For the weak form level, price reflect all information about past trading in terms of price movement and volume of trade made available to the public at negligible cost, so that future price cannot be predicted from past price movements for current consumption is called saving.

In the 1969, James Tobin came up with an alternative investment theory; the q-investment theory, sometimes also referred to as Tobin's q-investment theory. At its core, Tobin's q theory of investment relates fluctuations in investment to changes in the stock market. James Tobin was the first person to explain this relation between the stock market and investment and that is why it is also referred as "Tobin's q" theory. Where q = market value of the firm/ Replacement cost of capital or q = Value the stock market places on the firm's asset /Cost of producing those assets. That is, the q-investment theory explains investment using the difference between the stock market valuation of firms' real assets and the replacement costs of these assets. According to Tobin's q-investment theory, firms base their investment decisions on *q*, where *q* represents the ratio between the market value of all physical capital and its replacement costs.

$$q = \frac{\text{Equity Market Value} + \text{Liabilities Market Value}}{\text{Equity Book Value} + \text{Liabilities Book Value}}$$

In the case that q is above one (q>1), the stock market values the firm more than the market value of its real assets. In this case a firm can increase its value by acquiring additional capital. Thus, firms will investment and increase their capital stock. In the opposite case, when q is smaller than one (q<1), the market value of the firm is less than the replacement costs of the firms' assets. It this case a firm does not replace depreciated capital, because the market values the additional investment less its costs. Hence, the capital stock will decrease.

In other words, when q > 1, firms find it profitable to acquire additional capital because value of capital exceeds the cost of acquiring it.

Thus, when q > 1 → Investment will increase.

He reasoned that if the market value of physical capital of a firm exceeded its replacement cost, then capital has more value "in the firm" (the numerator) than outside the firm (the denominator). Tobin reasoned that firms should accumulate more capital when $q > 1$ and should draw down their capital stock when $q < 1$. That is, net investment in physical capital should depend on where q is in relation to one.

According to Tobin, firms need money for investment; this money can be raised either by borrowing or by selling shares, equity, etc. When the firm sells the share, the buyer buys the share to earn a capital gain from the increase in the market value of the shares. The purchaser of share, therefore, purchases shares when he expects a high capital gain. This is because during boom, the share price is high. The firm by selling only few shares can raise a lot of money. Thus when stock markets are high, firms are willing to sell equity to finance investment than when the stock market is low.

EMPIRICAL LITERATURE

Araoye, Ajayi and Aruwaji (2018) examined the impact of the Nigerian Stock market development on the Nigeria economic growth from 1985 to 2014. The economic growth was proxy by the GDP while the stock market variables considered included; market capitalization and market turnover ratio as proxy for stock market development in terms of size and liquidity. The study utilized the Johansson's co integration test in establishing if a long run relationship does exist between stock market development and economic growth in Nigeria. The empirical results suggest that the stock market is significant in determining economic growth in Nigeria using the error correlation model and it was found that the stock market has impacted insignificantly on the economic growth. It is recommended that policy makers should ensure improvement in the market capitalization, by encouraging foreign direct investment participation in the market. Small and medium entrepreneurs should be encouraged to access the market for investible funds given their close affinity with the grass root funds mobilization ability.

Ologunwa and Sadib (2016) empirically investigated the relationship between capital market development and economic growth in Nigeria. Using the ARDL technique, it was found that capital market ratio and turnover ratio are both significant and positive drivers of economic growth in Nigeria and that stock markets affect economic growth through savings mobilization. It is asserted that large, liquid and efficient stocks markets can ease savings mobilization. The study recommended that stock market should be made attractive to foreign economies, although it can also spell doom during a burst. However, if the funds had been carefully utilized, the economy may not be significantly affected during a burst.

Adesola and Arikpo (2015) examined the relationship between financial market performance and foreign portfolio investment in Nigeria. The study specifically assessed whether there is a long run and short run causal relationship running from financial market performance to foreign portfolio investment in Nigeria. Financial market performance was measured using stock market performance, stock market liquidity and total new issues. The study used the Autoregressive Distributive Lag (ARDL) technique for data analysis. Findings from the analyses showed that financial market performance has no long run causal relationship with foreign portfolio investment in Nigeria. Also, stock market performance and stock market liquidity have no short run causal relationship with foreign portfolio investment in Nigeria. Lastly, total new issue has a short run causal relationship with foreign portfolio investment in Nigeria. The study on the basis of these findings recommended that stock market regulators should through conscious enlightenment campaigns encourage more domestic participation in the market to enhance the market performance, deepening and growth as this will strengthen its long run causality with FPI. Lastly, stock market regulators should through conscious risk reduction policies formulation and implementation reduce the riskiness of investing in the stock market to increase transactions and liquidity in the stock market, boost the rate of turnover to investors as this will attract foreign portfolio investors to the Nigerian financial market.

