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ANALYSIS OF THE EFFECT OF EXCHANGE RATE FLUCTUATION ON THE MANUFACTURING PERFORMANCE IN NIGERIA (1981 – 2018)

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ABSTRACT*: Theoretically, and indeed empirically it has been postulated that Exchange Rate fluctuations has had a significant effect on manufacturing performance in terms of output growth and contribution to the Gross Domestic Product (GDP). This study aimed to examine the Exchange Rate fluctuations on manufacturing performance in Nigeria over a period of 37 years (from 1981-2018), using annual data obtained from collected from CBN, NBS and Index Mundi Nigeria. An ARDL approach was used for the analysis. The empirical results of the study shows that an exchange rate volatility has negatively affect the performance of the Nigerian manufacturing sector as can be seen from the from the respective coefficients of the estimated variables, , the long run relationship analysis and the causal relationship between the dependent and the independent variables. The study recommends encouraging and improving exchange rate stability in Nigeria as this may help improve the capacity of the country's manufacturing sector, hence expand its contribution to GDP growth.*

KEYWORDS*:* exchange rate fluctuations, manufacturing performance, Nigeria, ardl model, economic growth

1. Introduction and Motivation

Exchange rate of a country plays a key role in international economic transactions because no nation can remain in autarky due to varying factor endowment. These facts underscore the importance of exchange rate to the economic well-being of every country that opens its doors to international trade in goods and services. The importance of exchange rate derives from the fact that it connects the price systems of two different countries making it possible for international trade to make direct comparison of traded goods. As stated by Dada & Oyeranti, (2012), the distortions faced with overvalued exchange rate regime are hardly a subject of debate in developing economies that are mostly dependent on imports for production and consumption. Exchange rate which can simply be defined as the rate at which a country's currency is exchanged for another has been recognized in many literatures as one of the important spices of international trade.

In the 1970s before the collapse of the Breton Wood, what was in practice was the fixed exchange rate regime where the exchange rate of most countries is fixed by the monetary authority of a country. Trade and production flows in those periods seemed very profitable as a country need not

to be scared of any fluctuation in exchange rate. Obadan, (2006), states that the fluctuation in the exchange rate however can be an appreciation or depreciation, whichever way, both forms of fluctuation has a fundamental consequence on the economy. When a country's currency appreciates, it results into an improvement in the country's balance of payment, but when it depreciates, it deters the country's balance of payment. It is noticeable that the demise of the Breton Woods system fixed exchange rate has made many countries to resort to the floating exchange rate system, hence, exposure to uncertainty caused by fluctuation in exchange rate. Exchange rate volatility which has been defined by for example, Christelle & Joel (2017) as the risk associated with unpredicted movements in exchange rate which exerts a direct effect on a country's economy. Kazeem, (2017), argues that Nigeria has been on the receiving end of the floating exchange rate as the fluctuation in exchange rate has been instigating various macroeconomic severities. For instance, the Structural Adjustment Program (SAP) of 1986 was aimed at restructuring the production base of the economy with a positive bias for the production of agricultural exports.
In 2015, it averaged 193.28; 2016, 253.49; 2017, 305.79; and in 2018, it averaged 306.08 (Central Bank of Nigeria, 2018). Due to the fluctuations in exchange rate, investors and policy makers has found it uneasy to track the exchange rate of the economy.

The above thus, raises the question of the relative impact of exchange rate fluctuations on manufacturing sectors in Nigeria. It is in an attempt to provide answer to the question that this study seeks to empirically investigate the impact of exchange rate fluctuation on the manufacturing sectors in Nigeria.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

There has been growing interest among academics and policy makers alike on assessing the effect of exchange rate fluctuations on sectorial performance, particularly in the developing economies. Exchange rate has been identified as a leading factor affecting the production sectors as well as a country's macroeconomic activities. Exchange rate refers to the price one pays in his home currency to purchase a certain quantity of the currency of another currency. For instance the rate at which Naira (home currency) exchange for other countries currency-US dollars, British pound etc. is the exchange rate. In the international trade models, at least two countries as well as two currencies are involved. Foreign exchange rate is the relative value between two currencies. Pandey, (2010), defined Foreign exchange rate is the price of one currency quoted in terms of another currency. It is the price at which one nation's currency is exchanged for some other nation's currency. It could be at par, high or relatively low. Thus, exchange rate fluctuates relative to the comparative usage and need of the currencies concerned. According to Kathleen Crislip, (2018), it is the rate at which the amount of one currency can exchange for another. Kimberly (2018), argued that most exchange rates are determined by the foreign exchange market, or forex.

That is called a flexible exchange rate. For this reason, exchange rates fluctuate on a moment-by-moment basis.

On the other hand, manufacturing is an act of transforming raw material into finished or semi-finished goods and services. According Merriam Webster dictionary (1828) defines manufacturing as the process of making wares by hand or by machinery especially when carried on systematically with division of labour. In the words of Falaye (2017), manufacturing connotes transformation of substance through a defined process into a finished or semi-finished product; using factors. It has to do with the industrial consumption of assorted raw materials, digesting same, and churning them through a process of transformation. As at today, the dwindling fortune of the every country's manufacturing sector is of great concern to its citizens, considering the grace of employment.

