

# The Effect of Exchange Rate Fluctuation on the Performance of the Manufacturing Sector in Nigeria (1990-2020)

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## ABSTRACT

This study examined the effects of exchange rate fluctuation on Nigeria's manufacturing sector for the period between 1990 to 2020. Annual time series data were obtained from world development indicators and central bank of Nigeria statistical bulletin. Autoregressive Distributed Lag model (ARDL) was employed for the data analysis and the long and short run forms provided optimal estimates of the co-integrating regression. Explanatory variables specified for the model were Manufacturing Capacity Utilization (MACU), Exports (EXP), Raw Material Imports (IMP), Exchange Rate Fluctuations (EXRF), Exchange Rate (EXCR), Interest rate (INT) and Inflation Rate (INFR). The results of the analysis revealed that the model was of good fit with an adjusted  $R^2$  value of 96%. The ARDL model revealed a long run relationship among the variables and further reveals that (EXRF) and (IMP) had a significant negative effect on manufacturing output in Nigeria. MACU on the other hand had significant positive relationship with MGDGP. In the short run, EXRF, IMP, INT and INFR had significant negative relationship with MGDGP. The study concludes that exchange rate fluctuation has significant impact on MGDGP in Nigeria. Recommendations from the study are that the government should put in policies that can help checkmate the fluctuations in the Nigerian exchange rate system. Import restrictions should be placed on domestically available raw materials and facilities that can increase the capacity utilization of the manufacturing sector should be provided. This will go a long way to boost the manufacturing sector output in Nigeria and also encourage international competitiveness.

**Keywords:** Exchange rate; Fluctuation; Manufacturing sector output; Autoregressive distributed lag model; Raw materials

## INTRODUCTION

### Background to the study

The growth and performance of the manufacturing sector is critical to economic transformation in an economy. The Asian tigers namely China and Japan have experienced an increase in the per capita income of their economies due to the effective contributions of the manufacturing sector to national economic growth.

“The manufacturing sector plays a catalytic role in a modern economy and has many dynamic benefits that are vital for

economic transformation. In many advanced economies, the manufacturing sector is a leading sector in many respects. It is an avenue for increasing productivity in relation to import substitution and export expansion, creating foreign exchange earning capacity, raising employment, promoting the growth of investment at a faster rate than any other sector of the economy, as well as providing a wider and more efficient linkage among different sector”.

However, the case is different in African countries as the growth and performance of the manufacturing sector is relatively very low compared to what obtains in other regions of the world. Many African countries are fraught with problems of

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macroeconomic development and low productivity of the real sectors due to sheer neglect. Whereas, the enormous potentials of the manufacturing sector are sufficient to bring about a lasting solution to low productivity, unemployment and underdevelopment in the African continent. The manufacturing sector has several dynamic benefits that are critical for economic development and plays a catalytic role in a modern economy. This sector is one of the industries whose success or failure is determined by exchange rate stability. Similarly, in growing economies like Nigeria, the exchange rate is crucial to the economy's ability to reach optimal levels of production.

The Nigerian economy has witnessed varying economic, political, social security and corruption problems since independence and these has led to major economic instability, general inflation, food price hikes and poverty among her people. Over the years, the country drastically shifted its focus to proceeds from the oil sector while sidelining drastic measures to enhance rapid economic growth and development. During the time of the oil boom of the 1970's, the increase in the price per barrel of crude oil brought about major positive contributions to the foreign exchange market. The discovery of massive oil revenue during this time turned the focus of the Nigerian government to the oil sector. But today, the oil sector is not as vibrant as before and so to solve eminent problems, the government approved many different programmes and reforms to diversify the revenue base through monetary, fiscal and exchange rate policies. Many of the policies have however not brought back the expected positive returns.

The exchange rate is a means of quantifying a country's currency competitiveness. "It has proven to be an important macroeconomic indicator used in determining the level of performance of an economy because the overall changes in exchange rate tends to have multiplier effects on macroeconomic variables". Being a significant economic variable, its depreciation or appreciation has an impact on the performance of all sectors of an economy, particularly the manufacturing sector.

Many developing and developed economies intentionally drive at achieving sustainable growth and development through the adoption of appropriate exchange rate management. In this respect, price stability plays a major role in influencing and stimulating the exchange rate to determine the degree of macroeconomic competitiveness and economic stability. Nigeria practices the floating exchange management system by intending to improve trade balances and increase output, especially from the real sector. "However, irrespective of the exchange rate regime that a country chooses, there are tendencies for the economy to be exposed to different lopsided shocks which might result in economic imbalances and need for adjustment in the exchange rate policy over time".