Okonkwo (2016) investigated the effect of foreign portfolio investment on industrial growth in Nigeria with the view to establishing empirical the relationship among foreign portfolio investment and industrial productivity in Nigeria. Secondary data were employed in the study and were sourced from the Central Bank of Nigeria statistical bulletin 2013 edition and the International financial statistics (IFS). The ordinary least square (OLS) estimation technique was appropriately employed in the study and findings of the study revealed that there is statistically significant positive relationship existing among foreign portfolio investment, gross fixed capital formation, market capitalization and industrial growth proxied by industrial production index (IPI) in Nigeria. The study recommended among others that proactive steps must be taken to expand market capitalization which is the major driver of foreign portfolio investment in order to keep stimulating industrial productivity in the economy.

Ezeoha, Ogamba and Onyiuke (2009) examined the nature of the relationship existing between stock market development and the level of investment flows in Nigerian economy that has high degree of macroeconomic instability; with a view to ascertaining whether the stock market plays a uniform role in attracting both domestic and foreign investments in such economic situation. The Johansen Cointegration model was adopted to examine the long-run trends in the variables; while controlling for other variables, a vector error correction model (VERCM) was used in estimating the relationship between investment growth, on one hand, and stock market development on the other. The results showed that development in the Nigerian stock market over the years was able to spur growth in domestic private investment flows, but unable to do so in the case of foreign private investment; and that development in the country's banking system rather had some destabilizing effects on the flow of private investments. The study attributed this to persistent cases of distress and failure in the banking system.

Channels Through Which Capital Market Affect an Economy

The channels through which stock market development affects economic growth have been classified into four. The first is through stock market liquidity. Levine (1991) and Bencivenga, Smith and Starr (1996) argued that stock market may provide liquidity in the economy because savers have liquid assets, while firms have permanent use of capital, raised by issuing equities. Liquid stock markets reduce the downside risk and cost of investing in projects that do not pay off for a long time. According to Levine and Zervos (1996), a liquid stock market ensures that initial investors do not lose access to their savings for the duration of the investment project because they can quickly, cheaply and confidentially sell their stake in the company. They thus conclude that more liquid stock markets facilitate investment in long-term, potentially more profitable projects, thereby improving the allocation of capital and enhancing the prospect for long-term growth.

The second way by which stock markets affect economic growth is through risk diversification, which the market provides through international integration.Galinger (1994), and Spears (1991) show how stock markets provide a vehicle for diversifying risks. Their models demonstrate that greater risk diversification can influence growth by shifting investment into higher-return projects. However, other research suggests that, in some circumstances, lower risk can slow growth. They particularly show that reduced risk through international diversification can reduce saving rates, slow growth and more importantly reduce economic welfare.

The third channel is in the area of information acquisition. Stock market, according to Spears (1991) and Kiviet (1995) can spur economic growth through acquisition of information. Larger and more liquid stock market will make it easier for investors who have gotten information to trade at posted prices (Levine and Zervos, 1996). The investors are able to make money before the information become widespread and prices change. This ability to profit from information about firms will stimulate investors to research and monitor firms. Jensen and Murphy (1988) show that efficient stock markets help mitigate the principal-agent problem. It makes it easier to tie managerial compensation to stock performance. In addition, takeover threats induce managers to maximize a firm's equity price.

The last channel through which the stock market affects economic growth is through savings mobilization. It has been suggested that large, liquid and efficient stocks markets can cause savings mobilization. By agglomeration of savings, stock markets enlarge the set of feasible investment projects (Levine and Zervos, 1996). Since some worthy projects require large capital investment, and some enjoy economies of scale, stock markets facilitate resource mobilization and can boost economic efficiency and accelerate long-run growth. From another perspective, however, it has been argued that new equity issues account for very small frontiers of corporate investment (Mayer, 1988). This casts doubt on the potency of stock markets for amassing capital.

METHODOLOGY OF THE STUDY

Data Issues

The study used annual time series data spanning from 1986 to 2019; the data for the study were sourced from the annual statistical bulletins of the Central Bank of Nigeria (CBN), CBN annual reports, and the statistical bulletins of the National Bureau of Statistics (NBS). The data were collected on manufacturing output, market capitalization, stock market liquidity, and total new issues.

Model Specification

The study used the structural Vector Autoregressive (SVAR) model to investigate the impact of stock exchange development on the performance of the manufacturing sector in Nigeria.

Thus, the functional form of the model relating stock market development and manufacturing output can be expressed as follows, following the theoretical foundations of the efficient market hypothesis, and Tobin's q-theory of investment.

$$MO = f(MCAP, TNI, SML) \ldots \quad (1)$$

where:

MO = Manufacturing output

$MCAP$ = Market capitalization

TNI = Total new issues

SML = Stock market liquidity

The variables in model 1 will enter the SVAR model in their level form. Thus, utilizing an SVAR(1) with 4 variables, the model can be expressed in the form:

$$Z = [mo,\ mcap,\ tni,\ sml]' \ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Thus, to justify specifications of the order of our variables in our model yield the under listed transposed matrix of the form:

$$mo_t = f(mo_{t-1}, mcap_{t-1,} tni_{t-1} sml_{t-1,} mcap_{t,} tni_{t,} sml_t) \ldots\ldots\ldots 3$$

$$mcap_t = f(mo_{t-1}, mcap_{t-1,} tni_{t-1} sml_{t-1,} mo_{t,} tni_{t,} sml_t) \ldots\ldots\ldots 4$$

$$tni_t = f(mo_{t-1}, mcap_{t-1,} tni_{t-1} sml_{t-1,} mcap_{t,} mo_{t,} sml_t) \ldots\ldots\ldots 5$$

$$sml_t = f(mo_{t-1}, mcap_{t-1,} tni_{t-1} sml_{t-1,} mcap_{t,} mo_{t,} tni_t) \ldots\ldots\ldots 6$$

