An Examination of Manufacturing Sector Responses to Government Monetary and Trade Policies in the Nigerian Economy

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Abstract
This study examines the impact of government policies on manufacturing sector with the aim of ascertaining the implication on the overall growth in Nigeria. Vector auto-regression (VAR) is employed to capture the contemporaneous responses of manufacturing value added to government such as monetary and trade policies. It is found that government policy on manufacturing is not significant in the long run. In the forecast error decomposition of manufacturing valued added (MVAD) relative to monetary policy, own shocks are major causes of fluctuation. Response of MVAD to policy is negative in the short-run but tends towards neutral in the long run. In other words, monetary and trade policies are ineffective to address manufacturing sector performance in Nigeria. Non-monetary policy factor such as stabilization of economic environment where manufacturing sector operates is suggested. In addition, supply side policies like subsidy and infrastructure may provide a more relevant answer.

Keywords: *Government Policy, Manufacturing Value Added, Economic Growth, Impulse Responses*

Introduction

The responses of manufacturing sector to government policies in Nigeria have been the subject of debate since the past four decades. It became a critical issue in the 1980s when the import substitution industrialization (ISI) policy failed to achieve the projected results. The export promotion policy that followed in the mid-1980s, liberalization and deregulation policies in 1990s, and privatization and commercialization in 2000s provide meagre solutions. Recent trend in industrial plan dates back to 2014 when the government launched the Nigerian Industrial Revolution Plan (NIRP). “The NIRP is clearly a recognition of the embarrassingly modest contribution of the manufacturing sector, less than 7 per cent, to (Nigeria’s) gross domestic product (GDP)” (Boyo, 2014). However, for almost two years now, the NIRP and its counterpart project, the National Enterprise Development Progarmme (NEDEP) seems to have followed the same traits of undesirable outcome for industrial policy in Nigeria.

Industrial development, especially of the manufacturing sector, is a crucial component of the goal of macroeconomic policy of the government in Nigeria (Agba, 2004).The importance of manufacturing sector, particularly the small-scale manufacturing firms, to economic growth cannot be overemphasized. The sector plays a catalytic role in a modern economy and has many dynamic benefits that are crucial for economic transformation such as employment generation and self-sufficiency. These have in many respects made the manufacturing sector a leading sub-sector (Loto, 2005). In the modern world, manufacturing sector is regarded as one of the benchmarks for measuring a nation’s economic efficiency (Amakom, 2012; Ibbih & Gaiya, 2013). Therefore, discussion on economic growth and development in any country may be incomplete without focusing on government policy as it relates to the manufacturing sector.

Most developing economies in Africa, Latin America and Asia have undergone quite a varying degree of structural transformation since the Second World War. What became the order of the day in the Post-Second World War independent African countries were the quest for vibrant nationalist movement, increase political movement, and the need to fashion the economic prosperity after the advanced countries of the North. This incorporates import-substitution industrialization and the consequent high degree of economic closeness and structural rigidities. However, the failure of these policies to yield the desirable expectations in the 1970s and early 1980s ushered in new growth strategies characterized by structural (transformation) ideologies. Nigeria is one of the developing African countries that have adopted liberalization and structural changes approaches to economic management. Since independence and till now, import substitution and export promotion have been some of the critical policies involved in the realization of economic growth. However, this study focuses on the manufacturing sector as a key factor in the quest for growth. It examines the responses of the manufacturing sector to government monetary and trade policies unlike import substitution and export promotion industrialization policies.

Many studies exist on the connection between the manufacturing sector and economic growth but only few have examined critically the economic strategic policy that holds manufacturing in place and fewer still have ever looked into critical responses of manufacturing value added to some aspects of macroeconomic policies in Nigeria. Few studies have focused on the history and impact of macroeconomic schemes on industrial sector (Agenor & Montiel 2008). In Nigeria and Africa, Agba (2004) and Amakom (2012) have examined the connection between government policy and manufacturing sector. Their emphasis was however on industrial than monetary policy. Most of these studies play-down on the responses of manufacturing sector output to government policy which may engender long term multiplier effects on the macro economy. The objective of this study is to examine the responses of manufacturing output, in terms of value added, to government policy in the Nigerian economy. The important questions that emerge with respect to the study objective are: "What impact does interest rate have on manufacturing value added in Nigeria? Do the government trade policies (exchange rate and economic openness) have any impact on the manufacturing sector in the Nigerian economy?" The study is expected to enrich the literature and give policy makers new policy options advantage.

The study is divided into four sections: Section one discusses the introduction of the study where a brief background analysis is prepared. Section two focuses on the literature review, theoretical issues and methodology. Section three is concerned with presentation and discussion of regression results. Finally, section four which is the last segment comprises the summary, conclusion and recommendations.

Literature Review and Theoretical Framework

Literature Review

The relevance of manufacturing sector to the economy has generated intense debate over the years. Most literature on the manufacturing sector focus on the sector's significance to the national output and employment. In developing countries, the need to incorporate manufacturing into economic growth is considered to be an imperative for economic development. Therefore, taking account of responses of the sector to industrial policy within macroeconomic framework is assumed to the wise. This study proposes an alternative dimension to manufacturing sector and government policies nexus. More specifically macroeconomic variables represent government policies and are employed to address manufacturing problems in Nigeria. The variables employed are both monetary policy and trade policy. These include interest rate, exchange rate and economic openness.

Quite a number of empirical literature have been on industrial policy with focus on the role of government in creating macroeconomic balance and formulating appropriate policy mix between extreme control system and liberal market fundamentalism. For instance, the control system in Nigeria seems to be patterned along structural transformation normative ideology of the political class. Also discussed is the need to create incentives for growth of manufacturing industries. Nnanna, *et al.*, (2003), Adejugbe, (2006), Mordi *et al.*(2010) and Ajakaiye (2015) are a few prominent authors who have painstakingly underscored the crucial role of planning and industrial policy in economic growth and development.

Using a descriptive analysis, Adejugbe (2006) emphasized that conducive atmosphere must be created where industrialization policy objectives can be enhanced through creative activities that harnesses resources meaningfully. He added that policies and laws that are established by manufacturing industries are linked with home grown intermediate inputs. He however deplored the import substitution policy of the late 1970s to early 1980s which generated negative returns as a result of excessive import of finished goods and consequent adverse balance of payments. This condition was observed by Singer (1989), in (Adejugbe, 2006), "the most import weakness of the import substituting industrialization was that it failed to substitute for imports, as a result of lack of vertical integration with the host economy".

The role of macroeconomic policies, particularly monetary and trade policies, received no attention from these authors. Analyses were descriptive, excluding a more scientific econometrics method. For instance, Egwaikhide (1999) pointed out the intricacy of exchange rate on demand for raw materials and the industrial sector. He noted that in the absence of an increased domestic supply of raw materials, the growth of the industrial sector is expected to raise the demand for imported raw materials, pushing upward demand for foreign exchange. Golub (1994) maintained that exchange rate changes can alter the competitiveness of all sectors simultaneously, thereby altering the point at which the chain of comparative advantage is cut. The intricacies of interest rate on demand for loanable fund and investment in real sector are often overlooked. The Keynesian economists recommended that lower interest rate may increase investment, (Tomori, 2006), (McKinnon, 1973) and Shaw (1973) recommended high interest rate financial instruments. The authors predict that a positive economic growth effect may occur arising from positive real interest rate. Further literature on the subject are reviewed in the next session. However, none considers the responses of interest rate and exchange rate on the manufacturing sector. Moreover, the authors tend to focus on responses of manufacturing output volume other than the manufacturing value added.