"The Nigerian economy is under-industrialized. Obadan noted that low-capacity utilization of available natural resources among many other problems has been the topmost challenge of the Nigerian manufacturing sector. In order to source for non-labor inputs, the sector has become increasingly reliant on the external sector for supply. As a result, any situation hampering

importation of raw materials can have serious detrimental impact on the quantity and quality of manufactured output".

Oyejide and Umubanmwun pointed out to the fact that a sudden global rate of exchange rate fluctuation which came about through the break-up of the Bretton woods system also affected Nigeria having a negative impact on the ability to import. The subsequent devaluation of the naira due to the restructuring of the economy also further aggravated the exchange rate fluctuation. All these have had significant negative effects on economic performance in Nigeria.

"From the time of the deregulation of the economy in 1986, the issue of fluctuation has become a major challenge in Nigeria. The small productive range of the sector and increasing import bills contributed to the failure of the government to stabilize the exchange rate. However, many policies were put in place to correct this anomaly but very little improvement has been realized. The exchange rate fluctuation persisted leading to various consequences from the country's Balance of Payment (BOP) to its income and growth. This is not surprising since exchange rate behaviour is said to determine the behaviour of several other macro-economic variables in an economy.

In addition Jhingen, "highlights the fact that exchange rate fluctuation causes uncertainty and hinders foreign trade. Uncertainty in trade transaction creates various problems including Inflation. Furthermore, many small and medium scale businesses have been forced to shut down as a result of low dollar to naira exchange rate." Therefore, the issue of fluctuating exchange rate requires sufficient attention such that better policy remedies can be applied to the society.

Based on these crucial matters, this study seeks to examine the effect of exchange rate fluctuation on the Nigerian manufacturing sector output. It also seeks to ascertain the effect of importation of input and capital goods (raw materials) and exportation of manufactured goods on the manufacturing sector output in Nigeria.

## Research hypothesis

- **H<sub>0</sub>**: Exchange rate fluctuation has no significant effect on the manufacturing sector output in Nigeria.
- **H<sub>1</sub>**: Exchange rate fluctuation has significant effect on the manufacturing sector output in Nigeria.

## Conceptual review

Exchange rate is a term used to refer to the price of a country's domestic currency in relation to other countries' currency. It plays a vital role in relating the price system of multiple countries; allowing traders to compare prices directly. Kimberly noted that exchange rate of most economies is established by what obtains in the foreign exchange market. Thus, exchange rates fluctuate from moment to moment.

Because of its vital importance, government takes active interest in the determination of exchange rate". Exchange rate management is concerned with a country's currency transaction

designed to send and receive foreign payments". According to Kofi, effective foreign exchange market yields profitability. Excluding its transaction purposes, foreign exchange management obligates monetary authorities to understand the vital factors that influence a currency's value and how they can be efficiently managed in order to optimize revenue. Some of these vital variables include GDP, exchange rate, export, capacity utilization, rate of industrialization and inflation rate.

Capacity utilization is the extent to which a nation uses its natural productive capacity to improve the value of production of goods and services. Economically, when market prices rise, capacity utilization also rises and when demand falls, capacity utilization will reduce. Inflation rate is the percentage of annual increase in the general price level of goods and services.

GDP is the monetary worth of all finished goods and services produced within the geographical boundaries of a country at a particular period of time, usually within one year. Export is a classification of foreign trade whereby goods produced in one country are shipped to another country for future use or sale. Income gained from export contributes to the GDP of a country and it is referred to as foreign exchange.

## Empirical review

Empirical indications show that an economy's real exchange rate changes can impact growth rate outcomes. Enekwe, et al., examined the impact of exchange rate fluctuations on Nigeria's manufacturing sector over a 25 years period and specifically between 1985 and 2010. Manufacturing gross domestic product, manufacturing foreign private investment, manufacturing employment rate, and exchange rate were the variables specified for analysis. CBN statistical bulletin and Nigeria bureau of statistics were the sources of secondary data used for analysis and multiple regression analysis was the model for the research. The study revealed that all explanatory variables had significant and positive relationship with manufacturing sector GDP and  $R^2$  for the model was 80%. Based on the result of the research, the authors recommend that the government should encourage export diversification in agriculture and also commit to agriculturally related investments. Furthermore, the government will need to impose restrictions on importation on products that are manufactured domestically in Nigeria and Nigerians need to be encouraged to buy home made products.