Thus, the exposition of the normalized SVAR(1) system of equation yields:

$$mo_t = \beta_{11}^1 mo_{t-1} + \beta_{12}^1 mcap_{t-1} + \beta_{13}^1 tni_{t-1} + \beta_{14}^1 sml_{t-1} + \beta_{12}^0 mcap_t + \beta_{13}^0 tni_t + \beta_{14}^0 sml_t + \varepsilon_{1t} \ldots\ldots\ldots 7$$

$$mcap_t = \beta_{21}^1 mo_{t-1} + \beta_{22}^1 mcap_{t-1} + \beta_{23}^1 tni_{t-1} + \beta_{24}^1 sml_{t-1} + \beta_{21}^0 mo_t + \beta_{23}^0 tni_t + \beta_{24}^0 sml_t + \varepsilon_{2t} \ldots\ldots\ldots 8.$$

$$tni_t = \beta_{31}^1 mo_{t-1} + \beta_{32}^1 mcap_{t-1} + \beta_{33}^1 tni_{t-1} + \beta_{34}^1 sml_{t-1} + \beta_{31}^0 mo_t + \beta_{32}^0 mcap_t + \beta_{34}^0 sml_t + \varepsilon_{3t} \ldots\ldots\ldots 9$$

$$sml_t = \beta_{41}^1 mo_{t-1} + \beta_{42}^1 mcap_{t-1} + \beta_{43}^1 tni_{t-1} + \beta_{44}^1 sml_{t-1} + \beta_{41}^0 mo_t + \beta_{42}^0 mcap_t + \beta_{43}^0 tni_t + \varepsilon_{4t} \ldots\ldots\ldots 10$$

Collecting the contemporaneous effects to the left hand side (LHS) yields and presenting in a matrix form, the overparameterized SVAR model is specified as:

$$\begin{bmatrix} 1 & -\beta_{12}^0 & -\beta_{13}^0 & -\beta_{14}^0 \\ -\beta_{21}^0 & 1 & -\beta_{23}^0 & -\beta_{24}^0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 & -\beta_{34}^0 \\ -\beta_{41}^0 & -\beta_{42}^0 & -\beta_{43}^0 & 1 \end{bmatrix} \begin{bmatrix} mo_t \\ mcap_t \\ tni_t \\ sml_t \end{bmatrix} = \begin{bmatrix} \beta_{11}^1 & \beta_{12}^1 & \beta_{13}^1 & \beta_{14}^1 \\ \beta_{21}^1 & \beta_{22}^1 & \beta_{23}^1 & \beta_{24}^1 \\ \beta_{31}^1 & \beta_{32}^1 & \beta_{33}^1 & \beta_{34}^1 \\ \beta_{41}^1 & \beta_{42}^1 & \beta_{43}^1 & \beta_{44}^1 \end{bmatrix} \begin{bmatrix} mo_{t-1} \\ mcap_{t-1} \\ tni_{t-1} \\ sml_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \end{bmatrix} \ldots\ldots 11$$

Hence, $A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t \ldots\ldots\ldots 12$

Where:

$A_0 =$ 4×4 matrix of contemporaneous effects of endogenous parameters

$Z_t =$ 4×1 column vector matrix of estimable endogenous variables

A_1 = 4×4 matrix of estimable endogenous variables

Z_{t-1} = 4×1 column vector matrix of lagged estimable endogenous variables

ε_t = 4×1 column vector matrix of error terms in the system.

The above model cannot be estimated using SVAR because the number of parameters are more than the number of equations. Since we cannot estimate an overparameterized model, based on economic theory and institutional knowledge, certain restrictions will be imposed on some parameters of the A_0 matrix in order to resolve the problem of identification in SVAR. Following the recursive approach, we can impose restrictions on the upper elements above the matrix diagonal to zero. In other words, we set $-\beta_{12}^0 = -\beta_{13}^0 = -\beta_{14}^0 = \beta_{23}^0 = \beta_{24}^0 = \beta_{34}^0 = 0$.

Therefore, the generic SVAR model can be specified as:

$$A_0 Z_t = A_1 Z_{t-1} + A_2 Z_{t-2} + \ldots + A_P Z_{t-P} + \varepsilon_t \ldots\ldots\ldots 13$$

$$\Rightarrow A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t \ldots\ldots\ldots 14$$

Where:

A_0 =matrix of coefficients of contemporaneous effects

Z_t =vector matrix of estimable endogenous variables

A_1 =matrix of coefficients of parameters

Z_{t-1} =vector matrix of lagged endogenous variables

$\varepsilon_t = B\eta_t$ = vector matrix of uncorrelated structural shocks to the system.