Falokun and Chete (2004), Adeyemi (2011), and Ajakaiye (2015) recommended the role of planning and industrial policy. Falokun and Chete recommended the non-parametric approach of the factor decomposition of changes in industrial output as suggested by Torii and Fukasaku (1984). The approach allows the determination of the contribution of the industrial sector to each of domestic demands, imports, exports and technology. They observed that industrial growth in

Nigeria has different periodic pattern of outcome and recommended that industrial policy (in 2004) should be modified to enhance stimulation of industrial growth in line with the 1980-1985 experience, a period of favourable pattern of industrial growth in Nigeria. As complementarity factor, Ajakaiye (2015), Adeyemi (2011) and Nnanna *et al.* (2003) also recommended planning in the way recommended by Falokun and Chete in mostly their descriptive methodologies. Ajakaiye specifically recommended development of non-oil sector, particularly the manufacturing sub-sector, to enhance relief on over-dependence on oil and gas. Adeyemi (2011)recommended that "government and private sector should collaborate to set up new industrial parks where infrastructural facilities can be shared to reduce the cost of operations individually". Nnanna *et al*, (2003) recommended that formulation of industrial policies should have as its central focus the creation of enabling investment climate anchored on macroeconomic stability, export promotion, streamlining of the role of government, fortification of industrial facilities, greater participation of the private sector in the industrialization process, and the promotion of small-scale industrial enterprises among others.

Stiglitz (1996) in a rather cautious analysis on the East Asian Miracles, the "Asian Tigers", based on case studies, econometric data, and economic theory investigated the policies that contributed to the success of these economies: Hong Kong, Indonesia, Japan, the Republic of Korea, Malaysia, Singapore, Taiwan (China), and Thailand. This has been the subject of debate since the late 1990s. Stiglitz observed that although the government takes heavy responsibility in the industrialization of these economies, that the governments subsidize a sector that grew rapidly does not suggest that the growth should be credited to the government's action. The sector might have as well grown without government intervention. He observed that many countries which tried to replicate the East Asian Miracles, that is, what the government did to improve the economy, with adverse rather than positive effects. For instance, he explained that "they created development banks, only to find that the development banks diverted scarce savings into projects with low returns and made investments that did more to line the pockets of politicians than to raise the welfare of the country". The conclusion of Stiglitz in the Asian Miracle was in agreement with Mordi *et al* (2010), Nnanna, (2003) and Ekpo (2004). He remarked that there was nexus of policies, varying from country to country, and sharing the common characteristics and similar approach discussed above, that is active governments' intervention in the market, complemented regulation, and indeed established markets, rather than displaced them. In addition, governments also created enabling environment for markets to flourish and promoted exports, education, and technology; encouraged collaboration between government and manufacturing industry and between firms and their employees; and simultaneously encouraged competition.

Theoretical Issue

The 19th century and early 20th century classical economists propounded the theoretical causes of economic growth which excluded manufacturing productivity and policy effects but rather assumed perfect substitutability of factors and constant return to scale in production. This is the basis of the models developed by Harrod (1939), Domar, (1947) and Solow (1956). Although traditional theory of economic growth tends toward long-run theory, it concentrates on the effects of saving and investment in raising potential output and ignores short-run fluctuations of actual output around potential, (Lipsey & Ragan, 2008). In addition, it assumes the more the national saving increases in the long run, ceteris paribus, the more the increase in the level of investment and potential GDP. That is with the paradox of thrift held constant, economy with a high national savings would have high investment rates and high real GDP growth rates.

In the late 1980s however, another school of thought assumed increasing returns (to scale of production) based on innovations, technical progress, education and training. These are the basic ideologies behind the endogenous growth theory Romer, (1988), Grossman and Helpman, (1991). Additionally, government policies outline in development planning also play important role in the economic growth argument. Ajakaiye (2015) Adeyemi(2011), Mordi *et al*(2010), Diejomaoh (2008), Adejugbe, (2006), and Alokan, (2004). Kayode (1987) describe industry and particularly, the manufacturing sub-sector, as the heart of the economy. Nnanna *et al* (2003) submits that in the development literature, there is wide acceptance of industrialization as a significant driving force of the modern economy of which manufacturing plays an essential role.

The informal growth of Wagner (1883) and Kaldor-Verdoorn's, (1976) are discussed in the literature. Wagner highlighted the important role of government in promoting economic growth. He explains that the relationship between government expenditure and economic growth might exist since government expenditure seems to vary directly with economic expansion. Wagner observed that the growth in public expenditure is a natural consequence of economic growth, (Verma and Arora, 2010). Wagner implicitly implies that with economic growth, industrialization and modernization would take place and these would reduce public sector's role relative to private sector. Conversely, Kaldor-Verdoorn's law (1976) viewed economic growth as an increasing function of manufacturing productivity. That is, manufacturing, other than government expenditure in the case Wagner's, determines economic growth. Kaldor-Verdoorn's law expatiates that the faster the rate of growth of manufacturing sector, the faster the growth of total national output; secondly, the faster the growth of manufacturing, the faster the growth of labour productivity in manufacturing; and thirdly, the faster the growth of manufacturing the faster the growth of productivity outside manufacturing". The law implicitly attempts to explain differences in the growth performance of nations outside the neoclassical paradigm and debunk the constant return to scale and equilibrium theory of the neoclassical economics in favor of disequilibrium (Thirlwall, 1983). However, these theoretical views do not examine causes of manufacturing growth. On the other hand, the Wagner's law does not necessarily emphasize manufacturing sector.

Nevertheless, the theoretical literature further contends that careful study of the structure of a country may enhance appropriate policy design. For instance, in most developing countries like Nigeria where government takes the center stage and the biggest determining factor in the national expenditure, the connection of government policy with other sectors may be a serious phenomenon to overlook. According to Taylor, (2004), examining a country from the structural perspective enhances devising better relevant economic policy that gives plausible answers to economic backwardness. Taylor emphasized that economic laws are not immutable. Rather they depend on the structural, institutional, and social composition of a country.

It is quite clear from the Wagners's and Kaldor-Verdoorn's hypotheses that both government expenditure and manufacturing sector can cause economic growth. Therefore, examining Nigerian manufacturing sector relative to government macroeconomic policies is necessary. This is because inference can be drawn that manufacturing sector and government policy may follow ambiguous consequences and this needs to be unraveled.

Theoretical Framework and Methodology

Theoretical Framework

The theoretical framework of Wagner's law states there is a relationship between government expenditure and economic growth and the Kaldor-Verdoorn's law states there is a relationship between economic growth and manufacturing sector. The two expressions are represented quantitatively below:

$$GEXP = f(Y_g) \quad \text{------------} \quad 1$$

$$Y_g = f(MAN_g) \quad \text{------------} \quad 2$$

where:

$GEXP$ = *Government expenditure*

Y_g = *economic growth represented by national output GDP*

MAN_g= *Growth of manufacturing sector's output*

In most developing countries like Nigeria, government component of the aggregate expenditure is essential in determining rate of growth as well as the sectoral growth. Often, such countries devise industrial policy to enhance multi-sectoral growth. We can assume manufacturing as a function of government policy $\{MAN = f(GOVT)\}$; where *GOVT* can be disaggregated and proxy by government fiscal policy*(FP)*: (expenditure on human capital), monetary policy*(MP)*: (interest rate and exchange rate), and trade policy*(TP)* (economic openness). With reference to Adenikinju and Olofin (2000), determinant of manufacturing may be stated as follow:

$$MAN = f(FP, MP, TP).$$

Where:

FP= Government fiscal policy

MP = Government monetary policy

TP= Government trade policy

And the rate of change in manufacturing with respect to policy may be stated as:

$$\frac{\delta \mathrm{MAN}}{\delta \mathrm{FP}} > 0; \ \frac{\delta \mathrm{MAN}}{\delta \mathrm{MP}} < 0; \ \frac{\delta \mathrm{MAN}}{\delta \mathrm{TP}} > 0$$

This study examines the responses of the manufacturing sector to government policies in the Nigerian economy. Both the monetary and trade policies variables are employed as proxy for government policy. The interest rate movement represents monetary policy and it is a short term policy instrument which can be manipulated to achieve short-run stabilization. Trade policy proxies include economic openness (that is ratio of export to GDP) and exchange rate. Control over these can regulate the movement of capital and financial resources across national frontier. The Vector Auto Regression (VAR) is employed to capture the contemporaneous responses of manufacturing value added (MVAD) to government policies.