Similarly, Nura Ali examined the impact of exchange rate fluctuation on manufacturing performance in Nigeria over a 37 years period (from 1981 to 2018). Annual time series data from the CBN, NBS, and Index Mundi Nigeria were used for analysis using ARDL model. The result from the research showed that exchange rate fluctuation has negative effects on the performance of the Nigerian manufacturing sector. The study recommends that Nigeria ensure exchange rate stability so as to improve the manufacturing sector's capabilities, thereby increasing its contribution to the nation's GDP.

Onwuka, et al., studied the effect of exchange rate volatility on the manufacturing sector output in Nigeria from 1981 to 2018. The study employed the use of Vector Auto regressive model (VAR) to analyze time series data. The GARCH model

was used to establish the occurrence of exchange rate volatility and to extract the volatility series. The empirical result of the GARCH estimates showed that there is a prevalence of volatility connected with exchange rate. Results from the (VAR) estimates also showed that exchange rate volatility had a significant negative effect on manufacturing output in Nigeria. The study recommends that manufacturing companies should identify types of exchange rate risks posed to them and develop management strategies to cushion the effect [1].

Okolo, et al., studied the determinants of exchange rate volatility and its effect on manufacturing sector output in Nigeria. Vector auto regression technique and error correction techniques were used to assess the determinants of exchange rate volatility on the manufacturing sector output in Nigeria. Result revealed that the exchange rate showed a volatile unstable movement in Nigeria. The official exchange rate was found to significantly impact the manufacturing sector GDP. However, net international investment, trade balance and trade openness presented no significant connection with exchange rate in Nigeria [2].

Sulaimon, et al., also examined the effect of exchange rate on the growth of the manufacturing sector in Nigeria between 1986 and 2014 using Ordinary Least Square (OLS) regression model. Results revealed that there is a significant positive connection between exchange rate and manufacturing output in Nigeria. Recommendations from the study are that changes in the management strategy for exchange rate should be allowed to run its full course. Furthermore, incentives should be given to domestic manufacturers so as to improve their technological and infrastructural development which would have a positive impact on the gross domestic product and employment in Nigeria [3].

Areghan, et al., examined the impact of exchange rate management on performance of the agricultural and manufacturing sector in Nigeria by using time series data from 1981 and 2015. Ordinary least squares regression technique was used and findings revealed that the exchange rate has a significant positive relationship with the agricultural sector. The study recommends that agricultural exports should be increased against imports so as to boost exchange rate in Nigeria.

Ezie Obumneke, Suleiman, and Abdelrasaq used Ordinary Least Square (OLS) regression method to deduce the impact of exchange rates on manufacturing sector output between 1986 and 2014. Finding from the study showed that there is association between exchange rate and manufacturing GDP. Recommendations are that the manufacturing activity should be improved by providing subsidies and incentives to local manufacturers while improving infrastructural and technological development to bring about increase in the sector's contribution to the national gross domestic product [4].

Edward and Levy Yeyati affirmed that countries with flexible exchange rate grow faster. Pritchett, Rodrik also ascertained that real exchange rate depreciation is significantly connected with improved economic growth. For the period 1980-2010, Asher "looked at the influence of exchange rate fluctuations on Nigerian economic growth. The findings revealed that the real exchange rate had a favourable impact on economic growth" [5].

On the other hand, Eme and Johnson investigated the impact of exchange rate fluctuations on real GDP in Nigeria for the period between (1986-2010). Findings revealed that there is no strong relationship between fluctuations in exchange rate and output growth but economic growth was affected by monetary variables [6].

Our empirical review shows that many researchers have investigated the impact of exchange rate and exchange rate volatility on the performance of the manufacturing sector in Nigeria. However, there's need for more current research on the matter due to fact that changes in exchange rates have been more frequent in Nigeria since the last five years. In this study, we seek to determine the effect of these changes with the use of very recent up to date data spanning between 1991 and 2020 to ascertain it's up to date findings. In addition, many of the articles used the OLS, VAR and error correction methods for analysis but this study employed the use of the Auto Regressive Distributed Lag model (ARDL model).

