External Sector and The Performance of Manufacturing Sector in Nigeria

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Abstract: **The reliance of the Nigerian economy especially, the manufacturing sector on inputs and raw materials from the external economies makes it imperative to study how the external sector has affected the performance of the sector. In order to achieve this purpose, data on trade openness, foreign direct investment, foreign debt and exchange rate of the naira to the US dollar were sourced from the World Bank data base and regressed on share of the manufacturing sector to GDP using Parsimonious Vector Error Correction model (VECM) method. The result of Johansen Cointegration Test showed that there exists a long run relationship or cointegration between external sector and the performance of manufacturing sector in Nigeria. The result of Parsimonious Vector Error Correction Model showed that trade openness and external debt have positive effects on the performance of manufacturing sector in Nigeria while foreign direct investment and exchange rate have negative effects on the performance of manufacturing sector in Nigeria over the period of investigated (1985 – 2020). The result further revealed very high speed of adjustment among the variables in the manufacturing sector in the changes in the long run dynamics. The model diagnostic test indicated that the variables conformed to basic assumptions of the ordinary least squares estimation. Based on the findings, the study concluded that the external sector has significant effect on performance of the manufacturing sector in Nigeria. Consequent upon these findings, the paper recommends; a review of trade policy to favour domestic production, wooing of foreign investment and proper utilisation of foreign borrowing as possible ways of improving the performance of the manufacturing sector and the Nigerian economy at large.**

Key Words**: Manufacturing sector, trade openness, FDI, external debt and exchange rate**

I.INTRODUCTION

Industrial sector has been described as the heartbeat of every successful economy; this is due to the fact that it involves production and manufacturing of output in a large scale which simply opens up the economy to the outside world (Ayeyemi, 2013). Manufacturing sector as a sub-sector of the industrial sector deals with the productions of goods and services through combined utilization of raw materials and other production factors such as labour force, land and capital or by means of production process (Anyanwu, 2010). As the production of the output of the economy increases as a result of mass production of goods and services with the use of better utilization of technologies, materials and good labour capabilities, there is incidence of capital formation which invariably increases economic performance of the country (Okuneye, 2019). However, it is important to note that all industries in Nigeria require inputs for production of goods and/or services; most of these inputs are being imported from abroad. Therefore, external sector is expected to affect cost of inputs, overall level of output in the long-run as well as industrial development. According to Akidi, Tubotamuno, and Obayori (2018) external sector is one of the most important sectors in the growth and development process of any economy, be it developed or developing. This is because the external sector is a network of economic transactions a country has with other countries. It reflects the economic transactions between the residents of an economy and the rest of the world.

Consequently, the optimal functioning of the external sector is important to the growth and stability of every open economy. The external sector can either be in a state of stability or in a state of instability in deficit or surplus. A stable and balanced state of equilibrium occurs when receipts (inward payments) from activities in the sector are exactly enough and equal to outpayments (Gbosi, 2015). According to Mordi, Englama and Adebusuyi (2010) the major indicators of external sector are trade openness, exchange rate and external debt. Other indicators include: Foreign Exchange Earnings, Imports, Foreign Portfolio Investment (FPI) and Foreign Direct Investment (FDI). These indicators contribute in one way or the other to performance of manufacturing sector in Nigeria. For instance, Ejike, Anah and Onwuchekwa (2015) noted that the ultimate goal of trade openness is to enhance free trade by the removal of all trade barriers and restrictions. This is believed to promote the growth of manufacturing sector and the economy as a whole by capturing the static and dynamic benefits from trade through a more robust and efficient allocation of resources, healthy competition among nations, increase in the flow and exchange of technological advancement and investment, and of course, a faster pace of technological progress and capital accumulation. Also, exchange rate as an indicator of external sector bear on trade by determining the relationship between international and domestic prices (Olufayo & Fagite, 2014). In addition, inflow of foreign direct investment has positive spillover associated with the provision of funds and expertise that could help smaller companies to expand and increase international sales and transfer of technology hence, contribute to the growth of the manufacturing sector and the economy as a whole (Asogwa & Osondu, 2014).

However, despite the introduction of the various industrialization strategies by successive governments in Nigeria, there have not been significant improvement in the performance of industries in Nigeria. Also, the contribution of manufacturing sector Nigerian to Gross Domestic Product has been very low and quite unimpressive. Furthermore, even with some foreign investors aiming at boosting the activities of the manufacturing sector on the growth outlook in Nigeria, the available industrial outlet is still operating below the installed capacity while the presence of foreign and domestic investors, and their positive influence on the performance of manufacturing sector is yet to be seen or felt. Consequently, a good number of related empirical studies (Akidi, Tubotamuno & Obayori, 2018; Nelson & Wilberforce, 2018; Nwaeze, 2017; Omekwe, Kalu & Otto, 2017) but there seem to be no well-established conclusion regarding the direction and extent of the effect of external sector on the performance of manufacturing sector in Nigeria as most of the related studies showed lack of consensus in their findings. Hence, the lack of consensus among literatures clearly shows that further study needs to be carried out in this area.