Methodology

Sources of Data

The methodology focuses on examining responses of the manufacturing sector to government macroeconomic policies in Nigeria. The variables adopted are classified into two: monetary policy and trade policy. These are proxied by interest rate, exchange rate and economic openness. The variables for the study were obtained from the Central Bank of Nigeria (Statistical Bulletin) and National Bureau of Statistics (Annual Abstract of Statistics). The period under observation spans 1981 to 2015.

Estimation Technique

This study employs the vector auto-regressive (VAR) model developed by Sims (1980). It is a parametric approach to examine responses of one or more variables to another. In VAR, everything determines everything. How manufacturing value added respond to government industrial policy contemporaneous can be measure in VAR specification. Sims (1980)asserts that the direction of causality between dependent and independent variables will be detected by using the VAR Granger causality/block exogeneity test.

Preliminary step in the VAR method requires structural change test for each of the relevant variables to indicate the form of stationarity tests that must be performed. There has been a variety of methods proposed for implementing stationarity tests and each one has been widely used in applied economics literature. The likely spurious regression output may be encountered if stationarity test is exempted (Yule, 1926). According to Perron (1989), the standard tests of the unit root hypothesis may be unreliable with structural deviations. In addition, to study the responsiveness of each variable indicated and also separate to individual endogenous shock, impulse response function and variance decomposition are employed in the analysis.

The choice of estimation technique follows Sims (1980) and Fakiyesi and Adebiyi,(2012) and stems from the fact that VAR regression model best captures the diverse way relationship among variables and related lags. A unique attribute of the VAR model is that a dependent variable in one equation of the system appears in another equation as an independent variable, thereby becoming stochastic and correlated with the disturbance term (Shock or impulse term) of the equation. In a VAR model, variables are treated equally and no distinctions are made between dependent and independent variables. In order words, the Ordinary Least Square (OLS) technique will appear producing results that are not consistent. The general form of a VAR model is given by the following unrestricted (reduced form) system.

$$Z_t = \alpha + \psi(L)Z_t + ut$$

Where: Z_t is a vector of the η (stationary independent) Variable, α is an $n \times 1$ vector of constants, $\psi(L)$ is an $n \times n$ matrix of (lagged) polynomial coefficients, and ut is an $n \times 1$ vector of white noise innovation terms with $E(u_{tk}) = 0$ and $E(u_{tk}, u_{sk}) = 0;\ \ for\ t \neq s$). The disturbance term, ut, also has a covariance matrix, $E(u_t u_{t'}) = \Sigma$. The lag operator is defined as $\psi(L) = \psi_1 + \psi_2 L + ... + \psi_k L^{k-1}$ of degree $K-1$ and $\psi_j\ \ for\ \ j = 1, ..., K.$

More specifically, the regression model implicitly factors in the above analysis, and is presented as below.

Model Specification

$MAVAD = f\ (MP, TP)$

Where:

MAVD = Manufacturing value added

MP = Monetary policy (proxy by interest rate and exchange rate)

TP = Trade policy (proxy by economic openness)

The econometric form of the equation is presented as follow:

$$MAVDt = \delta_0 + \delta_1 \sum_{t=1}^{n=i} \Delta MAVD_{t-i} + \delta_2 \sum_{t=1}^{n=i} \Delta INT_{t-i} + \delta_3 \sum_{t=1}^{n=i} \Delta EXR_{t-i} + \delta_4 \sum_{t=1}^{n=i} \Delta OPN_{t-i} + U_{a1} \quad \ldots\ldots\ldots(6)$$

$$INTt = \delta_0 + \delta_1 \sum_{t=1}^{n=i} \Delta INT_{t-i} + \delta_2 \sum_{t=1}^{n=i} \Delta MAVD_{t-i} + \delta_3 \sum_{t=1}^{n=i} \Delta EXR_{t-i} + \delta_4 \sum_{t=1}^{n=i} \Delta OPN_{t-i} + U_{a.2} \quad \ldots\ldots\ldots\ldots(6)$$

$$EXRt = \delta_0 + \delta_1 \sum_{t=1}^{n=i} \Delta EXR_{t-i} + \delta_2 \sum_{t=1}^{n=i} \Delta MAVD_{t-i} + \delta_3 \sum_{t=1}^{n=i} \Delta INT_{t-i} + \delta_4 \sum_{t=1}^{n=i} \Delta OPN_{t-i} + U_{a3} \quad \ldots\ldots\ldots(6)$$

$$OPNt = \delta_0 + \delta_1 \sum_{t=1}^{n=i} \Delta OPN_{t-i} + \delta_2 \sum_{t=1}^{n=i} \Delta MAVD_{t-i} + \delta_3 \sum_{t=1}^{n=i} \Delta INT_{t-i} + \delta_4 \sum_{t=1}^{n=i} \Delta EXR_{t-i} + U_{a4} \ldots\ldots\ldots(6)$$

Where:

$MAVDt$ = Manufacturing value added in year t

$\sum_{t=1}^{n=i} \Delta MAVD_{t-i}$ = Sum of the lags of manufacturing value added from period t to j

$\sum_{t=1}^{n=i} \Delta INT_{t-i}$ = Sum of the lags of interest rate, from period t to j.

$\sum_{t=1}^{n=i} \Delta EXR_{t-i}$ = Sum of the lags of exchange rate from period t to j

$\sum_{t=1}^{n=i} \Delta OPN_{t-i}$ = Sum of the lags of economic openness from period t to j

δ_0 is the intercept, δ_1, δ_2, δ_3 and δ_4 are parameters due for estimation.

$U_{a1}U_{a2}U_{a3}U_{a4}$ =*Are the respective error terms*

The time series data employed in this study were sourced from the CBN Statistical Bulletin, the National Bureau of Statistics and World Development Indicators (WDI, 2015).

Degree of economic openness (OPN) is measured by the ratio of export to Gross Domestic Product (GDP);theoretically, increasing positive value is desirable. Degree of openness depicts the share of Nigeria's total external trade to GDP. A rise in the OPN ratio shows increased integration of the domestic economy with the rest of the world. This implies that more component of the growth of GDP has been exported when compared with the levels in the preceding period, (CBN Statistical Bulletin, 2012).

Presentation Discussion of Regression Results
Unit Root Test Results

Variables	ADF		PP		
	At Level	**At First Difference**	**At Level**	**At First Difference**	**Order of Integration**
EXR	-0.114232	-5.086364	-0.165663	-5.140227	I (1)
MVAD	-5.546091	-9.695888	-5.545288	-15.66361	I (0)
INR	-3.031499	-8.104251	-2.9271	-8.104251	I (1)
OPN	-4.943143	-7.517684	-4.925929	-9.194306	I (0)

The variables employed in this study are subject to unit root test. Both Augmented Dickey-Fuller (ADF) and Philips-Perron tests are used to examine the stationarity and order of integration of the variables. The result in table 3.1 above shows that the variables are significant both at level and first difference. Exchange rate and interest rate are significant at first difference while manufacturing value added and economic openness are significant at level.