## MATERIALS AND METHODS

### Data source and description

The aim of this study is to probe into the effects of exchange rate fluctuation on the Nigerian manufacturing sector. In order to accurately do this, secondary data was used in the research. The study employed annual time series data within a 30 years span from 1990-2020, sourced from the world bank Indicators and CBN statistical bulletin.

### Model specification

The model for the study is specified below;

$$\text{LogMGDP} = \beta_0 + \beta_1 \text{logMACU} + \beta_2 \text{logEXRF} + \beta_3 \text{logEXCR} + \beta_4 \text{logEXP} + \beta_5 \text{logIMP} + \beta_6 \text{logINT} + \beta_7 \text{logINF} + u \dots \dots \dots (1)$$

Where:

- MGDP=Manufacturing sector output,
- MACU=Manufacturing sector Capacity Utilization,
- EXRF=Exchange Rate Fluctuation,
- EXCR=Exchange Rate,
- EXP=Export (manufactured goods),
- IMP=Import (raw materials),
- INT=Interest rate,
- INF=Inflation rate,
- U=Error term.

### Estimation techniques and procedure

The method of data analysis used in this study is Auto Regressive Distributed Lag model (ARDL). The ARDL model was used to help establish the presence of co integration among the variables while the long run and short run forms of the model is to provide optimal estimates of the regression [7].

Pre-estimation tests such as unit root analysis using Augmented Dickey Fuller (ADF) test, descriptive statistics and trend analysis was carried out to analyze the data. The unit root test determines if the time series data utilized in the model is stationary or non-stationary. According to Ezie Obumneke, et al., this is to see if the relationship between economic factors is false or nonsensical. This estimation was done with E-Views version 10.0, an econometric computer software tool [8].

## RESULTS AND DISCUSSION

### Presentation of results of data analysis

**Trend analysis for manufacturing sector GDP, exchange rate and exchange rate fluctuation:** Figure 1 represents the trend results of manufacturing sector GDP in Nigeria over the period of the 30 years under review. A close look at the data and the graphical representation indicates that, the MGDP growth outcomes have witnessed a shaky rise over the years with its lowest point at 1995 and peak outcome in 2014.

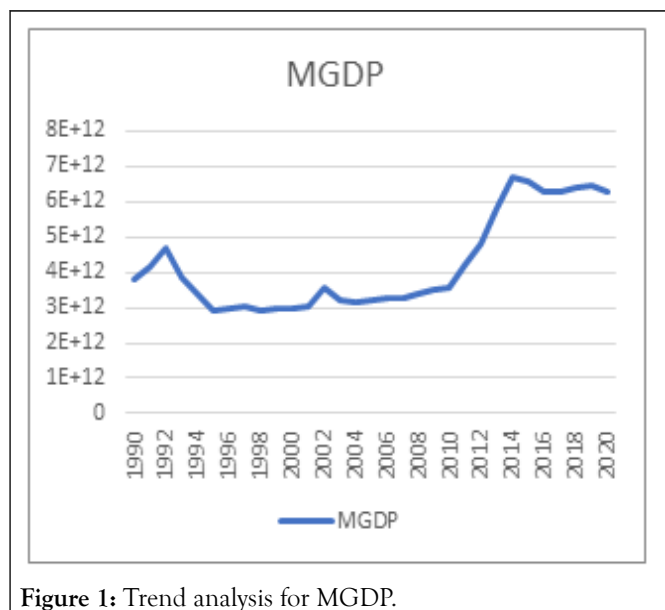


Figure 1: Trend analysis for MGDP.

The Figure 2 represents the trend results of exchange rate in Nigeria over the period under review. A cursory look at the data and the graphical representation indicates that, the economy has witnessed a steady rise in the foreign exchange market. Between 1990 and 1998 exchange rate was stable but increased rapidly between 2015 to 2020 [9].