Therefore, the aim of this study is to determine the effect of external sector on the performance of manufacturing sector in Nigeria. Specifically, the study intends to: determine the effects of trade openness on the performance of manufacturing sector in Nigeria, ascertain the effects of exchange rate on the performance of manufacturing sector in Nigeria, evaluate the effects of foreign direct investment on the performance of manufacturing sector in Nigeria, and analyze the effects of external debt on the performance of manufacturing sector in Nigeria. The remaining part of this study will be structured such that the next section (section two) will deal with review of related literature such as theoretical framework, empirical review and literature gap. Section three will deal with the methodology. Section four will analyze the data and discuss the results, while section five will wrap it up with conclusion and recommendations.

II. LITERATURE REVIEW

Theoretical literature

(a) Two-Gap Model

The two-gap model postulated by two theorists, Harrod (1939) and Domar (1946) is regarded as a post Keynesian growth model for closed economies. The major component of the model states that most countries are underdeveloped either because they are faced with a shortage of domestic savings to augment for investment opportunity or they are faced with foreign exchange constraints to finance the needed capital and international goods. The model therefore, introduces the assumption that an imported commodity not produced domestically is essential for the production of investment goods (Nwaeze, 2017). The model is represented thus:

$$Y = C + I + (X-M) \quad 1$$

where: (X-M) equals to net export.

Equation (2.1) can be rearranged as:

$$Y + M = C + I + X \quad 2$$

Thus, sources of income in the economy = uses of resources in the economy.

Equation (2.2) can be broken down further to:

$$S + C + M = C + I + X \quad 3$$

Subtracting C from both sides and defining savings (S= Y-C),

$$S + M = I + X \quad 4$$

The two-gap model is then represented by:

$$M-X = I-S \quad 5$$

(Foreign exchange gap) = (Savings gap).

In essence therefore, the model states that if the available domestic savings fall short of the level necessary to achieve the target rate of growth, a savings-investment gap is said to exist. And to close this gap requires Foreign Direct Investment (FDI); so also, if the maximum import requirement needed to achieve the growth target are greater than the maximum possible level of export, this is a situation of high importation which will lead to a shortfall in the foreign exchange. This creates the trade gap which can be corrected by foreign aid (Nwaeze, 2017). Despite the plausible contribution of this model, however, as observed by Abdullahi, Aliero and Addullahi (2013) the model is not immune to some weaknesses, as it focuses exclusively on the savings-investment gap to achieve growth. By not considering the performance of the external sector of the borrower's economy, the model is silent on this transformation problem being a close economy growth model. The relevance of this theory to this study is that the model promotes domestic savings as a compulsion to achieving a target rate of growth. It also affirmed that the external sector plays a pivotal role in industrial development, economic growth and/or development trajectory of any given economy, as it could be used to bridge the domestic savings-investment gap through Foreign Direct Investment, foreign exchange and foreign aid while maintaining external stability (Nwaeze, 2017).

(b) The Traditional Flow Model

The traditional flow model is also known as the balance of payment model. In this model, the exchange rate is in equilibrium when supply equals demand for foreign exchange (Olisadebe, 1991). The exchange rates adjust to balance the demand for foreign exchange depends on the demand domestic residents have for domestic goods and assets. On the assumption that the foreign demands for domestic goods is determined essentially by domestic income, relative income plays a role in determining exchange rate under the flow model. Since assets demand can be said to demand on difference between domestic and foreign interest rates, differential is other major determinants of the exchange rate in this frame work (Amassoma & Odeniyi, 2016). This theory further stipulates that under free exchange rates, the exchange rate of the

currency of a country depends upon its balance of payment. A favourable balance of payments raises the exchange rate, while an unfavourable balance of payments reduces the exchange rate (Jhingan (2004). Thus, the theory implies that the exchange rate is determined by the demand for and supply of foreign exchange. The major limitation of the traditional model or the portfolio balance model is the over-shooting of the exchange rate target and the fact that substitutability between money and financial asset may not be automatic (Amassoma & Odeniyi, 2016).

Empirical Review

Omoke and Opuala–Charles (2020) attempted to fill the prior knowledge gap in the nexus between trade openness and economic growth in Nigeria by incorporating the role of institutional quality. The study covered the period from 1984 to 2017 and employed three indicators of trade openness including total trade, import trade, and export trade. Cointegration among the variables is examined using the ARDL bounds testing approach. The results provided evidence of a long-run relationship among the variables. The estimates suggested that export trade has a significant positive impact on economic growth while the impact of import trade on economic growth is negative and significant. The results also showed that the negative long-run effects of import trade on economic growth in Nigeria decreases as institutional quality (quality of governance) improves. These empirical results have important policy implications for Nigeria. Among others, the study highlights the needs to improve the quality of governance in the country.

Effiong, Odey and Nwafor (2019) investigated the nexus between globalization, foreign direct investment and industrial sector performance in Nigeria. In achieving this, contemporary econometric approach involving unit root tests, co-integration test and error correction model was adopted to analyze the time series data from 1981 to 2017. The study used trade openness and current account balance to capture globalization while portfolio investment was used to represent foreign direct investment (FDI) inflows into the country. The findings revealed that FDI has a direct relationship with the Nigerian industrial sector, and globalization exerts a positive impact on industrial sector performance. It was concluded from the study that the development of any nation is tied to the ability of the country to industrialize its manufacturing sector, and industrial performance is seen as a surest way for countries especially developing economies to enhance sustainable growth and development. The study recommended amongst others; the development of the manufacturing, mining and quarrying sub-sectors of the industrial sector, and reduce the over dependence on crude oil revenue which has partly led to the neglect of these sub-sectors.

