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IMPACT OF TRADE OPENNESS ON MANUFACTURING OUTPUT IN NIGERIA

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Abstract

Trade liberalization otherwise known as trade openness is one of the policies adopted by the federal government dated back to the introduction of Structural Adjustment Programme (SAP) in the country to allow free movement of good and service among the countries. Trade-growth nexus is identified by two conflicting viewpoints. One theory contends that trade liberalization will reduce industrial productivity; while the other holds that trade openness will increase manufacturing productivity. The study investigates the impact of trade openness on manufacturing output in Nigeria from 1981 to 2022 using Structural vector autoregressive (SVAR) model. The findings of the paper show that trade openness has no any significant impact on manufacturing output in Nigeria as its detriment manufacturing output in Nigeria, while exchange rate and interest rate have significant impact on manufacturing output in Nigeria, with a shock to exchange rate having a much more significant and positive impact on manufacturing output. This implies that trade liberalization policy does not have much impact on manufacturing output in Nigeria. Based on these results, the study recommends that trade policy should be geared toward protecting our local manufacturing sector through imposition of high import duties of the similar product produce in the country to protect the manufacturing sector.

Keywords: Manufacturing Output, Structural Vector Autoregressive (SVAR) Model, Trade Openness

1. Introduction

International trade has broadened the opportunities available to countries for expanding economic activities, including attaining industrial development. As globalization expands, trade has increasingly become vital for any successful dynamic modern economy. The process of trade assists production across boundaries, resulting in productive a gain that accelerates economic expansion (Ajayi & Araoye, 2019). Since different technologies or allocations of resources are needed for efficient production of various kinds of traded goods and services, in addition to

differing preferences for these commodities across countries, international trade provides the structure through which countries can expand their range of available industrial goods and services (Belloumi & Alshehry, 2020; Iyoboyi, Abubakar & Okereke, 2020). Nigeria, like other developing countries has implemented several trade policies over the years. Recognizing the benefits of free trade, Nigeria in the 1980's made important changes in trade policy, targeted at reducing and removing previous restrictive trade policies and barriers, and fostering export activities. The Structural Adjustment Programme (SAP) of the era led to export promotion strategies using trade

liberalization for the purpose of aiding effective domestic resource allocation and production of output. Furthermore, the SAP was intended to increase efficiency and improvement in productivity, leading to additional investments in industries with identified comparative advantage, so as to aid resource allocation and increase output and innovations in export-oriented industries. This emphasis on industrial expansion follows Ehikioya and Guillemot (2020) submission that industrial growth is vital to attaining economic expansion. Spurring industrial growth and economic expansion through the gains from a liberalized and open trade is vital. The need for industrial development is important because it remains a driver of structural change and long-run growth since it guarantees higher productivity growth and technological advancement than other sectors of the economy, while also aiding technological spillovers. Additionally, Umoh and Effiong (2013) consented that countries that neglect industrial growth, depend on primary exports which is subject to long-run deterioration of their terms of trade. Furthermore, Stensnes, (2006) argued that free trade promotes efficiency through the division of labor and redistribution of productive activities across countries, thereby moving the world economy towards the international production possibility frontier.

Despite the arguments in favor of free trade, Omoke and Opuala-Charles (2021) noted that the relationship between free trade and productivity is ambiguous. They maintained that if specialization promoted by trade, channels domestic resources to sectors that enjoys increasing returns to scale, then growth may be enhanced. However, a technologically backward country may risk specializing in non-dynamic industries and lose out on these benefits, resulting in adverse effects on growth. Additionally, Bhagwati (2008) opined that an immiserizing growth condition can occur if expansion in exports causes the prices for the country's export goods to deteriorate enough to make it worse off with the increase in production. Available literatures do not offer clear predictions of the relationship between openness and growth, essentially, the relationship remains an empirical one, thereby

justifying this study in Nigeria. The study particularly notes that, more than three decades after liberalizing trade, Nigeria still remains undeveloped and unindustrialized, informing the central problem of this study. One may ask whether trade openness harm manufacturing sector in Nigeria or not. Consequently, this study seeks to provide empirical evidence of the impact of trade openness on manufacturing output in Nigeria.