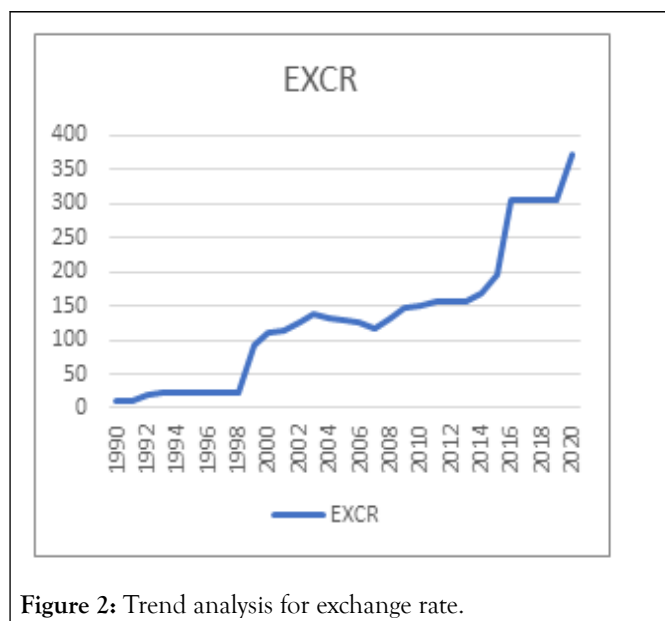


Figure 2: Trend analysis for exchange rate.

Figure 3 presents the trend result for exchange rate fluctuation from 1990 to 2020. The trend analysis reveals that the value of



exchange rate fluctuation had a zig zag movement all through the years of study with the only steady periods being between the years of 1994 to 1998 and 2017 to 2019. This trend analysis therefore gives a picture of the trends in the data relevant to this study.

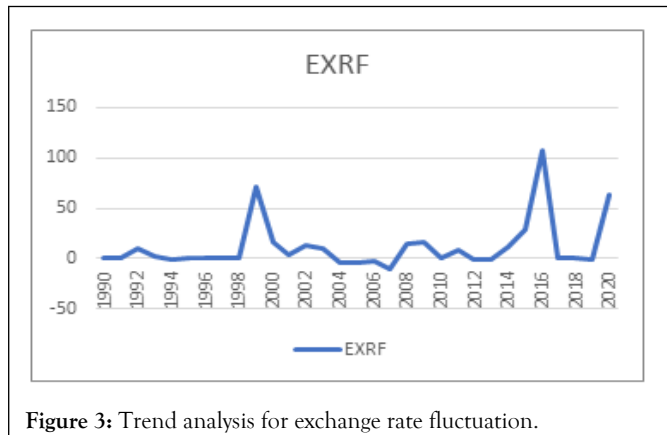


Figure 3: Trend analysis for exchange rate fluctuation.

Between 1992 and 2004, MGDG growth outcome fluctuated, increasing and decreasing in its contribution to the nation's GDP. Between 2004 and 2020, the MGDG experienced steady growth, increasing its contribution to the economy. The manufacturing sector output has huge implication on the economy of Nigeria in relation to standards of living and foreign trade [8].

**Descriptive statistics**

The results of the descriptive statistics presented on Table 1 shows the summary values of the variables. Evidence from the analysis reveal that the mean values of manufacturing sector output (GDP), manufacturing sector capacity utilization, interest rate, inflation rate, import, export, exchange rate and exchange rate fluctuation are 4.22E+12, 52.37, 18.70, 18.34, 6.68E+12, 1.12E+13, 131.87 and -16086 respectively [10].

Table 1: Results of descriptive statistics.

	MGDP	MACU	INT	INFR	IMP	EXP	EXCR	EXCRF
Mean	4.22E+12	52.37	18.70	18.34	6.68E+12	1.12E+13	131.87	-16086
Median	3.53E+12	48.15	18.14	12.72	5.96E+12	8.40E+12	128.00	-4.24
Maximum	6.68E+12	88.68	29.80	72.84	1.66E+13	2.27E+13	371.00	8.73
Minimum	2.90E+12	30.40	12.32	5.39	0.000000	4.65E+12	9.00	-482300
Skewness	0.790360	0.60	1.21	2.08	0.922153	0.442674	0.72	-5.2
Kurtosis	1.918997	2.39	5.35	6.16	3.624849	1.733364	2.76	28.03

Skewness is a measure of asymmetry of the probability distribution of a random variable about its mean. All variables are positively skewed except exchange rate fluctuation. Kurtosis is a statistical measure that is used to describe a distribution [11]. Kurtosis of manufacturing sector output, manufacturing sector capacity utilization, exchange rate fluctuation, exchange rate, exports and imports are 1.918997, 2.386658, 8.894924, 2.755190, 1.733364 and 3.624849 respectively. All values above 3 shows that the variables are leptokurtic while values below 3 shows that the variables are platykurtic. Leptokurtic distributions have positive excess kurtosis while platykurtic distributions have negative excess kurtosis. Therefore, leptokurtic distributions have a relatively high probability of extreme events whereas the opposite is true for platykurtic

distributions. Exchange rate fluctuation and import values are leptokurtic while the other variables have platykurtic distributions in this study.