Sule (2019) examined the potential of external financing in spurring industrial growth in Nigeria within the period of 1985-2018. The study used Industrial Output (INDO), External Loans (EXL), Foreign Direct Investment (FDI), Remittances (RIMT), Gross Fixed Capital Formation (GFCF), Industrial Energy Consumption (IEC) and Contract Intensive Money (CIM) as variables in estimating the relationship. The study hinged on Great Big Push Theory and Kaldor‟s First Law and adopted the Autoregressive Distributive Lagged (ARDL) bound approach as the estimation technique. The findings revealed that, a positive relationship exists between EXL and INDO while FDI and RIMT exerts a negative effect on industrial growth. The control variables further showed that GFCF, IEC, CIM exerts positive influence on industrial growth. Since only EXL exerts positive influence on INDO, the study concludes that external financing (that is, FDI and RIMT) has not yielded the desired effect on industrial growth in Nigeria. The study recommended amongst others that; public-private partnership, is necessary to spur the industrial sector activities with strong institutional setup.

Ajayi and Araoye (2019) examined the effect of trade openness on economic growth of Nigeria using data from 1970 to 2016. The study used secondary data obtained from world development data base (2000), World Bank and International Financial Statistics, IFS- International Monetary Fund Data Base (2010) and Central Bank of Nigeria Statistical Bulletin 2014. Using the Augmented Dickey-Fuller (ADF) and Phillip-Peron (PP) unit root test, the study discovered that all the series are non-stationary at levels. However taking the variables at first difference, results showed that all are I(1) at 5% for ADF and 1% for PP level of significance except the labour input which was not stationary at first difference in ADF. The findings from Co-integration test showed that an equilibrium relationship exists among the variables and using the Co-integration test in line with Engel and Granger (1987) which believed that there is a long-run relationship among economic variables if tested for unit root problem and since no problem is found which then conform with the claim of the study. Thus, all the coefficients were correctly signed and stationary at 5% level. Trade openness and economic growth depicted a positive relationship but a negative relationship existed between economic growth and exchange rate but this was expected especially for a country that engaged in international trade.

Akidi, Tubotamuno and Obayori (2018) empirically examined the effects of selected external sector aggregates on economic growth in Nigeria from 1981 to 2016. Time series data on Real Gross Domestic Productas proxy for economic growth, and on Imports, Exports, Exchange Rate and Foreign Direct Investment were collected from secondary sources. The data sets were analyzed using descriptive statistics, unit root test, co-integration test and error correction technique of model estimation. The result of the analysis revealed that Imports, Exchange Rate and Foreign Direct Investment are negatively related with economic growth while Exports positively related with economic growth in Nigeria within the reviewed period. Also, except Exchange Rate all the other explanatory variables – Imports, Exports and Foreign Direct Investment did not impact significantly on economic growth in Nigeria within the period of study. Based on these findings, the study recommends

that government should encourage export diversification, especially the nonoil sector exports. This can be achieved through value addition in both the agriculture and manufacturing subsectors output.

Bamidele, Olukayode, Oluwaseyi and Olorunfemi (2018) investigated the growth effects of external sector in Nigeria taking into consideration the role played by non-oil export commodities within the periods, 1980-2016. The Vector Error Correction Model (VECM) was employed to analyse the dynamic long-run and short-run estimates. The stationarity level of the variables at first difference and cointegration are confirmed prior VECM estimation. The results showed that the parameter of non-oil export was positive and significant at 10% in the long-run indicating that the contribution of non-oil export commodity on output growth is weak. However, the parameter was positive and significant in the short-run at the conventional level. This implies that government policy should be directed towards increasing non-oil export commodities of agriculture, manufacturing and service industries with the aim of boosting output growth in Nigeria.

Aidi, Saidu and Suleiman (2018) investigated the relationship between exchange rate volatility and industrial sector performance in Nigeria using quarterly time series data spanning from 1980Q1 to 2016Q4. The researchers relied on the use of OLS multiple regression technique for analysis while exchange rate volatility was generated using Exponential Generalised Autoregressive Conditional Heteroskedasticity (EGARCH). The result showed that exchange rate volatility is inversely related to industrial sector performance (using industrial sector contribution to GDP as a proxy) in Nigeria. Furthermore, trade openness was observed to have a negative sign (though statistically insignificant) while exchange rate and interest were also found to be strong and significant positive drivers of industrial sector performance in Nigeria. Following the findings, the Nigeria government and other stakeholders are advised to hasten efforts to arrest the perennial fluctuations in exchange rate in the country in order to stimulate expansion of productivity in industrial sector.

The review done exposed us to works carried out by researchers on the issue being investigated. However, there appears to be some gaps in empirical studies especially in the Nigerian context on the link between external sector and the performance of manufacturing sector. Most of the studies were concerned about external sector and economic growth. Those that embarked on studies that linked external sector to manufacturing sector performance did not used the variables utilised in this study. These are some of the gaps the paper seeks to bridge.