With var(ε_{it}) set to unity and A_0 being chosen to capture the contemporaneous interactions among the z_t, along with the standard deviation of the structural shocks in the model.

Since most macroeconomic variables are recursive in nature, restricting A_0 matrix above in the recursive specification yields:

$$mo_t = lags + \varepsilon_{1t} \ldots\ldots\ldots 15$$

$$mcap_t = \beta_{21}^0 mo_t + lags + \varepsilon_{2t} \ldots\ldots\ldots 16$$

$$tni_t = \beta_{31}^0 mo_t + \beta_{32}^0 mcap_t + lags + \varepsilon_{3t} \ldots\ldots\ldots 17$$

$$sml_t = \beta_{41}^0 mo_t + \beta_{42}^0 mcap_t + \beta_{43}^0 tni_t + lags + \varepsilon_{4t} \ldots\ldots\ldots 18$$

Thus, the parsimonious form of equations 15 – 18 is specified in a triangular matrix below:

$$A_0 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 & 0 \\ -\beta_{41}^0 & -\beta_{42}^0 & -\beta_{43}^0 & 1 \end{bmatrix} \begin{bmatrix} mo_t \\ mcap_t \\ tni_t \\ sml_t \end{bmatrix} = \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \end{bmatrix} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..19$$

A_0 =From our equation (3.14), where $A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t$,

We know that:

$$\varepsilon_t = B\eta_t$$

And $B = \begin{bmatrix} \sigma_1^2 & 0 & 0 & 0 \\ 0 & \sigma_2^2 & 0 & 0 \\ 0 & 0 & \sigma_3^2 & 0 \\ 0 & 0 & 0 & \sigma_4^2 \end{bmatrix}$ = unit variance, i.e., var (η_t) = 1

$$A_0 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 & 0 \\ -\beta_{41}^0 & -\beta_{42}^0 & -\beta_{43}^0 & 1 \end{bmatrix} \begin{bmatrix} mo_t \\ mcap_t \\ tni_t \\ sml_t \end{bmatrix} = \begin{bmatrix} \sigma_1^2 mo & 0 & 0 & 0 \\ 0 & \sigma_2^2 mcap & 0 & 0 \\ 0 & 0 & \sigma_3^2 tni & 0 \\ 0 & 0 & 0 & \sigma_4^2 sml \end{bmatrix} \begin{bmatrix} u_{t^{mo}} \\ u_{t^{mcap}} \\ u_{t^{tni}} \\ u_{t^{sml}} \end{bmatrix}$$

One of the restrictions was used in this work is by making the system recursive. Proposed by Wold (1951), this assumes that A_0 is typically lower triangular and the structural shocks are uncorrelated. This is a method of identifying the parameters of structural equations. Wold's suggestion reduces the number of unknown parameters to exactly the number estimated in the summative model.

More so, A_0 whichis a lower triangular matrix, measures the contemporaneous effects or long run path. This implies that $\mathrm{var}(\varepsilon_{1t}) = \sigma_1^2$, $\mathrm{var}(\varepsilon_{2t}) = \sigma_2^2$, $\mathrm{var}(\varepsilon_{3t}) = \sigma_3^2$, $\mathrm{var}(\varepsilon_{4t}) = \sigma_4^2$ such that $\mathrm{cov}(\varepsilon_{1t}\varepsilon_{2t}\varepsilon_{3t}\varepsilon_{4t}) = 0$. The zeros at the upper diagonal imply that there must be no serial correlation among the structural shocks in the model. The B matrix measures the structural shocks in the SVAR system. Note that, the lower triangular matrix of variances of the parameters changes to zeros. Furthermore, it is also set to avoid spillover effects of the shocks on other variables in the model. That is Ω_S and Ω_S is a diagonal matrix.

This implies that our normalized SVAR of the form $A_0 Z_t = A_1 Z_{t-1} + \varepsilon_t$ reduces to $A_0 e_t = B\eta_t$.

But we know that $B\eta_t = Bu_t$. Hence, the baseline line for our estimable SVAR model can be specified in the reduced form as:

$$A_0 e_t = Bu_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 20$$

In matrix form, we have:

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 & 0 \\ -\beta_{41}^0 & -\beta_{42}^0 & -\beta_{43}^0 & 1 \end{bmatrix} \begin{bmatrix} mo_t \\ mcap_t \\ tni_t \\ sml_t \end{bmatrix} = \begin{bmatrix} \sigma_1^2\, mo & 0 & 0 & 0 \\ 0 & \sigma_2^2\, mcap & 0 & 0 \\ 0 & 0 & \sigma_3^2\, tni & 0 \\ 0 & 0 & 0 & \sigma_4^2\, sml \end{bmatrix} \begin{bmatrix} u_{t^{mo}} \\ u_{t^{mcap}} \\ u_{t^{tni}} \\ u_{t^{sml}} \end{bmatrix}$$