2. Literature Review

2.1 Theoretical Literature

The Neo-Liberalism theory, a resurgence of the *laissez-faire* economic liberalism prescribes the free markets system as the most-efficient allocator of resources. The idea is the liberalization of economic policies in terms of free trade, economic deregulation, execution of austerity measures, privatization and, reductions in government expenditure (Moini, 2016). The postulation of the neo-liberals as reviewed by Aalbers (2013), asserts that a country should embark on domestic markets liberalization in concert with external trade openness. This will allow the prices; interest rates and wages find their natural equilibrium through market discipline as a result of the reduction in government interference in domestic markets for labour, capital and goods. This will consequently propel the market and the economy towards an equilibrium growth path where investment, production, and indeed the absorptive capacity creation follow a dynamic comparative advantage. The concomitant impact is a more efficient utilization of resources through increased competition in domestic markets and international competitiveness. With respect to the foreign markets, there are additional costs: trade costs (tariffs) and sunk and/or variable costs (Dalgic & Gasiorek, 2015).

The self-selection theory propounded by Bernard and Jensen (1995) states that companies involved in export markets demonstrate higher productivity level in comparison with non-entrants into the international arena. This is because a higher level of efficiency is required by the exporting firm to deal with the complexities of selling in the foreign markets including

the sunk costs, and foreign trade specific variable costs. Only the higher productive firms are able to incur and yet make profits Melitz (2003). However, the Metzler Paradox (1949) conceptualized within the Heckscher-Ohlin model, posits the theoretical likelihood that the imposition of an import tariff may in fact lead to a reduction in the relative internal price of the commodity. This could have a deleterious effect on the recipient country leading to immiserating growth (Casas & Choi, 1985) if the offer curve of the exporting nation is very inelastic. Krugman and Obstfeld (2003) therefore recommend the lowering of import tariffs on goods and services only where the offer curve exporting nation is elastic which would cause the tariff to beneficially impact international trade. This situation is particularly germane for countries with agrarian monoculture.

2.2. Empirical Review

Some studies have examined the relationship between manufacturing sectors performance and trade openness and they found the relationship to be positive. For instance, Umoh and Effiong (2013) examined the impact of trade openness on the performance of the manufacturing sub-sector in Nigeria employing time series data from 1970 to 2008. They employed the cointegration technique (ARDL bounds test) to determine whether a long run relationship exists between the manufacturing index of production, interest rate spread, exchange rate and openness to trade. Their findings revealed that trade openness has a significant positive impact on manufacturing productivity in Nigeria both in the short and long run. Also, studies from Onakoya et al (2012); Chete and Adenikinju (2002); Dodzin and Vamvakidis (2004) and Paus et al. (2003) corroborated the evidence of a positive relationship between trade and productivity measures. Asongo (2013) evaluated the impact of trade liberalization on the Nigeria manufacturing sector between 1989 and 2006. The results showed that the manufacturing is favourably impacted by the openness of international trade. Similar results were recorded in the investigation of the level of export by manufacturing companies in Nigeria by Umoro (2013).