III. METHODOLOGY

in order to achieve the purpose of this paper, time series data sourced from the World bank data base were used. This paper is hinged on Two-Gap Model of Harrod (1939) and Domar (1946). The model introduces the assumption that an imported commodity through external sector, which is not produced domestically, is essential for the production of investment goods. In addition, the model of this study is built on the work of Akidi, Tubotamuno and Obayori (2018) in his analysis of the external sector aggregates and economic growth in Nigeria. However, the model for the study is modified to incorporate the effect of external sector on manufacturing sector performance in Nigeria by including all the variables used in this study. Therefore, the model is expressed in its functional, mathematical and econometric forms respectively:

Expressing the model in its functional form, we have:

$$MGDP_t = \delta\left(TPN_t^{\delta_1},\ EXR_t^{\delta_2},\ FDI_t^{\delta_3},\ EDT_t^{\delta_4}, U_t^{e_t}\right) \quad (6)$$

Equation 6 can be explicitly stated as:

$$\ln MGDP_t = \delta_0 + \delta_1 \ln TPN_t + \delta_2 \ln EXR_t + \delta_3 \ln FDI_t + \delta_4 \ln EDT_t + \mu_t \quad (7)$$

A Priori Expectation: $\delta_1 > 0$, $\delta_2 < 0$, $\delta_3 > 0$, $\delta_4 > 0$.

Where: MGDP = Manufacturing Sector share of Gross Domestic Product; TPN = Trade Openness; EXR = Exchange Rate; FDI = Foreign Direct Investment; EDT = External Debt, δ_0 = intercept, δ_1 - δ_4 = parameters of independent variables, log =Natural logarithm, μ_t = disturbance or error term.

To examine the short run relationship, this study employed Vector Error Correction approach. The model is stated below:

$$\Delta\ln(MGDP_1) = \beta_0 + \sum_{i=1}^{p}\lambda_1\Delta\ln(MGDP_{t-1}) + \sum_{i=1}^{q}\lambda_2\Delta\ln(TPN_{t-1}) + \sum_{i=1}^{q}\lambda_3\Delta\ln(EXR_{t-1}) + \sum_{i=1}^{q}\lambda_4\Delta\ln(FDI_{t-1}) + \sum_{i=1}^{q}\lambda_5\Delta\ln(EDT_{t-1}) + \delta ECT_{t-1} + \psi_t \quad (8)$$

$$\Delta\ln(TPN_1) = \beta_0 + \sum_{i=1}^{p}\lambda_1\Delta\ln(TPN_{t-1}) + \sum_{i=1}^{q}\lambda_2\Delta\ln(MGDP_{t-1}) + \sum_{i=1}^{q}\lambda_3\Delta\ln(EXR_{t-1}) + \sum_{i=1}^{q}\lambda_4\Delta\ln(FDI_{t-1}) + \sum_{i=1}^{q}\lambda_5\Delta\ln(EDT_{t-1}) + \delta ECT_{t-1} + \psi_t \quad (9)$$

$$\Delta\ln(EXR_1) = \beta_0 + \sum_{i=1}^{p}\lambda_1\Delta\ln(EXR_{t-1}) + \sum_{i=1}^{q}\lambda_2\Delta\ln(MGDP_{t-1}) + \sum_{i=1}^{q}\lambda_3\Delta\ln(TPN_{t-1}) + \sum_{i=1}^{q}\lambda_4\Delta\ln(FDI_{t-1}) + \sum_{i=1}^{q}\lambda_5\Delta\ln(EDT_{t-1}) + \delta ECT_{t-1} + \psi_t \quad (10)$$

$$\Delta\ln(FDI_1) = \beta_0 + \sum_{i=1}^{p}\lambda_1\Delta\ln(FDI_{t-1}) + \sum_{i=1}^{q}\lambda_2\Delta\ln(MGDP_{t-1}) + \sum_{i=1}^{q}\lambda_3\Delta\ln(TPN_{t-1}) + \sum_{i=1}^{q}\lambda_4\Delta\ln(EXR_{t-1}) + \sum_{i=1}^{q}\lambda_5\Delta\ln(EDT_{t-1}) + \delta ECT_{t-1} + \psi_t \quad (11)$$

$$\Delta\ln(EDT_1) = \beta_0 + \sum_{i=1}^{p}\lambda_1\Delta\ln(EDT_{t-1}) + \sum_{i=1}^{q}\lambda_2\Delta\ln(MGDP_{t-1}) + \sum_{i=1}^{q}\lambda_3\Delta\ln(TPN_{t-1}) + \sum_{i=1}^{q}\lambda_4\Delta\ln(EXR_{t-1}) + \sum_{i=1}^{q}\lambda_5\Delta\ln(FDI_{t-1}) + \delta ECT_{t-1} + \psi_t \quad (12)$$

Where:

Δ = the difference operator and indicates the optimum lag
β_0 = constant variable
$\lambda_1 - \lambda_5$ = explanatory variables parameters (corresponding short run multipliers)
δ = the speed of adjustment which is expected to be less than zero
ψ_t = serially uncorrelated stochastic term with zero mean and constant variance.

Description of Variables in the Model

Operationally, the variables of this study are classified as explained (dependent) variable and independent (explanatory) variable:

Explained (Dependent) Variable

For the purpose of this study, the explained (dependent) variable is manufacturing sector performance and it is measured by manufacturing sector GDP.

Manufacturing sector GDP (MGDP): This is the monetary value of the final output of goods and services produced by manufacturing sector in an economy in a given period of time, usually a year.