$$A_0\, e_t \qquad = \qquad B \qquad\qquad u_t$$

Where: A_0 = matrix of long run contemporaneous effects

e_t = column vector matrix of errors for the respective variables

B = matrix of structural shocks in the model

u_t = column vector matrix of structural shocks in the model

Hence the "S" matrix is specified as:

$$e_t = A_0 B u_t = \begin{bmatrix} e_{t^{mo}} \\ e_{t^{mcap}} \\ e_{t^{tni}} \\ e_{t^{sml}} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ -\beta_{21}^0 & 1 & 0 & 0 \\ -\beta_{31}^0 & -\beta_{32}^0 & 1 & 0 \\ -\beta_{41}^0 & -\beta_{42}^0 & -\beta_{43}^0 & 1 \end{bmatrix} \begin{bmatrix} u_{t^{mo}} \\ u_{t^{mcap}} \\ u_{t^{tni}} \\ u_{t^{sml}} \end{bmatrix}$$

This represents the initial impact of shocks in the SVAR model. The impulse responses were used to determine the final impact of shocks in the SVAR model.

Thus, the impact of the stock market development on manufacturing output in Nigeria can be seen through the following channels.

i) $-\beta_{21}^0$ is expected to measure the effect of market capitalization on manufacturing output.

ii) $-\beta_{31}^0$ is expected to measure the impact of total new issues on manufacturing output.

iii) $-\beta_{41}^0$ is expected to measure the impact of stock market liquidity on manufacturing output.

iv) $-\beta_{32}^{0}$ is expected to measure the impact of total new issues on market capitalization.

v) $-\beta_{42}^{0}$ is expected to measure the impact of stock market liquidity on market capitalization.

vi) $-\beta_{43}^{0}$ is expected to measure the impact of stock market liquidity on total new issues.

EMPIRICAL RESULTS

First, the study tested for the stationarity properties of the series used in the SVAR model using the Augmented Dickey-Fuller (ADF) unit root test. The results are presented in Table 1.

Table 1 The ADF Test Results

Variables	Level	5% Critical values	First Difference	5% Critical Values	Prob. Values	Remarks
mcap	-1.874335	-2.922449	-5.78980**	-2.923780	0.0000	I(1)
Sml	-1.911864	-2.922449	-6.47590**	-2.923780	0.0000	I(1)
Tni	-2.163882	-2.925169	-8.26373**	-2.925169	0.0000	I(1)
Mo	-1.364130	-2.925169	-3.77271**	-2.925169	0.0299	I(1)

Sources: Authors' Computation using Eviews 10

**Denotes 5% level of significance

Table 1 shows the ADF results for the series used in the model, the results revealed that all the variables were not stationary at level. After differencing once, all the series became stationary since at first difference the absolute values of the computed ADF test statistics are greater than the critical values at 5% level significance. This leads to the rejection of the null hypotheses that the series have unit root and the acceptance of the alternate hypotheses that the series do not have unit root. This implies that all series have mean reverting ability. That is, any shock to the series will fade away with passage of time.

Given the outcome of the unit root test, the Johansen co-integration test was used as the most appropriate long-run test statistic and the results are presented as follows:

Table 2a: Rank Test (Trace)

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.528978	87.04403	47.85613	0.0000
At most 1 *	0.494012	50.90721	29.79707	0.0001
At most 2 *	0.219133	18.20757	15.49471	0.0190
At most 3 *	0.123636	6.334756	3.841466	0.0118
Trace test indicates 4 cointegratingeqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Authors' Computation using Eviews 10

Table2b: Rank Test (Maximum Eigenvalue

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.528978	36.13683	27.58434	0.0031
At most 1 *	0.494012	32.69963	21.13162	0.0008
At most 2	0.219133	11.87282	14.26460	0.1155
At most 3 *	0.123636	6.334756	3.841466	0.0118
Max-eigenvalue test indicates 2 cointegratingeqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Authors' Computation using Eviews 10

From Table 2a, the Trace rank test has indicated four co integrating equations at 5% level of significance; while the Maximum Eigenvalue rank test in Table 2b has indicated two co integrating equations at 5% level of significance. Thus, both the Trace rank test and the

Maximum Eigenvalue rank test have indicated the presence of long-run relationship between stock market development indicators and manufacturing output in Nigeria.

In order trace the impact of stock market development indicators on the manufacturing output in Nigeria, the contemporaneous matrix was estimated and the results are presented in the following table:

Table 3: Estimated Contemporaneous Structural Parameters

	MCAP	SML	TNI	MO
MCAP	1	0	0	0
SML	0.1709	1	0	0
TNI	0.0609	0.1110	1	0
MO	0.4824	0.0314	0.0216	1

Source: Authors' Computation using Eviews 10

The estimated contemporaneous structural parameters have shown that there is a positive and statistically significant relationship between market capitalization and manufacturing output in Nigeria in the short-run given the period of this study. This means that a 1% increase in the contemporaneous effect of market capitalization will lead to 0.4824% increase in the manufacturing output in Nigeria. Also, the estimated contemporaneous structural parameters have shown that there is a positive and statistically significant relationship between stock market liquidity and manufacturing output in Nigeria in the short-run. This implies that a 1% increase in the contemporaneous effect of stock market liquidity will lead to 0.0314% increase in the manufacturing output in Nigeria. Finally, the estimated contemporaneous structural parameters have indicated that there exists a positive and statistically significant relationship total new issues and the manufacturing output in the short-run in Nigeria. This means that a 1% increase in the contemporaneous effect of total new issues will lead to 0.0216% increase in the manufacturing output in Nigeria.