This study emphasized that in the long run, trade openness significantly influenced with the potential ability to boost the manufacturing output in Nigeria. However, the use of the same OLS method revealed the insignificant impact of globalization on the Nigerian manufacturing sector in the study by Ojo and Olalade (2014). The combined use of the Simple Annual Growth Rate (AAGR) and Co-integration, error correction techniques by Umoru and Eborieme (2013) on the influence of open trade on the growth of the Nigerian industrial sector found a negative connection between manufacturing sector and the advent of globalization. This contrasted from the earlier research in China by Mairerse, Mohnen, Zhao and Zhen (2012) on the impact of globalization, innovation and productivity in manufacturing firms. The use of the Marginal impact estimation technique by Edeme and Karimo (2014) incorporated the standard errors to within a Structural-break model, correct for serial correlation. The finding showed that trade liberalization when combine with financial deepening, weakened the Nigerian manufacturing sector performance. In the same vein, Ogu, (2016), using the VECM mechanism techniques reported that the liberalization of international trade was harmful to the output of the manufacturing sector in Nigeria in the short run but with the potential for enhancement in the long term. These lapses were fully exploited by multinationals. This result is contrary to the findings of Onakoya, Fasanya and Babalola (2012) who using the same method, discovered a positive consequence of open trade on the Nigerian manufacturing sector output with the use of time series data spanning from 1975 to 2010. The mixed results in the literature findings on the nexus between trade openness and the output of the manufacturing sector makes the need for this study manifest as the African Continental Free Trade Agreement is readied for implementation on the other hand, some studies have found a negative relationship between trade openness and manufacturing performance. For example, Emerenini and Ohadinma (2018) investigated the impact of trade liberalization on the manufacturing sector of the Nigerian economy spanning 1980 to 2016 using the Error Correction

Model (ECM) approach was used to analyze the data. The researchers tested the impact of trade openness, exchange rate, volume of exports/imports and balance of payment on manufacturing sector output. Their result pointed out that the short run effect of trade openness, exports and balance of payment have negative relationships with manufacturing output while the short run effects of exchange rate and imports exerts positive relationship with manufacturing output with only imports and exports being significant. Ashamu and Abiola (2014) investigated the impact of international trade on Nigerian Manufacturing sector growth. They employed the cointegration and error- correction modeling techniques to explore the long-run dynamic relationship between some proxies of international trade on one hand, and Nigeria's manufacturing sector growth on the other. Their study showed that there is a long-run relationship between the two. Also, they found that despite the positive relationship between, exports imports and the Nigerian manufacturing sector's growth, both exports and imports do not have significant impact on the Nigerian manufacturing sector's growth. Their findings further revealed that Nigeria's manufacturing sector has not been benefiting from trade liberalization as the coefficient of trade openness is negative. Nevertheless, some studies have revealed mixed findings on the relationship between trade openness and manufacturing sectors performance. In order to study the role of trade liberalization in the growth of manufacturing output in Nigeria, Ogu, Aniebo and Elekwa (2016) focused on the short to medium term period while not ignoring the very important long term on which most studies have focused. Trade liberalization was found to hurt manufacturing output in the short run although it showed a real potential to boost it in the long term. An overhaul of competition policy was recommended with a view to establishing Neutral Status in manufacturing export trade. Also, Takam et al (2017) examined the effect of trade openness on manufacturing growth in Economic and Monetary Community of Central Africa (EMCCA) countries with the use of panel data covering the period from 1984 to 2014. The estimation technique was panel cointegration as well as Dynamic Ordinary

Least Square method. Their results signified two effects. Firstly, there is a positive and significant effect of Foreign Direct Investment and investment on manufacturing growth. Secondly, there is an ambiguous effect of trade openness on manufacturing growth. They pointed out that indeed, trade openness affects either negatively the manufacturing growth or has no effect on manufacturing growth in EMCCA countries. From the above, it can be observed that the debate is still ongoing on the relationship between trade openness and the manufacturing sector performance.

3. Methodology

3.1 Data and Source

The data employed in this study are secondary data as well as annual time series data. The data are obtained from the World Bank development indicators (2022). The period covered is from 1981 to 2022, a period of forty-one years (42 years). The data includes manufacturing output (MO) measured by Manufacturing, value added (constant LCU), trade openness (TO) measured by Trade (% of GDP), interest rate measured by Interest rate spread (lending rate minus deposit rate, %) and exchange rate measured by Official exchange rate (LCU per US\$, period average).