3.2 Johansen Co-Integration Test

Null Hypotheses	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.****
None	0.451339	39.96860	47.85613	0.2236
At most 1	0.309890	21.36011	29.79707	0.3356
At most 2	0.259431	9.862064	15.49471	0.2915
At most 3	0.017637	0.551619	3.841466	0.4577

Trace test indicates no co-integration at the 0.05 level

The null hypothesis cannot be rejected following the trace statistics tests indicating no co-integration at the 0.05 level. Thus, there is no long-run co-integrating relationship among the variables. Therefore, the use of vector error correction (VECM) may generate spurious estimates. Econometricians recommend unrestricted Vector Auto-Regression (VAR) as appropriate estimation technique, Sims (1980); Adebiyi and Lawanson (2006).

The VAR regression result is displayed in the appendix. Having ascertained the lag order selection and that VAR (1) or (2) is not enough to capture all the dynamics, with three of the coefficients significant at 5%. There is need to carry out stability and serial auto-correlation test. Results are presented in the appendix.

Variance Decomposition

The forecast error variance decomposition measures the degree of variation of the fluctuation of the variables. The decompositions reveal the proportional contribution of policy shocks to variations in a given macro-economic variable. The greater the proportion of variation attributable to a given policy variable, the more important is the variable in the policy-manufacturing nexus. While forecast error variance decomposition may reveal the importance of a policy variable to movement in a macro variable, the direction or extent of these movements can only be detected in impulse responses,(Adebiyi & Lawanson, 2006; Fakiyesi & Adebiyi, 2012).

Table: 3.3.1 Variance Decomposition, Manufacturing Value Added; D(MVAD)

Period	S.E.	D(OPN)	D(MVAD)	D(INR)	D(EXR)
1	114.1759	1.494779	98.50522	0.000000	0.000000
2	140.5632	0.993833	98.58282	0.048678	0.374668
3	145.2526	1.289411	93.48750	0.057792	5.165298
4	147.9539	1.438160	91.58167	0.070500	6.909668
5	149.2570	1.424952	91.46527	0.070803	7.038971
6	149.6603	1.735132	91.16405	0.090204	7.010617
7	149.8637	1.895444	90.92070	0.190160	6.993694
8	149.9592	1.894151	90.82909	0.278492	6.998268
9	150.0091	1.909299	90.77629	0.293756	7.020659
10	150.0171	1.910618	90.76732	0.294505	7.027555

From table 3.3.1, own shocks constitute significant source of variation in manufacturing value added(MVAD) forecast errors decomposition ranging from 90.77 per cent to 98.51 per cent over the 10 periods. Economic openness explains maximum of 2.0 per cent of the variation in MVAD after the 10^{th} period. Interest rate is insignificant as it accounts for between 0.29 and 0.0 per cent while exchange rate accounts for 7.03 per cent after the 10^{th} period. Most importantly, major source of manufacturing value added fluctuations is due largely to own shocks as depicted by the forecast error variance decomposition table above.

Impulse Response Function

Impulse responses identify responsiveness of the independent variables (endogenous variables) in the VAR when a shock is exerted on the error terms such as $U_{a1}U_{a2}U_{a3}U_{a4}$ in the regression equation above. It is assumed a unit shock is applied to each variable to see the effect in VAR system; hence one standard deviation positive shock is applied to the VAR residual to see how it affects the whole VAR model. Ordering of the variable is necessary for impulse responses and the study conducts proper ordering of the variable via the Cholesky's adjustment method. We assume all variables are endogenous in the unrestricted VAR.

Table 3.4.1

Response of (MVAD):

Period	D(OPN)	D(MVAD)	D(INR)	D(EXR)
1	-13.95928	113.3193	0.000000	0.000000
2	1.224863	-81.46612	-3.101264	-8.603892
3	-8.699570	15.69375	1.604808	31.87106
4	6.540205	17.97979	1.799828	-20.56115
5	1.620946	-18.13148	-0.583600	7.454239
6	-8.437565	6.541300	-2.104973	1.460989
7	6.087812	0.938187	4.743850	-0.685403
8	-0.502279	-2.333993	-4.463015	-1.741318
9	-1.921548	1.310674	1.864527	2.467106
10	0.585305	-0.392884	0.418984	-1.311436

There is a negative response ofManufacturing Value Added (MVAD) to economic openness in the short run. However, in the long run, MVAD may be insensitive to economic openness because the shock is not significant at -0.50, -0.92 and 0.59 in the 8th, 9th and 19th periods respectively. Contemporaneous response of manufacturing value added to own shock is positive in the first period but negative in the medium term. In the long run, MVAD own shock may be neutral to policy. Concerning the response to interest rate, manufacturing value added is not significant though there is occasional short run positive or negative shock. In the medium term, the response of manufacturing value added to exchange rate is negative but tends towards neutral in the long run.

The bottom line is that manufacturing value added would respond positively or negatively to government policies in the short run, In the long run, however, the response may be insignificant.

Summary, Conclusion and Recommendations

This study attempts to examine empirically the responses of manufacturing sector to government macroeconomic policies proxied by monetary and trade policy variables. Yearly data obtained from the National Bureau of Statistics and Central Bank of Nigeria ranging from 1981-2014 is engaged. The study begins by recognizing manufacturing as an essential factor to accelerate economic growth and provide critical answers to unemployment and achieve poverty reduction. However, available literature indicate that the sector has performed below expectation for over 40 decades in Nigeria, providing insignificant solution to economic growth. This study, therefore, examines the responses of government policies on manufacturing sector with the aim of ascertaining the implication on the overall economic growth in Nigeria.

The Vector Auto-Regression (VAR) is employed to capture the contemporaneous responses of manufacturing value added to government policies. Forecast error variance decomposition is also examined to analyze the causes and degree of fluctuations in individual variables in the event of application of innovations/shocks. The forecast error variance decomposition shows that the major source of fluctuations and ineffectiveness of government policies on the manufacturing sector is owing to own shock. This means that manipulation of policy variables may constitute ineffective solutions to manufacturing sector performance in Nigeria. The ineffectiveness may be due to developing transmission channels through which government policy takes effect - a new research study is required.

Economic openness has negative impact on the manufacturing sector in the short run but portends no significant impact in the long run. In most cases, the study found that both monetary and trade policies are ineffective in addressing manufacturing sector's performance in Nigeria. Therefore, less emphasis should be placed on this aspect of macroeconomic policy in correcting manufacturing sector performance. Non-monetary policy factor such as stabilization of macroeconomic environment where manufacturing sector operates is recommended. The study also suggests supply-side policy like subsidy, as well as infrastructure, may be a better option to address the performance outcome of manufacturing sector in Nigeria.

References

Adebiyi, M. A. & Lawanson, O.I. (2006). Financial sector reforms, monetary policy transmission mechanism and commercial bank credit. In Akano, O., & Familọni, K. A. (Eds.). *The National Economic Empowerment and Development Strategy: Philosophy, opportunities and challenges*. Lagos: University of Lagos Press, 220-235.

Adejugbe, A.M. (2006). The Nigerian derailed industrialization: Causes, consequences and cures. *Inaugural lecture series*. Lagos: Unilag Press.

Adeyemi, K.S. (2011). Governance, budgeting and planning in the economic transformation of Nigeria. Presidential address, 56th annual conference of the Nigerian Economic Society, Ota Ogun State.