Impulse Response Functions

The Impulse Response Functions (IRF) show the response of each variable in the system to shocks from the system variables. In order to further buttress how manufacturing output in Nigeria responses to changes in stock market development indicators, the impulse response functions were computed and the results are presented in the following figures:

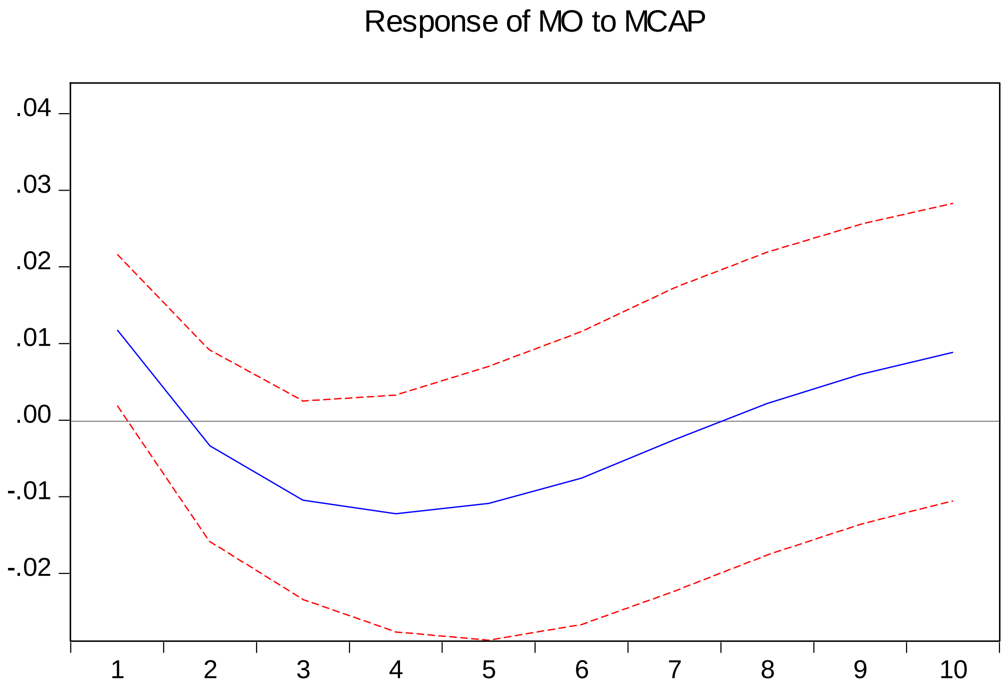

Figure 1: Impulse Response Manufacturing Output to Cholesky One Standard Deviation of Market Capitalization

The impulse response graph in Figure 1 shows the response of the manufacturing output to one standard deviation innovation in market capitalization in Nigeria. In the first quarter, the response of manufacturing output was positive but declined and became negative in the second quarter and maintained this negative trend up to the seventh quarter when it turned positive. From the seventh quarter, the response maintained a positive movement through to the tenth quarter. This positive effect after the seventh quarter appears to be permanent. This suggests that with the capitalization of the stock market, firms in the manufacturing sector can raise long term capital that can increase their output in the long-run.