3.2. Model Specification

The model of this study is specifying as:

$$MO_t = (TO, INT, EXR).....(1)$$

The econometric model of equation (1) can be written as:

$$MO_t = \alpha_0 + \beta_1 TO_t + \beta_2 INT_t + \beta_3 EXR_t + \varepsilon_t....(2)$$

Were

MO = Manufacturing sector output

TO = Trade openness proxy by Total Trade

INTR = Interest Rate

EXR = Exchange rate

t= time period

α_0 = intercept

β_1 to β_3 = are coefficients of the variables

ε_t = error term

4. Results and Discussions

4.1 Unit Root Tests

The time series properties of the data were checked through the use of various methods to examine the stationarity or otherwise of the variables in order to avoid mis-specification of the model. In this study, two different unit root tests were employed with trend and

intercept in order to have robust results. These are Augmented Dickey Fuller (ADF), Phillips-Perron (PP). All unit root tests employed in this study have a null hypothesis stating that, the series in question has a unit root against the alternative that the variable does not have a unit root. Table 1 below presents the unit root tests.

Table 1 Unit Root Tests

Variables	ADF unit root (at level)		PP unit root (at Level)	
	T statistic	Probability	T statistic	Probability
LMO	-2.472792	0.3391	-2.63008	0.2698
TO	-2.400375	0.3740	-2.312959	0.4179
INT	-2.691703	0.2452	-2.556011	0.3014
EXCR	0.096299	0.9962	0.060992	0.9958
	ADF unit root (at 1st Difference)		PP unit root (at 1st Difference)	
	T statistic	Probability	T statistic	Probability
ΔLMO	-4.959997	0.0013*	-4.930624	0.0014*
ΔTO	-4.937328	0.0019*	-13.33665	0.0000*
ΔINT	-6.732852	0.0000*	-13.73297	0.0000*
ΔEXCR	-4.93124	0.0014*	-4.797426	0.0021*

Source: researcher's computation 2023

Note: * shows statistical at 1% level of significant

The results in table 1 show that, all the variables are not stationary at level but stationary at first difference which implies that all the variables are characterized as *I* (1) processes. Since all the variables are stationary at

first difference, the unit root test results validated the test for cointegration before taking the appropriate model to be adopt. Therefore, Johansen cointegration test was employed. Table 2 present the Johansen cointegration test below

Table 2: Johansen Cointegration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized	Eigenvalue	Trace	0.05	Prob.**
No. of CE(s)		Statistic	Critical Value	
None	0.410667	36.69482	47.85613	0.3621
At most 1	0.238945	16.07301	29.79707	0.7071
At most 2	0.080638	5.424072	15.49471	0.7623
At most 3	0.053518	2.145149	3.841466	0.1430
Trace test indicates no cointegration at the 0.05 level				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized	Max-Eigen		0.05	Prob.**
No. of CE(s)	Statistic		Critical Value	

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.410667	20.62180	27.58434	0.2997
At most 1	0.238945	10.64894	21.13162	0.6822
At most 2	0.080638	3.278923	14.26460	0.9264
At most 3	0.053518	2.145149	3.841466	0.1430

Max-eigenvalue test indicates no cointegration at the 0.05 level

Source: researcher's computation 2023

Table 2 presented the Johansen cointegration test and the results show the absence of cointegration among the variables in both trace test and Maximum Eigen value test which paved way to used standard (unrestricted) VAR. The unrestricted VAR chooses the optimal lag

length in line with the information provided by the lag order selection criteria in order to avoid specification error. Table 3 presents the VAR lag order selection criteria and the results reveal that all the criteria selected lag one (1) as shown below:

Table 3: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-442.1326	NA	185202.6	23.48067	23.65304	23.542
1	-313.3392	223.6938*	492.1579*	17.54417*	18.40606*	17.85082*
2	-298.907	22.02817	551.0605	17.62668	19.17808	18.17866
3	-293.7348	6.805513	1053.651	18.19657	20.43747	18.99386
4	-275.8744	19.74038	1118.162	18.09865	21.02907	19.14127