Agba, A. V. (2004). Long-term funding options for manufacturing industries in Nigeria. Selected Papers for the 2004 Annual Conference (NES); In *Challenges of Nigerian Industrialization: A Pathway to Nigeria becoming a Highly Industrialized Country in the Year 2015*, 387-421.

Agénor, P.R., & Montiel, P. J. (2008). *Development macroeconomics.* Princeton, NJ: Princeton University Press.

Ajakaiye, O. (2015). Development planning in contemporary Nigeria. President Address Delivered at the 56th Annual Conference of the Nigerian Economic Society, Abuja.

Alokan, O.O. (2004). Theoretical perspective on Nigeria's industrialization selected papers for the 2004 Annual Conference (NES); In *Challenges of Nigerian Industrialization: A Pathway to Nigeria becoming a Highly Industrialized Country in the Year 2015*, 29-62.

Amakom, U. (2012). Manufactured Exports in Sub-Saharan African Economies: Econometric Tests for the Learning by Exporting Hypothesis. *American International Journal of Contemporary Research*, *2*(4), 195-206.

Boyo, H. (2014). Is Nigeria's de-industrialization imminent? *The Punch,* Monday December 22, 2014.

Domar, E. D. (1947). Expansion and employment. *The American Economic Review 37*(1), 34-55.

Egwaikhide, F.O. (1999). Determinants of imports in Nigeria: A dynamic specification. *African Economic Research Consortium, Nairobi Research Paper 91.*

Ekpo, A.H. (2004) *Industrialization and Nigeria's economic development.* Paper presented at the 2004 Annual Conference (NES). In *Challenges of Nigerian Industrialization: A Pathway to Nigeria becoming a Highly Industrialized Country in the Year 2015*, 3-26.

Fakiyesi, T. and Adebiyi, M.A. (2012.) Channels of monetary policy transmission mechanism in Nigeria and their Impact on output and price. In *Monetary Policy and Economic Development in Nigeria: A Festschrift in Honour of Professor Siyanbola Tomori*. Lagos: Unilag Press, 397-418.

Falokun, G.O., & Chete, L.N. (2004). Challenges of Industrialization in Nigeria: What are the sources of Industrial Growth? Selected Papers for the 2004 Annual Conference (NES); In Challenges of Nigerian Industrialization: A Pathway to Nigeria Becoming A Highly Industrialized Country in The Year 2015. 579-608.

Grossman, G.M. & Helpman, E. (1991). *Innovation and Growth in the Global Economy*. Cambridge, MA: MIT Press.

Harrod, R. F. (I939). An Essay in Dynamic Theory. *Economic Journal* 49: 14-33.

Ibbih, JM, and Gaiya, B.A. (2013). A cross-sectional analysis of industrialization and growth in Africa *International Research Journal of Arts and Social Sciences* 2(6): 150-167.

Kayode, M. O. (1987): The Structural Adjustment Programme (SAP) and the Industrial Sector: NISER, Ibadan, Nigerian 1987.
Loto, M.A. (2005). The manufacturing industry: Structure and performance. In Fakiyesi O. O. & Akano, O. (Eds.), *Issues in Money, finance and economic management in Nigeria: Essays in Honour of Prof. Obasanmi Olakanpo.* Lagos: Unilag Press, 325-365.
McKinnon, R.I. (1973). *Money and capital in economic development.* Washington DC.: Brooking Institution,
Mordi, C. N., Englama, A., & Adebusuyi, B. S. (2010). The changing structure of the Nigerian economy. Abuja: Central Bank of Nigeria, Retrieved from http://www.cbn.gov.ng/out/2011/pressrelease/gvd/the%20changing%20structure%20of%20the%20nigerian%20economy%20second%20edition.pdf
Nnanna, O.J., Alade S.O., & Odoko, F.O. (2003). *Contemporary economic policy issues in Nigeria.* Abuja: CBN Publication.
Perron, P. (1989). The great crash, the oil price shock and the unit root hypothesis. *Econometrica* 57: 1361-1401.
Romer, P.M. (1986). Increasing returns and long-run growth. *Journal of Political Economy* 94(5):1002-1037.
Solow, R.M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics* 71, 65-94.
Shaw, E. (1973). Financial Deepening in Economic Development, Oxford University Press.
Sims, C.A. (1980). Macroeconomics and Reality. *Econometrica* 48: 1-48.
Singer, H.W. (1989). Lesson of Post War Development Experience. *Africa Development Review* 1(2): 1-29.
Stiglitz, J. E. (1996). Some Lessons from the East Asian Miracle. *The World Bank Research* Observer 11(2): 151-177.
Taylor, L. (2004). Structuralist Economics: Challenge to the Mainstream. *Challenge, 47*(5), 104-115.
Thirlwall, A. P. (1983). A plain man's guide to Kaldor's growth laws. *Journal of Post Keynesian Economics* 5(3): 345-358.
Tomori S. (2006). Macroeconomic and monetary policy: The Nigerian experience. In Fakiyesi O. O., & Akano O. *Issues in Money, Finance and Economic Management in Nigeria: Essays in Honour of Prof. Obasanmi Olakanpo.* Lagos: Unilag Press, 9-34.
Torri, Y., & Fukasaku, K. (1984). Economic Development and Challenges in Linkage Structure: An input-output Analysis of the Republic of Korea and Japan. Proceedings of the 7th International Conference on Input-Output Techniques. UNIDO, United Nations.
Verma, S., & Arora, R. (2010). Does the Indian Economy Support Wagner's Law?: An Econometric Analysis. *Eurasian Journal of Business and Economics* 3(5): 77-91.
Yule, G.U. (1926). Why do we sometimes get nonsense correlation between time series? A study in the Sampling and the nature of time Series. *Journal of the Royal Statistical Society* 89: 1-6.

Appendix 1

Johansen Co-Integration Test

Date: 03/09/16 Time: 21:08
Sample (adjusted): 1984 2014
Included observations: 31 after adjustments
Trend assumption: Linear deterministic trend
Series: OPN MVAD INR EXR
Lags interval (in first differences): 1 to 2

Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.451339	39.96860	47.85613	0.2236
At most 1	0.309890	21.36011	29.79707	0.3356
At most 2	0.259431	9.862064	15.49471	0.2915
At most 3	0.017637	0.551619	3.841466	0.4577

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.451339	18.60849	27.58434	0.4454
At most 1	0.309890	11.49804	21.13162	0.5976
At most 2	0.259431	9.310445	14.26460	0.2612
At most 3	0.017637	0.551619	3.841466	0.4577

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

OPN	MVAD	INR	EXR
-2.251650	-0.005458	-0.115343	-0.004958
4.184934	0.017251	-0.216502	-0.011496
-3.597301	0.017333	0.097488	-0.003494
-0.424219	-0.006299	-0.107944	0.016771

Unrestricted Adjustment Coefficients (alpha):

D(OPN)	0.162424	-0.010190	0.094831	0.010535
D(MVAD)	22.42389	-27.51591	-37.76235	1.866530
D(INR)	0.983646	1.873048	-0.560120	-0.066600
D(EXR)	-1.122297	0.135391	-1.621089	-1.477647

1 Cointegrating Equation(s):		Log likelihood	-384.7242

Normalized cointegrating coefficients (standard error in parentheses)

OPN	MVAD	INR	EXR
1.000000	0.002424	0.051226	0.002202
	(0.00272)	(0.02528)	(0.00220)

Adjustment coefficients (standard error in parentheses)