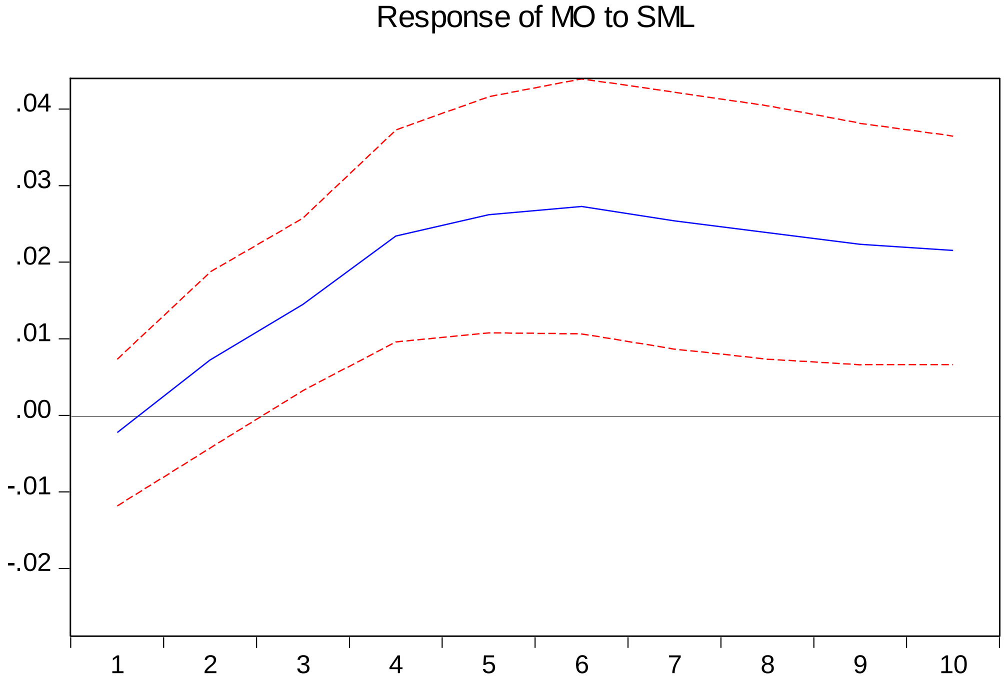

Figure 2: Impulse Response Manufacturing Output to Cholesky One Standard Deviation of Stock Market Liquidity

The impulse response graph in Figure 2 shows the response of manufacturing output to one standard deviation innovation in stock market liquidity. A cursory look at the figure reveals that the manufacturing output responses positively to one standard deviation in stock market liquidity throughout the forecast period. The positive response appears to be permanent, implying that if the stock market is liquid, manufacturing firms in Nigeria can raise long term capital to increase their output.

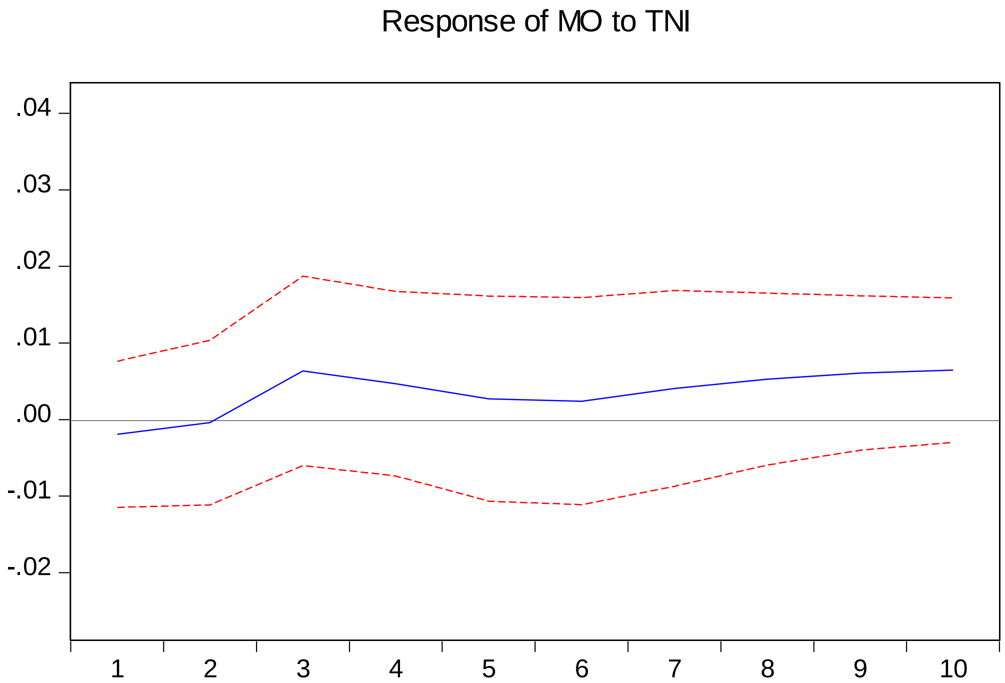

Figure 3: Impulse Response of Manufacturing Output to Cholesky One Standard Deviation of Total New Issues

The impulse response graph in Figure 3 shows the response of the manufacturing output to one standard deviation innovation in total new issues in the Nigerian stock market. A close at the figure reveals that from the first quarter to the second quarter, the manufacturing output responses negatively to one standard deviation in innovations in the total new issues in the Nigerian stock market; but after the second quarter, the response turns positive and maintained a low positive trend through to the tenth quarter of the forecast horizon. This suggests that when new shares are issued by the manufacturing firms on the stock exchange, long term capital are raised which tends to increase the output of such manufacturing firms.