Source: researcher's computation 2023

4.2 Estimation of the model

Since the VAR model was estimated at lag 1, the next is to look in to the stability of the model before we move to the estimation of Structural VAR to a void unbiased estimation. Figure 1 shows the result of stability test and the VAR satisfies the stability condition since no root lies outside the unit circle as shown below

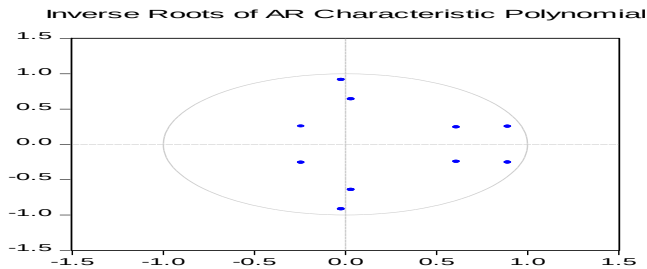


Figure 1 VAR stability Test

Source: researcher's computation 2023

Since the VAR is stable, our main concern is to estimate Structural VAR model in order to achieve our objective. Hence, we have estimated the SVAR model based on long run identification proposed by Bernanke (1986) and Amisano and Giannini (2012) and generated the Impulse Responses and SVAR Forecast Error Variance Decomposition. The results of SVAR Impulse Responses is presented in figure 2 below