**Unit root test results:** To confirm the unit root property of the series and the model's stationarity, the study employed the Augmented Dickey-Fuller (ADF) technique. The ADF unit root tests showed that the variables are stationary at first difference I (1) and at level I (0) at 1 % level of significance. This presentation leads us to choose the autoregressive distributed lag model to help reveal the possibility of long and short run relationships among the variables (Table 2) [12].

Table 2: Results of stationarity (unit root test).

Variable	ADF statistic	1% Critical values	5% Critical values	10% Critical values	Order of integration	p-value
Log MGDG	-3.6549	-2.6471	-1.9529	-1.61	I (1)	0.0007
Log MACU	-7.7387	-2.6471	-1.9529	-1.61	I (1)	0
Log EXRF	-6.183	-3.6793	-2.9677	-2.6229	I (1)	0

Log EXCR	-5.075	-3.6793	-2.9677	-2.6229	I (1)	0.0003
Log EXP	-7.807	-3.6793	-2.9677	-2.6229	I (1)	0
Log IMP	-5.2805	-2.6471	-1.9529	-1.61	I (1)	0
INFR	-4.442	-3.6793	-2.9677	-2.6229	I (1)	0.0015
INT	-4.1227	-3.6702	-2.9634	-2.621	I (0)	0.0033

**Estimation test results**

**Co-integration test:** Results on Table 3 reveals that there is co integration among the variables specified. This is clearly revealed at 1%, 5% and 10% respectively.

**Table 3:** Results of autoregressive distributed lag bound test.

Test statistics	Value	Significance	I (0)	I (1)	Decision
F-statistic	20.38	10%	1.99	2.94	Co-integration
k	6	5%	2.27	3.28	Co-integration
		2.5%	2.55	3.61	Co-integration
		1%	2.88	3.99	Co-integration

Table 4 presents the long run estimates of the autoregressive distributed lag model and the results show that the exchange rate fluctuation and imports were significant at 5%, and 1% respectively being negatively related to the manufacturing sector output in the long run. This result implies that a 1% increase in exchange rate fluctuation will lead to a reduction in manufacturing output by 15.30% and a 1% increase in imports will lead to a reduction in the manufacturing output by 2%.

Conversely, manufacturing sector capacity utilization has a significant positive long run relationship with manufacturing sector output implying that a 1% increase in manufacturing capacity utilization will lead to a 44% increase in manufacturing sector output (Table 4) [13].

**Table 4:** Long run form.

Variable	Coefficient	Std. error	t-statistic	Prob.
C	2.6867	1.437031	1.869606	0.1037
LOGMGDP (-1)	-0.1435	0.075897	-1.89102	0.1005
LOGEXRF (-1)	-0.1530**	0.057205	-2.67403	0.0318
LOGMACU (-1)	0.4411**	0.156041	2.8272	0.0255
LOGIMP (-1)	-0.0172***	0.002475	-6.96646	0.0002
LOGEXP (-1)	-0.1114	0.075508	-1.47532	0.1836
LOG_EXCR (-1)	0.0138	0.01668	0.825109	0.4365
INT (-1)	0.0022	0.003395	0.656686	0.5324
INFR (-1)	0.0005	0.000707	0.673504	0.5222
R-squared	0.979691			
Adjusted R-squared	0.962089			

S.E. of regression	0.007772
Sum squared resid	0.000906
Log likelihood	109.2689

\*\*\*, \*\* and \* represents 1%, 5% and 10% levels of significance.