D(OPN)	-0.365722
	(0.13308)
D(MVAD)	-50.49075
	(45.9580)
D(INR)	-2.214827
	(1.83571)
D(EXR)	2.527020
	(5.71996)

2 Cointegrating Equation(s):		Log likelihood	-378.9752

Normalized cointegrating coefficients (standard error in parentheses)

OPN	MVAD	INR	EXR
1.000000	0.000000	0.198229	0.009268
		(0.06677)	(0.00463)
0.000000	1.000000	-60.64042	-2.914742
		(18.4203)	(1.27752)

Adjustment coefficients (standard error in parentheses)

D(OPN)	-0.408367	-0.001062
	(0.28068)	(0.00107)
D(MVAD)	-165.6430	-0.597063
	(92.7045)	(0.35296)
D(INR)	5.623755	0.026942
	(3.35229)	(0.01276)
D(EXR)	3.093623	0.008462
	(12.0715)	(0.04596)

3 Cointegrating Equation(s):		Log likelihood	-374.3199

Normalized cointegrating coefficients (standard error in parentheses)

OPN	MVAD	INR	EXR
1.000000	0.000000	0.000000	0.000710
			(0.00100)
0.000000	1.000000	0.000000	-0.296967
			(0.23281)
0.000000	0.000000	1.000000	0.043169
			(0.02097)

Adjustment coefficients (standard error in parentheses)

D(OPN)	-0.749503	0.000581	-0.007283
	(0.32972)	(0.00139)	(0.01460)
D(MVAD)	-29.80045	-1.251610	-0.310558
	(105.387)	(0.44304)	(4.66746)
D(INR)	7.638674	0.017233	-0.573580
	(4.14083)	(0.01741)	(0.18339)
D(EXR)	8.925169	-0.019637	-0.057900

	(14.9924)	(0.06303)	(0.66400)

Appendix 2

VAR at level

Vector Autoregression Estimates
Date: 03/10/16 Time: 08:07
Sample (adjusted): 1982 2014
Included observations: 33 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	OPN	MVAD	INR	EXR
OPN(-1)	0.118712	-14.66784	1.217149	-0.879775
	(0.18485)	(46.2494)	(2.18795)	(7.01556)
	[0.64221]	[-0.31715]	[0.55630]	[-0.12540]
MVAD(-1)	0.000333	-0.129173	0.002823	-0.011900
	(0.00079)	(0.19800)	(0.00937)	(0.03004)
	[0.42126]	[-0.65238]	[0.30142]	[-0.39619]
INR(-1)	0.007647	-0.039134	0.590977	0.301109
	(0.01217)	(3.04407)	(0.14401)	(0.46175)
	[0.62852]	[-0.01286]	[4.10379]	[0.65210]
EXR(-1)	0.000345	0.405821	-0.007572	0.998651
	(0.00103)	(0.25670)	(0.01214)	(0.03894)
	[0.33593]	[1.58090]	[-0.62356]	[25.6465]
C	1.113085	10.66323	7.195259	0.812963
	(0.30727)	(76.8787)	(3.63695)	(11.6617)
	[3.62252]	[0.13870]	[1.97838]	[0.06971]
R-squared	0.058589	0.083791	0.419734	0.964511
Adj. R-squared	-0.075898	-0.047096	0.336839	0.959441
Sum sq. resids	3.580730	224154.4	501.6612	5157.744
S.E. equation	0.357608	89.47354	4.232785	13.57222
F-statistic	0.435651	0.640179	5.063428	190.2449
Log likelihood	-10.17945	-192.4141	-91.72836	-130.1788
Akaike AIC	0.919967	11.96449	5.862325	8.192654
Schwarz SC	1.146710	12.19123	6.089068	8.419398
Mean dependent	1.468594	15.48485	20.23606	77.26716
S.D. dependent	0.344764	87.43824	5.197765	67.39207

Determinant resid covariance (dof adj.)	2352809.
Determinant resid covariance	1219447.
Log likelihood	-418.5294
Akaike information criterion	26.57754
Schwarz criterion	27.48451

Note that VAR is not enough to capture all the dynamics as only two of the coefficient is significant at level.

VAR at First Difference

Vector Autoregression Estimates
Date: 03/10/16 Time: 09:04
Sample (adjusted): 1984 2014
Included observations: 31 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	D(OPN)	D(MVAD)	D(INR)	D(EXR)
D(OPN(-1))	-0.688973	-37.53297	-3.289538	-5.602817
	(0.19709)	(60.0229)	(2.41090)	(7.29832)
	[-3.49580]	[-0.62531]	[-1.36444]	[-0.76769]
D(OPN(-2))	-0.543864	-23.50209	0.331498	9.658924
	(0.19449)	(59.2309)	(2.37909)	(7.20202)
	[-2.79643]	[-0.39679]	[0.13934]	[1.34114]
D(MVAD(-1))	0.000269	-0.724876	-0.000201	-0.004598
	(0.00065)	(0.19874)	(0.00798)	(0.02416)
	[0.41251]	[-3.64744]	[-0.02519]	[-0.19027]
D(MVAD(-2))	-3.20E-05	-0.367998	0.001293	0.002333
	(0.00065)	(0.19911)	(0.00800)	(0.02421)
	[-0.04893]	[-1.84818]	[0.16163]	[0.09637]
D(INR(-1))	-0.020734	-0.275055	-0.361526	0.163423
	(0.01728)	(5.26122)	(0.21132)	(0.63972)
	[-1.20023]	[-0.05228]	[-1.71076]	[0.25546]
D(INR(-2))	0.009835	-2.107804	-0.219887	-0.056867
	(0.01678)	(5.11155)	(0.20531)	(0.62153)
	[0.58601]	[-0.41236]	[-1.07099]	[-0.09150]
D(EXR(-1))	-0.003898	-0.738271	-0.094892	0.095279
	(0.00641)	(1.95252)	(0.07843)	(0.23741)
	[-0.60808]	[-0.37811]	[-1.20996]	[0.40132]
D(EXR(-2))	0.006685	2.097514	-0.013487	0.162842
	(0.00593)	(1.80585)	(0.07253)	(0.21958)
	[1.12748]	[1.16151]	[-0.18594]	[0.74161]
C	0.035539	-5.248431	1.140545	4.132124
	(0.08263)	(25.1655)	(1.01081)	(3.05993)
	[0.43009]	[-0.20856]	[1.12835]	[1.35040]
R-squared	0.530406	0.411013	0.302354	0.187406
Adj. R-squared	0.359645	0.196836	0.048665	-0.108083
Sum sq. resids	3.092062	286794.9	462.6967	4240.174
S.E. equation	0.374898	114.1759	4.586030	13.88291
F-statistic	3.106128	1.919032	1.191829	0.634224

Log likelihood	-8.257285	-185.5414	-85.88490	-120.2219
Akaike AIC	1.113373	12.55106	6.121607	8.336895
Schwarz SC	1.529692	12.96738	6.537926	8.753213
Mean dependent	0.018220	-2.032258	0.295806	5.551803
S.D. dependent	0.468492	127.4008	4.701865	13.18847

Determinant resid covariance (dof adj.)	5083237.
Determinant resid covariance	1289390.
Log likelihood	-394.0284
Akaike information criterion	27.74377
Schwarz criterion	29.40904

Indicate First to twelve order auto correlation is not significant. Second order autocorrelation is not significant. Meaning there is no residual auto-correlation.