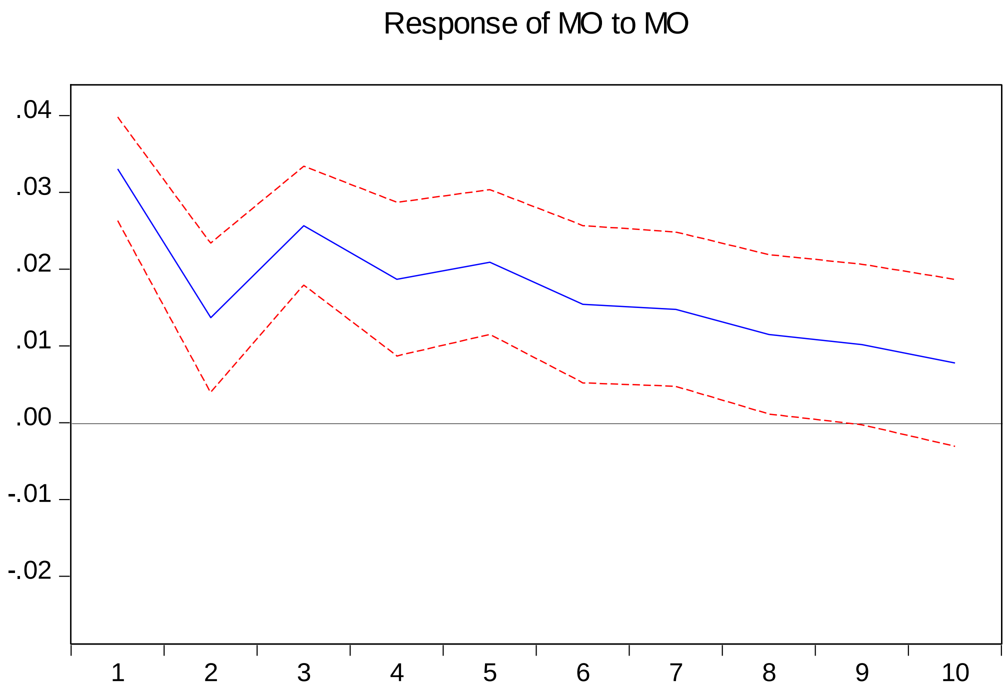

Figure 4: Impulse Response of Manufacturing Output to Cholesky One Standard Deviation of the Manufacturing Output

The impulse response graph in Figure 4 shows the response of manufacturing output to one standard deviation innovation in the manufacturing output. A cursory look at the figure shows that the response of the manufacturing output to its own standard deviation innovation is positive but it has maintained a continuous declining trend though within the positive region throughout the forecast period. This may be attributable the contributions of the other variables in the model which are good predictors of the manufacturing output.

Forecast Error Variance Decomposition

The Forecast Error Variance Decomposition (FEVD) provides information about the proportion of movements in a sequence due to its own shocks and the shocks due to other variables in the system. The variance decomposition separates the variation in an endogenous variable into the component shocks to the SVAR. Thus, the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the SVAR. The variance decomposition analysis provides a means of determining the relative importance of shocks in explaining variations in the variable of interest. It gives the proportion of the forecast error variance of a variable that can be attributed to its own innovations and to that of other variables.

Thus, the FEVD was estimated to show the response of the manufacturing output due to its own shocks and the shocks due to other variables in the system. The results are presented in the following table.

Table 4: Variance Decomposition of the Manufacturing Output

Variance Decomposition of MO:					
Period	S.E.	MCAP	SML	TNI	MO
1	0.035230	11.14982	0.408974	0.304309	88.13689
2	0.038620	10.03571	3.826670	0.264088	85.87353
3	0.050096	10.32579	10.62487	1.762765	77.28658
4	0.059821	11.40646	22.78228	1.843854	63.96742
5	0.069486	10.90409	31.10264	1.518976	56.47429
6	0.076638	9.938999	38.24002	1.344285	50.47670
7	0.082222	8.730803	42.77716	1.411145	47.08089
8	0.086572	7.938227	46.18819	1.643444	44.23014
9	0.090393	7.716184	48.48523	1.960390	41.83819
10	0.093891	8.043140	50.20257	2.287708	39.46659
Cholesky Ordering: MCAP SML TNI MO					

Source: Authors' Computation using Eviews 10

The variance decomposition results revealed that own shocks of the manufacturing output are dominant from first quarter to the seventh quarters. It however, declines from 88.14% from the first quarter and became 47.08% in the seventh quarter; meaning that the variables, market capitalization, stock market liquidity and total new issues are the predictors of manufacturing output in Nigeria. A unit change in market capitalization accounts for about 11.15% in the forecast error variance of the manufacturing output in the first quarter and the results appear to decline gradually to 8.04% in the tenth quarter. For stock market liquidity, a unit change in stock market liquidity is able to explain about 0.41% in the forecast error variance of the manufacturing output in the first quarter and the results appear to improve significantly to 50.20% in the tenth quarter. From the eighth quarter the contribution of stock market liquidity to changes in the manufacturing output became dominant. Also, a unit change in total new issues accounts for 0.30% in the forecast error variance of RGDP in the first quarter and the impact appear to increase gradually to 2.29% in the tenth quarter.

The implication of these variance decomposition results is that market capitalization, stock market liquidity and total new issues are good predicators of manufacturing output in Nigeria.

CONCLUSION AND POLICY IMPLICATIONS

Based on the foregoing analysis, it was found that stock market development indicators namely, market capitalization, stock market liquidity and total new issues have positive impact on the manufacturing output both in the short and long-run in Nigeria. This means that if the stock market is efficient in its operations, manufacturing firms can raise long term capital for investment. The implication of this is that conscious efforts should be made to make the Nigerian Stock Exchange Market efficient so that manufacturing firms can raise long term funds for investment. This will immensely help the economy to achieve its diversification quest via the Economic Recovery and Growth Plan (ERGP). Also, improving manufacturing productivity will immensely benefit the economy following the signing of the African Continental Free Trade Area Agreement. This is because the manufacturing output will form the export base for the Nigerian economy.

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