The result of the error correction form on Table 5 reveals that the model was of good fit having an adjusted R<sup>2</sup> value of 96%. The ECT value was negative and highly significant at 1% implying a speed of adjustment to equilibrium at 15.35%. Current values of exchange rate fluctuation was inversely related with manufacturing sector output. This result is in line with Sulaimon, et al., and Ali. Manufacturing sector capacity utilization was positively related with the manufacturing sector output. One year lagged values of imports was positively related to manufacturing output while current values of imports are negatively related to manufacturing GDP. Similarly, one year past values of exports are negatively related to manufacturing GDP while current values of exports have no significant relationship with manufacturing output. This could be because Nigeria exports limited amount of manufactured good. One

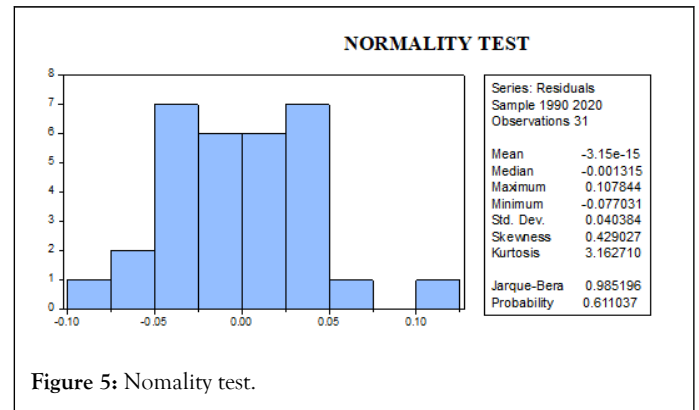
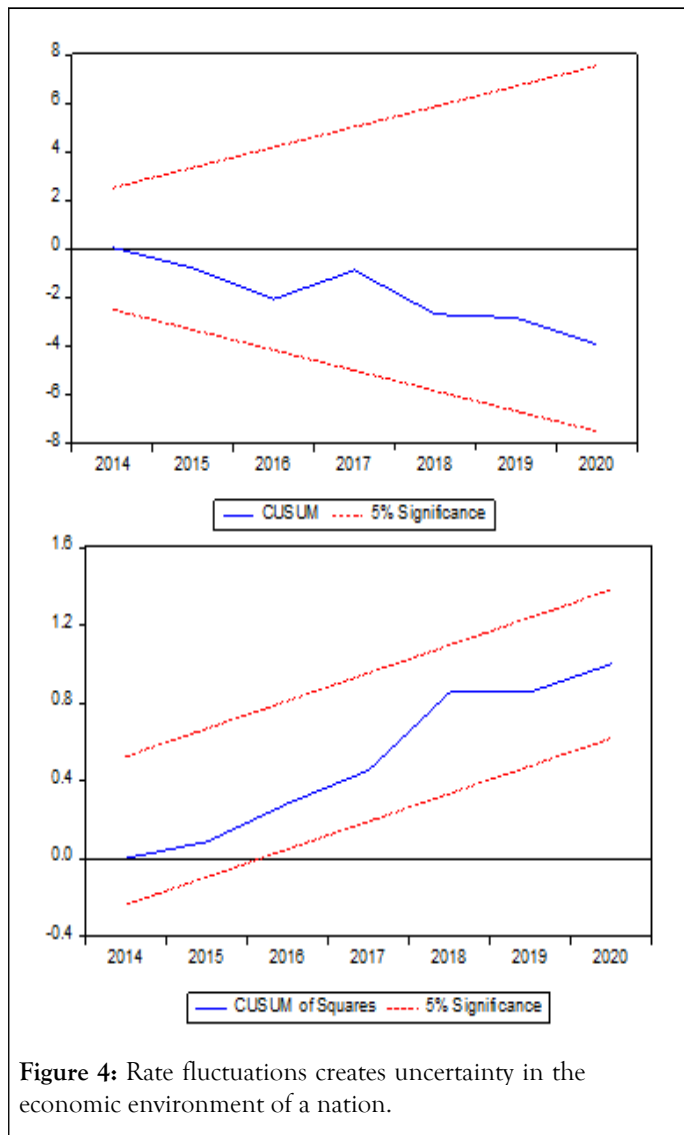
year lagged values of exchange rate and current values of exchange rate have negative significant relationship with manufacturing sector output. Similarly, lagged values of interest rate were negatively associated with manufacturing output but current values of interest rate had positive relationship with manufacturing output. Both current and past values of inflation were negatively associated with manufacturing output and this implies that a unit increase in inflation will decrease manufacturing output. Current values of exchange rate fluctuation were negatively signed and significant at 1%. This result shows that a unit decrease in exchange rate fluctuation will lead to an increase in manufacturing sector output.