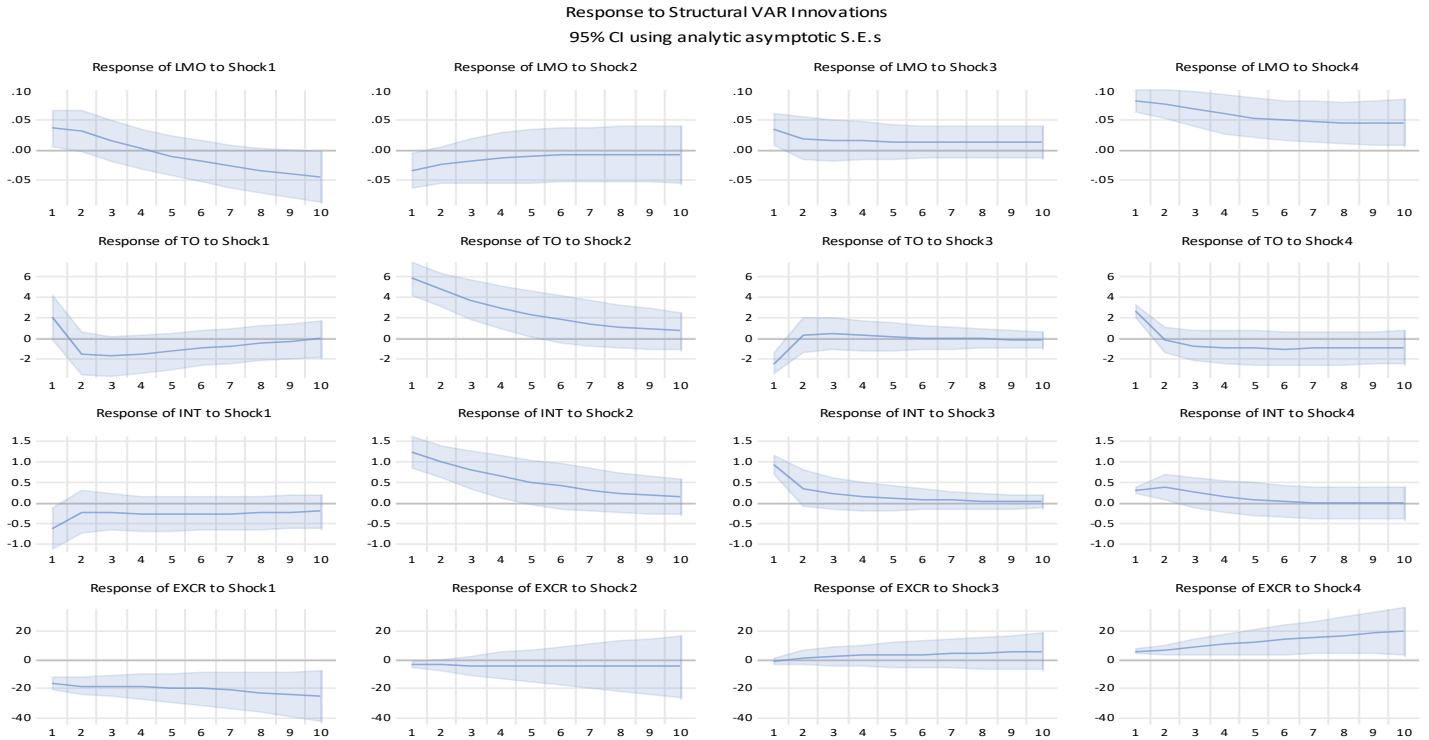


Figure 2 SVAR Impulse Responses

Source: researcher's computation 2023

Figure 2 shows the results of the SVAR Impulse Responses and our objective is to look into the response of manufacturing output (LMO) due to a 1-unit shock to itself and other variables. The response of LMO to itself and other variables in figure 2 shows that, one unit shock to itself (shock 1) accounted for a positive response at period 1 to 4 and negative response for the remaining periods. A one-unit shock of Trade openness (shock 2) accounted for a negative response of manufacturing output throughout the periods. While a unit shock to INT (Shock 3) and

EXCR (shock 4) accounted for a positive response to manufacturing output in Nigeria throughout the periods. The impulse response functions show how an endogenous shock affects the other variables in the SVAR; while, the variance decomposition offers details on the relative contribution of each random innovation to the variation in the SVAR. Table 4 presents the SVAR Forecast Error Variance Decomposition with specific focuses on Proportions of forecast error in manufacturing output accounted by the variables under study.

Table 4 Variance Decomposition of LMO

Period	S.E.	Shock1	Shock2	Shock3	Shock4
1	0.104958	0.041509	14.13680	25.26021	60.56147
2	0.157538	0.031791	12.05221	25.68939	62.22661
3	0.187947	0.584089	13.17708	27.70091	58.53792
4	0.204389	2.179398	14.90115	27.43524	55.48421
5	0.214781	4.104567	16.24718	26.31519	53.33305
6	0.223297	6.362519	17.10606	25.22911	51.30231
7	0.231777	9.197928	17.55262	24.16388	49.08557

8	0.240880	12.51837	17.66517	23.03042	46.78603
9	0.250828	16.11624	17.52331	21.86557	44.49489
10	0.261758	19.89845	17.19478	20.71256	42.19420

Source: researcher's computation 2023

The results of SVAR Forecast Error Variance Decomposition of LMO (shock 1) in table 4 reveals that, manufacturing output (shock1) accounts for less than 0.05% variation to itself for the first two periods from there its contribution to itself account for about 20% variation at the end of the period. Trade openness (shock 2) accounts for 14.14%, in the first period, 16.25% in the fifth period and 17.19% at the end of the period respectively. While interest rate (shock 3) and exchange rate (shock 4) account for 25.26% and 60.56% contribution to manufacturing output at first period and eventually decline to 20.71% and 42.19% at the end of the period respectively.

4.3 Post-Estimation Statistical Diagnostic Tests

In order to have acceptable results some statistical diagnostic tests were carried out which includes serial correlation test, autocorrelations test and normality test. The results of serial correlation and autocorrelations tests reported in table 5 revealed that the residuals of the model are not serially correlated and also the errors term are homoscedastic which corroborates the fact that the SVAR model used in this paper can be adjudged as statistically adequate. In addition, the result of normality test in table 6 showed that the errors are normality distributed.