Independent (Explanatory) Variables

For the purpose of this study, the independent (explanatory) variable is external sector and it is proxied by trade openness, exchange rate, foreign direct investment and external debt:

a. *Trade Openness (TPN):* This is the sum of export and import divided by Gross Domestic Product. It represents trade liberalization. Based on economic theory, the study expects the relationship between trade openness and manufacturing sector GDP to be positive.
b. *Exchange Rate (EXR):* This is the price for which the currency of one country is exchanged for another country's currency. Based on economic theory, the study expects the relationship between exchange rate and manufacturing sector GDP to be positive.
c. *Foreign Direct Investment (FDI):* This is an investment in the form of a controlling ownership in a business in one country by an entity based in another country. Based on economic theory, the study expects the relationship between foreign direct investment and manufacturing sector GDP to be positive.
d. *External Debt (EDT):* There are loans raised from foreign countries or international institutions like World Bank. IMF, Paris Club, and London club etc. to take up various developmental programmes. Based on economic theory, the study expects the relationship between external debt and manufacturing sector GDP to be positive.

Nature and Sources of Data

Annual time series data were used in this study and these data were sourced from Central Bank of Nigeria (CBN) and World Bank Development Indicators. The data covered the periods from 1985 to 2020, indicating thirty-six (36) years sample observations.

Estimation Procedure

The analytical procedure for this study began with providing the descriptive statistics of each variable included in our model. This was followed by trend analysis. In addition to this, a unit root test was conducted. In statistics, a unit root test tests whether a time series variable is non-stationary and possesses a unit root. The null hypothesis is generally defined as the presence of a unit root and the alternative hypothesis is either stationarity, trend stationarity or explosive root depending on the test used. To carry out the unit root test, Augmented Dickey-Fuller (ADF) Test Statistic and Philip-Perron (PP) Test Statistic were used. While the Augmented Dickey-Fuller approach accounts for the autocorrelation of the first differences of a series in a parametric fashion by estimating additional nuisance parameters, the Phillips-Perron unit root test makes use of non-parametric statistical methods to take care of the serial correlation in the error terms without adding lagged difference terms (Gujarati & Porter, 2009). Johansen Cointegration test was used to test cointegrating relationships among the variables while Parsimonious Vector Error Correction Model (VECM) was adopted since all the variables have I(1) series.

Post Estimation Tests

For the purpose of this study, the normal distribution of the residuals will be examined with the application of normality test. To achieve this, Jarque-Bera statistics was used to show the normal distribution of the regression variables. In addition, serial correlation tests will be carried out using the Breusch-Godfrey approach, stability test was conducted using plots of the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residual (CUSUMSQ), Ramsey Regression Equation Specification Error Test (RESET) test was used to test if model was correctly specified while test of heteroskedasticity was carried out using the Breusch-Pagan-Godfrey test of Heteroskedasticity. It is important to note that Econometric Views (E-Views) 12 statistical package facilitated the data analysis.

IV. DATA ANALYSIS AND DISCUSSION OF FINDINGS

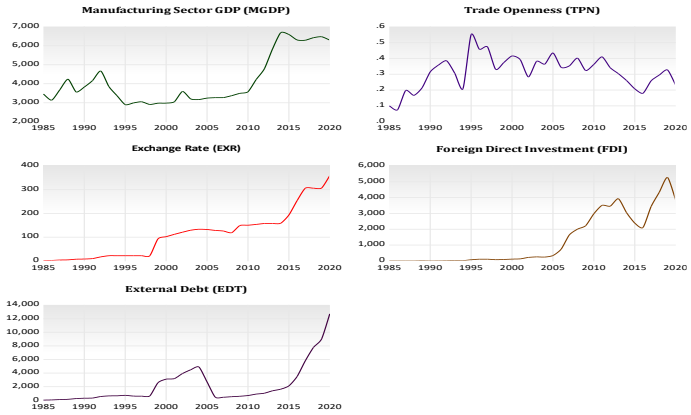
Table 1: Descriptive Statistics of Manufacturing Sector GDP (MGDP), Trade Openness (TPN), Exchange Rate (EXR), Foreign Direct Investment (FDI), and External Debt (EDT)

	MGDP	TPN	EXR	FDI	EDT
Mean	4135.120	0.316012	112.0042	1299.772	2191.653
Median	3573.665	0.329032	119.7700	236.7200	703.3550
Maximum	6684.220	0.550213	358.8100	5270.130	12705.62
Minimum	2898.470	0.075206	0.890000	0.430000	17.30000
Std. Dev.	1293.719	0.103568	100.1910	1628.718	2849.555
Skewness	0.985994	-0.284697	0.781219	0.876039	2.038875
Kurtosis	2.386003	2.955063	2.868912	2.321353	7.053259
Jarque-Bera	6.398595	0.489343	3.687597	5.295511	49.58543
Probability	0.040791	0.782962	0.158215	0.070810	0.000000
Sum	148864.3	11.37642	4032.150	46791.80	78899.52
Sum Sq. Dev.	58579783	0.375421	351338.2	92845287	2.84E+08
Observations	36	36	36	36	36

Source: Authors' Computation (2022).