**Table 5:** Results of the error correction model.

Variable	Coefficient	Std. error	t-statistic	Prob.
D (LOGMACU)	0.5526***	0.032411	17.04827	0
D (LOGIMP)	-0.0064***	0.00064	-9.98324	0
D (LOGIMP(-1))	0.0056***	0.000653	8.609435	0.0001
D (LOGEXP)	0.012385	0.022263	0.556324	0.5953
D (LOGEXP(-1))	-0.2172***	0.022167	-9.79677	0
D (LOG_EXCR)	-0.1919***	0.015403	-12.4583	0
D (LOG_EXCR(-1))	-0.1191***	0.013953	-8.53747	0.0001
D (INT)	0.0063***	0.000739	8.515506	0.0001
D (INT(-1))	-0.0081***	0.000871	-9.30738	0
D (INFR)	-0.0006***	0.00013	-4.31176	0.0035
D (INFR(-1))	-0.0017***	0.000152	-11.1344	0
D (LOGEXRF)	-0.1425***	0.031469	-4.52923	0.0027
D (LOGEXRF(-1))	0.1192**	0.041477	2.874508	0.0238
CointEq (-1)*	-0.1435***	0.007388	-19.4261	0

The results on Table 5 proved that exchange rate fluctuation has negative significantly relationship with the Manufacturing sector GDP of Nigeria. We therefore conclude that exchange rate fluctuation has a positive relationship with manufacturing sector output but not significant. This result is in line with similar

studies which registered the fact that exchange rate fluctuation creates uncertainty in the economic environment of a nation (Figures 4 and 5).



This result is also in line with the findings of Dada and Oyeranti; Adeniran, Yusuf and Adeyemi; Lawal, and Sulaiman, et al. who also discovered from their studies that exchange rate fluctuation had significant effect on the manufacturing sector output and economic growth in Nigeria.

**Post estimation test**

In order to determine the applicability of the estimated model for policymaking, the post estimation results help in the validation of the ECM results. This model fits well and passes all of the diagnostic tests in terms of the diagnostic checks. The dependent variables' variances are 96 percent represented by the model and the remaining 4 percent variance is represented by the error term, according to the adjusted R square value of 0.9621 (R-square value: 0.9797). It passes the Breusch-Godfrey test for serial correlation, the Jarque-Bera test for normality, and the heteroscedasticity test. The CUSUM (Cumulative Sum of recursive residuals) and the CUSUMSQ (Cumulative Sum of Square of recursive residuals) are used to determine whether the parameters are stable. Pesaran and Pesaran recommend these tests for gauging parameter stability (Table 6).

Table 6: Residual diagnostic test.

Residual diagnostic tests	Probability F value	Probability X <sup>2</sup>
Breusch-Godfrey serial correlation test	4.2523	0.0834
Heteroskedasticity test	0.5534	0.8612
Jarque-Bera (normality) test	5.3101	0.0703

**CONCLUSION**

This study titled “the effect of exchange rate fluctuations on the manufacturing sector in Nigeria” was carried out to find out the effect of exchange rate fluctuation and other explanatory variables on the Nigerian manufacturing sector. The null hypotheses for the study states that exchange rate fluctuation

and other explanatory variables have no significant effect on the manufacturing sector output in Nigeria. To test these hypotheses, annual time series data on manufacturing gross domestic product, exchange rate fluctuation, exchange rate, export, import and manufacturing capacity utilization, interest rates and inflation were collected between the years 1990 and 2020. To analyze these data, descriptive statistics, augmented



dickey fuller unit root test and auto regressive distributed lag model were employed for the study.

From the findings it was realized that exchange rate fluctuation had significant effect on the manufacturing sector output. Other findings from the study revealed that the manufacturing sector capacity utilization had significant positive relationship on the manufacturing sector GDP. On the other hand, imports had a significant negative relationship with the manufacturing sector GDP while exchange rate had a negative effect on manufacturing sector GDP. Inflation and interest rates had inverse relationships with the manufacturing sector

Based on this result, we reject the null hypotheses of the study that exchange rate fluctuation had no significant effect on the manufacturing sector output over the period of study and accept the alternative hypothesis of a significant relationship.

This result suggests that there is a need to further encourage exports of manufactured products and improve manufacturing sector capacity utilization while at the same time discourages imports of manufactured goods to bring about the expected growth of the manufacturing sector in Nigeria.

Previous studies have revealed that the manufacturing sector is anticipated to be the driving force behind the push for industrialization, and the exchange rate is a key element. It has been noted that Nigeria's heavy reliance on foreign trade for input imports has worsened the impact of exchange rate depreciation, particularly in manufacturing sector.

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