Appendix 3

Impulse Response Function Table

Response of D(OPN) Respon:

Period	D(OPN)	D(MVAD)	D(INR)	D(EXR)
1	0.374898	0.000000	0.000000	0.000000
2	-0.238183	0.043948	-0.104182	-0.045433
3	-0.061191	-0.067885	0.167704	0.125500
4	0.102460	0.023877	-0.070232	-0.070589
5	0.019483	0.025670	-0.029181	0.004827
6	-0.074469	-0.026488	0.026466	0.009334
7	0.019023	-0.002220	0.021877	0.017690
8	0.029842	0.015471	-0.030588	-0.025720
9	-0.016258	-0.005846	0.004161	0.009304
10	-0.014400	-0.004717	0.010834	0.004618

Response of D(MVAD):

Period	D(OPN)	D(MVAD)	D(INR)	D(EXR)
1	-13.95928	113.3193	0.000000	0.000000
2	1.224863	-81.46612	-3.101264	-8.603892
3	-8.699570	15.69375	1.604808	31.87106
4	6.540205	17.97979	1.799828	-20.56115
5	1.620946	-18.13148	-0.583600	7.454239
6	-8.437565	6.541300	-2.104973	1.460989
7	6.087812	0.938187	4.743850	-0.685403
8	-0.502279	-2.333993	-4.463015	-1.741318

9	-1.921548	1.310674	1.864527	2.467106
10	0.585305	-0.392884	0.418984	-1.311436

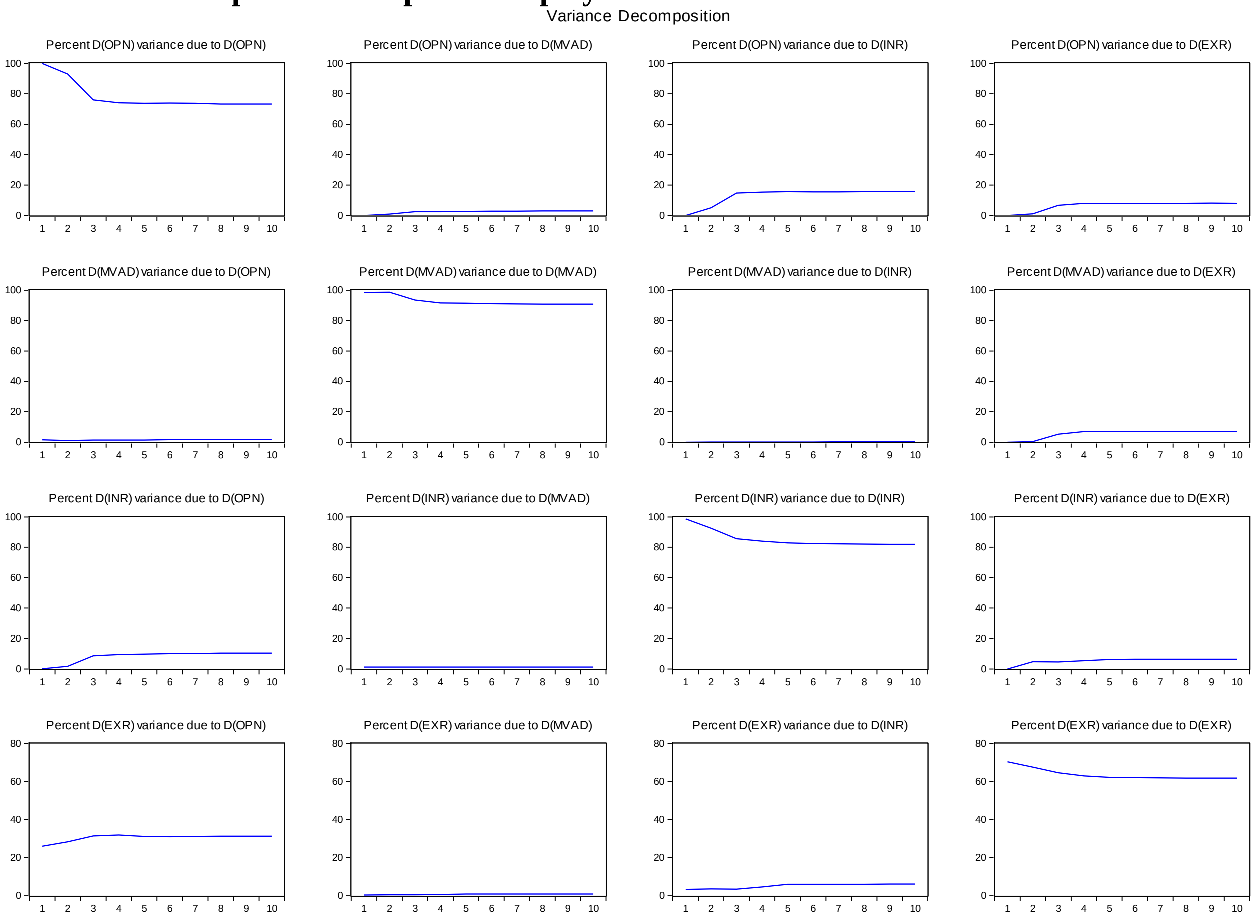
Response of D(INR): Period	D(OPN)	D(MVAD)	D(INR)	D(EXR)
1	0.179915	-0.512035	4.553803	0.000000
2	-0.623685	0.231162	-1.883936	-1.105882
3	1.425345	0.121037	-0.103929	0.288440
4	-0.538669	0.017601	-0.202499	-0.522394
5	-0.367417	-0.165309	0.534696	0.493461
6	0.347812	0.071138	-0.232508	-0.304143
7	0.178458	0.073747	-0.109152	0.015151
8	-0.304569	-0.060910	0.051925	-0.000612
9	0.047900	-0.031182	0.123266	0.090754
10	0.122321	0.056247	-0.123141	-0.106275

Response of D(EXR): Period	D(OPN)	D(MVAD)	D(INR)	D(EXR)
1	-7.079554	-0.725367	2.504117	11.65411
2	-2.681431	-0.673811	0.982784	1.110391
3	3.396919	0.277292	0.532546	2.116957
4	-1.759487	0.465943	-1.659586	-0.816051
5	-0.999037	-0.749985	1.910219	1.941786
6	0.477183	0.188522	-0.497336	-0.628631
7	0.608510	0.240833	-0.226549	0.183549
8	-0.728477	-0.170808	-0.000848	-0.067508
9	0.002818	-0.086411	0.391996	0.343876
10	0.293780	0.133034	-0.283344	-0.279322

Cholesky Ordering: D(OPN) D(MVAD) D(INR) D(EXR)

Appendix 4

Variance Decomposition Graphical Display



Appendix 5

Variance Decomposition, Economic Openness; D(OPN)

Period	S.E.	D(OPN)	D(MVAD)	D(INR)	D(EXR)
1	0.374898	100.0000	0.000000	0.000000	0.000000
2	0.460574	92.99980	0.910502	5.116636	0.973064
3	0.514156	76.04271	2.473848	14.74468	6.738758
4	0.534172	74.12978	2.491733	15.38902	7.989470
5	0.535960	73.76816	2.704530	15.58294	7.944366
6	0.542483	73.88918	2.878295	15.44846	7.784065
7	0.543550	73.72196	2.868678	15.54989	7.859471
8	0.546052	73.34639	2.922715	15.72146	8.009442
9	0.546421	73.33607	2.930222	15.70607	8.027641
10	0.546758	73.31508	2.934054	15.72598	8.024884

Own shocks constitute significant source of variation in economic openness (OPN) forecast errors decomposition ranging from 73.32 per cent to 100 per cent over the 10 periods. Manufacturing value added explains 2 per cent of the variation in OPN after the 10th period. Interest rate and exchange rate account for 15.73 per cent and 8.02 per cent respectively after the

10th period. The most important point in variance decomposition depicted by this table is that major source of economic openness fluctuations is due largely to own shocks.