The results of the descriptive statistics as presented in Table 1 show that Manufacturing Sector GDP (MGDP) has the highest mean value of ₦4135.12 billion. Followed by this is external debt (EDT) with an average value of ₦2191.65 billion. Foreign direct investment (FDI) came next in terms of the average (mean) value with ₦1299.77 billion while the average rate at which the Nigerian Naira exchanged to one US Dollar stood at ₦112.0 coupled with the average value of degree of trade openness which stood at 0.31 percent over the period of the study (1985 - 2020). Furthermore, the results of the descriptive statistics reported in Table 1 indicates that there is a wide deviation or dispersion in Manufacturing Sector GDP (MGDP), foreign direct investment (FDI) and external debt (EDT). This is evidence in the values of the standard deviation for Manufacturing Sector GDP (MGDP), foreign direct investment (FDI) and external debt (EDT). On the other hand, trade openness (TPN) and exchange rate (EXR) clustered around their mean values and this indicates a very marginal level of deviation or dispersion. Lastly, the average (mean) values of all the variables suggest that external sector in Nigeria has less implication on the performance of manufacturing sector in Nigeria.

Figure 1: Trend Analysis



Source: Authors' Computation (2022).

Figure 1 showed the trends in manufacturing sector gross domestic product (MGDP), trade openness (TPN), exchange rate (EXR), foreign direct investment (FDI), and external debt (EDT) in Nigeria from 1985 to 2020. As it is shown in the graphs, there are high levels of inconsistencies (upward and downward) in the movements of manufacturing sector gross domestic product and trade openness in Nigeria throughout the research period (1985 to 2020) while exchange rate, foreign direct investment and external debt were moderately consistent in their movements.

Table 2: Unit Root Test Result

Augmented Dickey Fuller (ADF) Test Statistic					Philip-Perron (PP) Test Statistic				
Variables	ADF	1% critical Value	5% critical Value	Order of Integration	Variables	PP Statistic	1% critical Value	5% critical Value	Order of Integration
LOGMGDP	-4.849926	-3.639407	-2.951125	1(1)	LOGMGDP	-4.878323	-3.639407	-2.951125	1(1)
LOGTPN	-4.095291	-3.653730	-2.957110	1(1)	LOGTPN	-7.834491	-3.639407	-2.951125	1(1)
LOGEXR	-5.388878	-3.639407	-2.951125	1(1)	LOGEXR	-5.407497	-3.639407	-2.951125	1(1)

LOGFDI	-7.965482	-3.639407	-2.951125	1(1)	LOGFDI	-7.974326	-3.639407	-2.951125	1(1)
LOGEDT	-4.057639	-3.639407	-2.951125	1(1)	LOGEDT	-4.005668	-3.639407	-2.951125	1(1)

Source: Authors' Computation (2022).

In order to ascertain the order of integration among the variables in the model, the unit root tests were carried out using Augmented Dickey Fuller (ADF) and Philip-Peron (PP) tests. These tests were carried out to identify the stationarity of variables used in this study. From the results of both the Augmented Dickey Fuller (ADF) and Philip-Peron (PP) unit root tests in Table 2, it was revealed that all the variables were stationary at first difference. Specifically, manufacturing sector gross domestic product (MGDP), trade openness (TPN), exchange rate (EXR), foreign direct investment (FDI) and external debt (EDT) were stationary at first difference i.e. integrated of order one [I(1)]. This is because the test statistics values for both tests were found to be greater than the critical values at 1% and 5% levels of significance.

Table 3: Johansen Cointegration Test Result

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Values	Prob.**	Max Eigen Statistics	0.05 Critical Values	Prob.**
None *	0.727192	99.57937	76.97277	0.0004	48.06249	34.80587	0.0008
At most 1	0.442563	51.51688	54.07904	0.0831	21.62303	28.58808	0.2983
At most 2	0.300364	29.89385	35.19275	0.1667	13.21622	22.29962	0.5358
At most 3	0.220878	16.67762	20.26184	0.1450	9.234759	15.89210	0.4091
At most 4	0.182217	7.442864	9.164546	0.1049	7.442864	9.164546	0.1049

Source: Authors' Computation (2022).

As shown in Table 3, since the Trace statistic value is greater than the 0.05 critical value and the Max Eigen statistic value is also greater than the 0.05 critical value at one co-integrating equation from each statistic respectively, there is therefore sufficient statistical evidence to reject the null hypothesis of no cointegration among the variables and conclude that there is existence of cointegration among all the variables at 5% level of significance. This further indicates that there exists a long run relationship or cointegration between external sector and the performance of manufacturing sector in Nigeria. Specifically, there is long-run relationship among manufacturing sector GDP (MGDP), trade openness (TPN), exchange rate (EXR), foreign direct investment (FDI) and external debt (EDT).

Table 4: Parsimonious Vector Error Correction Model Results

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.065850	0.026486	2.486249	0.0199
DLOG(MGDP(-1))	0.312980	0.144505	2.165881	0.0401
DLOG(TPN)	0.089730	0.063822	1.405940	0.1720
DLOG(TPN(-1))	0.188743	0.065371	2.887266	0.0079
DLOG(EXR)	-0.086309	0.075435	-1.144144	0.2634
DLOG(FDI(-1))	-0.067460	0.036182	-1.864479	0.0740
DLOG(FDI(-2))	-0.074009	0.037579	-1.969396	0.0616
DLOG(EDT)	0.185676	0.066944	2.773593	0.0111
DLOG(EDT(-1))	0.029684	0.038655	0.767904	0.4497
VECM(-1)	-0.239901	0.091483	-2.622354	0.0147
R^2 = 0.803023, Adj R^2 = 0.637148; F-statistics = 4.841121; DW = 2.382032				

Source: Authors' Computation (2022).