Table 5: Diagnostic Tests

VAR Residual Serial Correlation LM Tests					
LRE* stat	Df	Prob.	Rao F-stat	Df	Prob.
36.46715	25	0.0648	1.667302	(25, 34.9)	0.0806
VAR Residual Portmanteau Tests for Autocorrelations					
Q-Stat	Prob.*	Adj Q-Stat	Prob.*	Df	
32.98982	0.0703	44.12004	0.1260	25	

Table 6 Normality Test

Jarque-Bera	Df	Prob.
0.482114	2	0.7858

4.4 Discussion of the findings

The characteristics of time series data were checked first using ADF and PP unit root tests with trend and intercept were carried out to check the stationary of the data and the empirical results revealed that the variables were stationary at first difference that is, it was integral of order one process $I(1)$. This paved way to conduct the cointegration test using Johansen Cointegration test developed by Johansen Seren in 1991. The empirical

findings of cointegration showed the absence of cointegration among the series under study. The absence of cointegration among the series paved way to used Structural Vector Autoregressive (SVAR) model instead of Structural Vector Error Correction model (SVECM).

The results of SVAR Impulse Responses function showed that, one unit shock of manufacturing output (shock 1) accounted for a positive response at period 1

to 4 and negative response for the remaining periods. This implies that in the short run manufacturing output accounted for a positive response of two itself and a negative response to itself in the long run. Also, the result shows that, a one-unit shock of Trade openness (shock 2) accounted for a negative response to manufacturing output throughout the periods. This implies that as trade liberalization policy continues in Nigeria the manufacturing output decline as more foreign goods prefer by Nigerian than our local ones. While a unit shock to INT (Shock 3) and EXCR (shock 4) accounted for a positive response to manufacturing output in Nigeria throughout the periods. This means if there is any improvement of exchange rate policy; it may lead to increase in manufacturing output and at the same time interest has a positive response to manufacturing output in Nigeria. From economic point of view interest rate and investment have inverse relationship but from the finding of the study it indicates that a unit shock of interest rate account for a positive response to manufacturing sector. This is due to the fact that people prefer to save the money if the interest rate is high and even the manufacturers tend to sell more of the product in order to save some the money in the financial institution in order to gain more interest from the saving they made.

The result of SVAR Forecast Error Variance Decomposition of LMO (shock 1) revealed that, manufacturing output (shock1) accounts for less than 0.05% variation to itself for the first two periods from there its contribution to itself account for about 20% variation at the end of the period. This implies that other factors are the major contribution in variation of manufacturing output in Nigeria. Trade openness (shock 2) accounts for 14.14%, in the first period, 16.25% in the fifth period and 17.19% at the end of the period respectively. This indicates that trade openness

has some influence in the variation to Manufacturing output in Nigeria as its contribution is more than 17% at the end periods. While interest rate (shock 3) and exchange rate (shock 4) account for 25.26% and 60.56% contribution to manufacturing output at first period and eventually decline to 20.71% and 42.19% at the end of the period respectively. This implies that interest and exchange are among the significant factors in the contribution of the variation to manufacturing output in Nigeria.

The findings in line with findings of Emerenini and Ohadinma (2018) and Ashamu and Abiola (2014) in Nigeria, Takam et al (2017) in Economic and Monetary Community of Central Africa among others and contradict with findings Yasin (2022) in Indonesia, Neoh and Lai (2021) in Malaysia, Umoh and Effiong (2013) in Nigeria among others

5. Conclusions and Recommendations

The study investigates the impact of trade openness on manufacturing output in Nigeria from 1981 to 2022 by adopting SVAR model. The findings demonstrate a negative and significant relationship between trade openness and manufacturing output in Nigeria, while exchange rate and interest rate have significant impact on manufacturing output in Nigeria, with a shock to exchange rate having a much more significant and positive impact on manufacturing output. Therefore, the paper concludes that, trade openness detriment manufacturing output in Nigeria. Based on these results, the paper recommends that trade policy should be geared toward protecting our local manufacturing sector through imposition of high import duties of the similar product produce in the country to protect the manufacturing sector.

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