Variance Decomposition, Interest Rate; D(INT)

Period	S.E.	D(OPN)	D(MVAD)	D(INR)	D(EXR)
1	4.586030	0.153907	1.246597	98.59950	0.000000
2	5.123112	1.605377	1.202517	92.53249	4.659610
3	5.327901	8.641280	1.163460	85.59388	4.601378
4	5.384321	9.462015	1.140274	83.95094	5.446768
5	5.448177	9.696307	1.205765	82.95773	6.140193
6	5.473137	10.01192	1.211687	82.38328	6.393120
7	5.477651	10.10156	1.227817	82.28727	6.383353
8	5.486696	10.37643	1.236096	82.02515	6.362326
9	5.489128	10.37485	1.238228	82.00290	6.384024
10	5.493188	10.40911	1.246883	81.93199	6.412021

Own shocks constitute significant source of variation in interest rate forecast errors decomposition ranging from, higher (98.60 per cent) at the beginning of the period and lower at the 10th period at (81.93 per cent). Economic openness accounts for 10.41 per cent after the 10th period while manufacturing value added explains 1.25 per cent of the variation in interest rate after the 10th period. Exchange rate accounts for 6.41 per cent after the 10th period. The most important point in variance decomposition depicted by this table is that major source of economic openness fluctuations is due largely to own shocks.

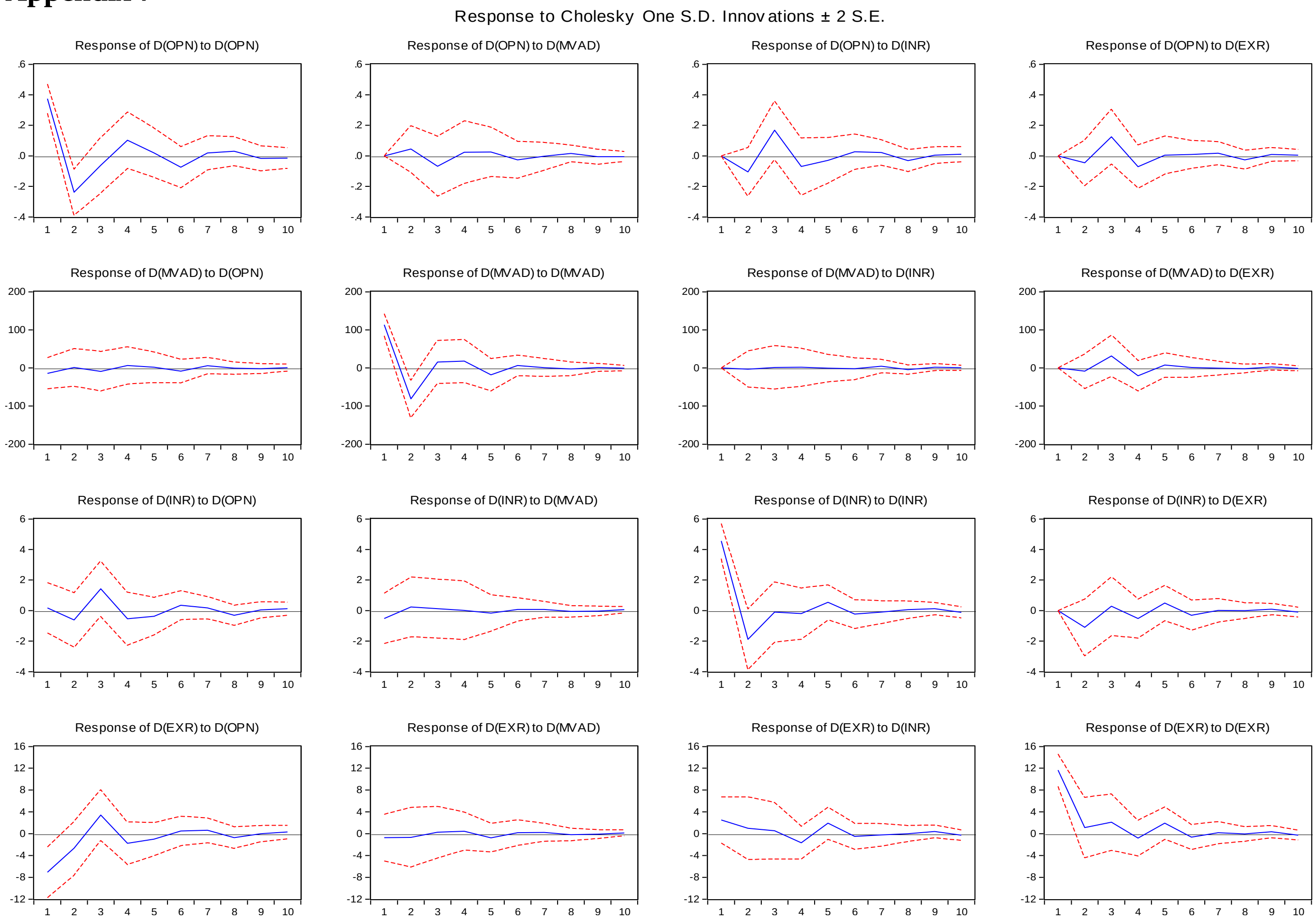
Variance Decomposition, exchange Rate; D(EXR)

Period	S.E.	D(OPN)	D(MVAD)	D(INR)	D(EXR)
1	13.88291	26.00464	0.272995	3.253480	70.46889
2	14.23299	28.29040	0.483852	3.572185	67.65356
3	14.79727	31.44386	0.482770	3.434462	64.63891
4	15.02306	31.87749	0.564562	4.552348	63.00560
5	15.31902	31.08296	0.782645	5.933054	62.20134
6	15.34855	31.06011	0.794722	6.015237	62.12993
7	15.36526	31.14942	0.817561	6.023898	62.00912
8	15.38362	31.29937	0.827940	6.009531	61.86316
9	15.39270	31.26246	0.830115	6.067298	61.84012
10	15.40121	31.26428	0.836658	6.094436	61.80463

This shows that own shocks constitute significant source of variation in exchange rate forecast errors decomposition ranging from 61.80 per cent to 70.47 per cent over the 10 periods. Manufacturing value added explains variation ranging between 0.27 to 0.84 per cent in exchange rate within the 10 periods. Interest rate accounts for 6.09 per cent after the 10th period.

The observation drawn from the forecast errors decomposition results is that own shocks constitute fundamental variations to each variables. Policy makers should ensure careful and cautious policy adjustments while attempting macroeconomic corrections that involve variables stated above.

Appendix 7



A unit shock to economic openness in period impacts both positively and negatively on economic openness both short run and long run. In other words, the contemporaneous response may be favorable or unfavourable from period 1 to 8 till stability is attained in the long run. Manufacturing value added response to economic openness and interest rate is neither positive nor negative. However, contemporaneous response of manufacturing value added to own shock is positive in the first period but negative in the medium term. In the long run it is positive. This means that economic openness may generate adverse effect in the short run, but in the long run it may be favourable as the nation participate more in global trade especially by exporting manufactured goods. In addition, manufacturing responds positively to exchange rate except in the fourth period.

The bottom line is that manufacturing value added would respond positively to government macro-industrial policies in the long run if appropriate macroeconomic frameworks (order than monetary) is applied. It should be highlighted that contemporaneous responses of monetary variables is characterized with fluctuations as depicted by the impulse responses. Also, the forecast error decomposition raises own shock fluctuations among the variables.