The result in Table 4 shows that manufacturing sector GDP is positively influenced by initial level and first lag of trade openness. However, the initial level was not significant while the first lag was significant. This result is in consonance with theoretical a priori expectation and theory. This result is also related to the finding of Ajayi and Araoye (2019) which stated that trade openness has a positive and significant relationship with economic growth in Nigeria.

On the other hand, manufacturing sector GDP is negatively and insignificantly influenced by exchange rate. This implies that changes in exchange rate will insignificantly retard the performance of manufacturing sector in Nigeria. This result

agrees with theoretical a priori expectation and theory. This result is also in agreement with the finding of Akidi, Tubotamuno and Obayori (2018) which stated that exchange rate has a negative relationship with economic growth in Nigeria.

In addition, manufacturing sector GDP is negatively and insignificantly influenced by changes in foreign direct investment. This implies that foreign direct investment has either been low or insufficient hence has negative and less marginal impact on the performance of manufacturing sector in Nigeria. The finding is also related to the finding of Akidi, Tubotamuno and Obayori (2018) who found that foreign direct investment is negatively related to economic growth in Nigeria.

In furtherance, manufacturing sector GDP is positively influenced by initial level and first lag of external debt. However, the initial level was significant while the first lag was not significant. This implies that increase in external debt will improve the performance of manufacturing sector in Nigeria. This result agrees with theoretical a priori expectation and theory. This result is also supported by the result of Sule (2019) who established a positive and significant relationship between external loans and industrial output in Nigeria.

Also, the error term coefficient of -0.239901 shows an evidence of speedy adjustment towards long run equilibrium (i.e about 24 percent disequilibrium is corrected on yearly basis by changes in manufacturing sector GDP). In other words, the appropriateness of the sign of the error correction model and its significance at five percent (5%) level indicates that all the variables adjust speedily to long run dynamics. Moreover, the Adjusted R-squared (goodness of fit) value of 0.637148 indicates that 64 percent of the total variation in manufacturing sector GDP is explained by trade openness, exchange rate, foreign direct investment and external debt. Also, the F-ratio of 4.841121 shows that trade openness, exchange rate, foreign direct investment and external debt have joint significant effect on manufacturing sector GDP. This also indicates that the model is statistically significant and is therefore fit for prediction. Lastly, Durbin-Watson value of 2.382032 shows that there is absence of serial correlation in the model.

Table 5: Diagnostic Tests Results

Test	Test Statistic	P-value	Null Hypothesis	Decision
Breusch-Godfrey Serial Correlation LM Test	F(2,11) 0.7815	0.4958	**H_0:** No serial correlation	Retain H_0
Ramsey RESET test	F(1, 12) 0.9146	0.8581	**H_0:** Correctly specified	Retain H_0
Jarque-Bera Normality Test	3.243796	0.197523	**Ho:** Normal distribution	Retain H_0
Heteroskedasticity Test	F(18, 13) 0.9213	0.7980	**H_0:** Homoscedasticity	Retain H_0

Source: Authors' Computation (2022).

The results of the diagnostic tests were reported in Table 5. The serial correlation of the residuals was tested using Breuch Godfrey test or Lagrange Multiplier (LM). The null hypothesis of no serial correlation was retained because the probability value of 0.4958 was greater than the 5 percent level of significance. Thus, there was sufficient statistical evidence to conclude that there was absence of serial correlation in our model. In furtherance, the probability value of 0.8581 against the Ramsey Regression Equation Specification Error Test (RESET) test was greater than 5 percent level of significance. As a result, the null hypothesis that the model was correctly specified was sustained. Therefore, there was no possibility of the model being specified incorrectly which may result in the omission of certain variables. Besides, the model has no wrong functional form. In furtherance, under the Jarque-Bera normality test, a probability value of 0.197523 was greater than 5 level of significance and this suggests that the errors were normally distributed due to the upholding of the null hypothesis of normal distribution. Lastly, the result of the ARCH test showed that there was no heteroscedasticity in our model. This is because we retained the null hypothesis of homoscedasticity. Thus, a probability value of 0.7980 showed that the errors were homoscedastic and independent of the explanatory variables. Hence, the model has a good fit and can be used for structural and policy analysis.

Figure 2: Stability Cusum Tests

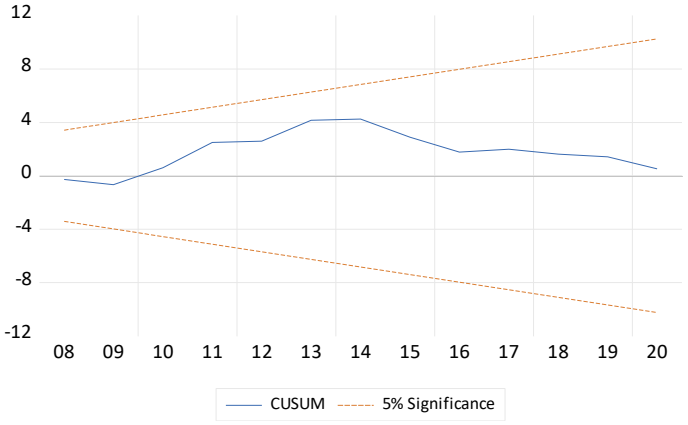
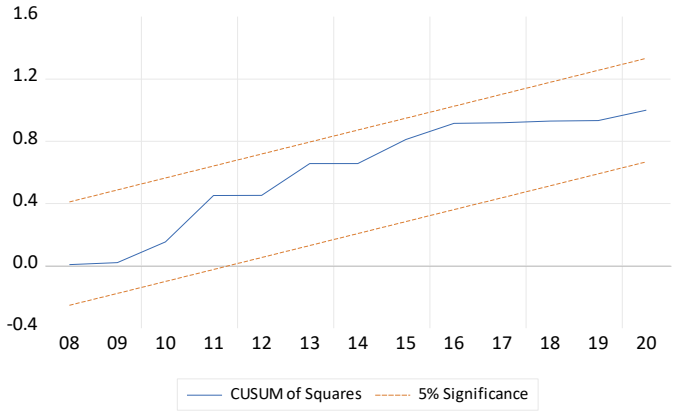


Figure 3: Stability Cusum of Squares Tests



In testing the stability of the long-run coefficients with the short-run dynamics, the cumulative sum (CUSUM) and CUSUM of squares were used. As shown in figure 2 and figure 3, the CUSUM and CUSUM of squares lines stayed within the 5 percent critical bound. Thus, neither the CUSUM nor CUSUM of squares plots across the 5 percent critical lines, hence, these statistics ascertained the stability of the long-run coefficients of the regressors that have an effect on the performance of manufacturing sector in Nigeria. Therefore, the results of the model of the effect of external sector on the performance of manufacturing sector in Nigeria show the existence of parameter stability.

Table 6: Pairwise Granger Causality Test

Pairwise Granger Causality Tests

Sample: 1985 2020

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LOG(TPN) does not Granger Cause LOG(MGDP)	34	3.75975	0.0353
LOG(MGDP) does not Granger Cause LOG(TPN)		0.73801	0.4868
LOG(EXR) does not Granger Cause LOG(MGDP)	34	5.12375	0.0124
LOG(MGDP) does not Granger Cause LOG(EXR)		0.21938	0.8043
LOG(FDI) does not Granger Cause LOG(MGDP)	34	4.42483	0.0210
LOG(MGDP) does not Granger Cause LOG(FDI)		0.55612	0.5794
LOG(EDT) does not Granger Cause LOG(MGDP)	34	3.63125	0.0391
LOG(MGDP) does not Granger Cause LOG(EDT)		0.09495	0.9097
LOG(EXR) does not Granger Cause LOG(TPN)	34	0.47529	0.6265
LOG(TPN) does not Granger Cause LOG(EXR)		2.20707	0.1282
LOG(FDI) does not Granger Cause LOG(TPN)	34	0.85208	0.4369
LOG(TPN) does not Granger Cause LOG(FDI)		0.77921	0.4681
LOG(EDT) does not Granger Cause LOG(TPN)	34	0.15943	0.8534
LOG(TPN) does not Granger Cause LOG(EDT)		3.03215	0.0637
LOG(FDI) does not Granger Cause LOG(EXR)	34	2.68401	0.0852
LOG(EXR) does not Granger Cause LOG(FDI)		1.14975	0.3307
LOG(EDT) does not Granger Cause LOG(EXR)	34	0.19458	0.8242
LOG(EXR) does not Granger Cause LOG(EDT)		0.62154	0.5441
LOG(EDT) does not Granger Cause LOG(FDI)	34	1.66019	0.2077
LOG(FDI) does not Granger Cause LOG(EDT)		1.50043	0.2398

Source: Authors' Computation (2022).

The pairwise Granger causality test result in Table 6 shows that trade openness, exchange rate, foreign direct investment, and external debt have unidirectional causation with manufacturing sector GDP. This implies that trade openness, exchange rate, foreign direct investment, and external debt enhanced manufacturing sector GDP but manufacturing sector GDP did not determine manufacturing sector GDP in Nigeria over the period of the study.

V. CONCLUSION AND POLICY RECOMMENDATIONS

This study investigated the effects of external sector on the performance of manufacturing sector in Nigeria. In order to achieve its objectives, times series data were used and analysed using descriptive statistical technique, Augmented Dickey Fuller (ADF) and Philip-Peron (PP) unit root tests, Johansen cointegration test, vector error correction model (VECM) technique and pairwise Granger causality test. The results of this study demonstrated that external sector has serious implications on the performance of manufacturing sector in Nigeria. This is evidenced in the causality test result which indicates that trade openness, exchange rate, foreign direct investment and external debt enhanced and propelled manufacturing sector GDP. Also, the results of the Vector Error Correction revealed that trade openness and external debt have positive effects on the performance of manufacturing sector in Nigeria while foreign direct investment and exchange rate have negative effects on the performance of manufacturing sector in Nigeria. This implies that trade openness and external debt improved the performance of manufacturing sector over the period of the study. Based on these findings, the study concludes that performance of manufacturing sector in Nigeria is influenced by external sector.

Based on the finding, the study therefore suggested that government should offer tax incentives, import duty exemptions, improve infrastructural development as well as adopt other policy measures aimed at attracting foreign direct investment so as to boost the performance of manufacturing sector in Nigeria. Also, more policy attentions should be channelled towards efficient management of the exchange rate in order to maintain a stable and sustainable exchange rates since its stability could improve the performance of manufacturing sector in Nigeria. Lastly, the government should embark on a comprehensive trade liberalization policies and programs in order to create a favourable business environment

for manufacturing firms to thrive for improved performance of manufacturing sector in Nigeria.

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