Theoretically, Purchasing Power Parity is an economic theory that compares different countries' currencies through a basket of goods approach. It is an approach that takes cognizance of differences in countries' rates of inflation relative to the purchasing power of their currencies. That is, a persistent high inflation rate would make the prices of locally produced commodities more costly relative to foreign substitutes. As a result of this, there would be increased flair for foreign products; hence, foreign currencies to purchase them. Consequently, the surge for foreign currencies would raise the value of the foreign currencies at the expense of the domestic currency; leading to reduction in value of the nation's currency. The lower the value of the nation's currency, the higher and more expensive would be the value of the foreign currencies; leading to increased costs of exchange. The more the costs of exchange increase, the less would the production lines consume foreign inputs? The tendency is that increased costs of production would lead to increase in prices of products, reduced outputs, labour retrenchments, loss of profits, or total closure of operations at the lowest ebb of the strata. At the highest ebb of the strata, influencing the rate of exchange could boost production, enhance employment, increase profit margin or creation of a new production line. Summarily, the purchasing power of nations' currencies, upon which inflation weighs great influence, plays a key role in determining the side of the pendulum that foreign exchange rate swings.

In the words of Herbert Stein, The balance-of-payments accounts of a country record the payments and receipts of the residents of the country in their transactions with residents of other countries. If all transactions are included, the payments and receipts of each country must be equal. Any apparent inequality simply leaves one country acquiring assets in the others. The balance of payment position of a country equally weighs great influence on the nation's currency. While balance of payments deficit necessitates payments in foreign currency, its surplus ensures foreign

currency receipts. More receipts of foreign currencies impact positively on enhancing the value of the national currency, while persistent balance of payments deficit impacts negatively and often leads to devaluing the nation's currency. The more the nation's currency losses its value, the more expensive it becomes for firms and industries to import necessary factors of production that are not available locally. Tendency is that an industry that majorly depends on foreign inputs may suffer loss. This is simply due to the fact that exports generally would become comparatively costlier and may not be fully able to increase sales to cover anticipated profit margins. To correct balance of payments deficits, the right approach would be to increase dominance in foreign trade so that more foreign earnings could be engendered. Such an increase may necessitate a push from the public sector. Directions and standards have to be pre-determined and enforced by the government that knows of the nation's state of accounts. In line with this, (Aghion and Howitt, 1992) stated that the tenets of endogenous growth theory ought to be keenly promoted.

In the same way, Ayinde (2014) examined the impact of exchange rates fluctuations on the Nigerian manufacturing via the sector's contribution to GDP. As variables, study used the exchange rate, inflation rates, labour force and lending rates to establish the relationship. The results revealed that exchange rate has negative and significant relationship with the manufacturing sector. It also found that inflation rate has a positive relationship with the manufacturing sector.

In view of the above, this rest of this section present a comprehensive review of empirically previous studies on the effect of exchange rate fluctuations on economic activities with particular reference with the manufacturing sector performance. In the beginning of this review, Weliwita, Ekanayake and Tsujii (1999) examined the effects of exchange rate volatility on Sri Lanka's exports on manufacturing output to six developed countries during the flexible exchange rate regime. The Johansen-Juselius multivariate cointegration technique was used to test for the presence of long-run equilibrium relationships between real exports and its determinants. There is strong evidence to suggest that Sri Lanka's exports to the countries under investigation were affected opposite by the increased volatility in bilateral real exchange rates during the sample period. According to Weliwita and Tsujii (2000) the growth of manufacturing exports is positively correlated with the increase in income of the importing countries. Weliwita and Tsujii (2000) showed unceasing devaluation, the trade deficit continued to move in the wrong direction proposing that exchange rate policy was unable to create a favorable balance of trade position using Cointegration. Individual trade volumes also were not responsive to the changes in real exchange rates. With the use of co-integration and error correction models, Habibur and Ismail (2003) quantitatively examined the existence of a long-run relationship between the real exchange rates and the manufacturing private investment sector in Bangladesh. The study concluded that the

appreciation of exchange rates had negative effect on the level of manufacturing private investment sector; both in the long-run and short run. It found that interest rates do not have any impact on long and short run investments. Azid et al (2005) conducted a study on the impact of exchange rate volatility on the growth and economic performance of Pakistan between 1973 and 2003. The study used real money, real exchange rate, real exchange rate volatility, exports, imports, and manufacturing production indexes as the dependent variable to investigate the relationship. The study shows the results were positive but insignificant, and does not support the position that excessive volatility of exchange rate regimes has pronounced impact on manufacturing in Pakistan.

Jongwanich (2007) revealed that the growing importance in the export composition of parts and components within vertically integrated cross-border production processes has tended to weaken the nexus between real exchange rate and export performance. World GDP is played a leading role in determining demand of exports which consignment by thee income of buyers. It is also detected that the GSP and MFA had a positive and significant impact on the demand for textiles and garments of Sri Lanka. Hooy and Choong (2010) suggested that Real exchange rate volatility was found to have a significant and negative impact on the export demand of most of the south Asian countries. This intends that higher exchange rate fluctuation does not encourage intra-regional trade within south Asian region.

Jayasinghe and Tsui and Zhang (2011) assumed that a firm's future operating cash flows is proxied by its market value, and the exposure coefficient would be able to efficiently measure the impact of exchange rate changes on a firm's return and its sensitivity to the changes. Based on the outcome of the multiple regression models. Ehinomen and Oladipo (2012) also investigated the impact of exchange rate management on the growth of the manufacturing sector in Nigeria. The study used the ordinary least squares multiple regression analysis. The empirical result shows that exchange rate appreciation has a significant relationship with domestic output. Besides, study shows that exchange rate appreciation will promote growth in the manufacturing sector. Enekwe et al (2013) also examined the effect of exchange rates fluctuations on the Nigerian manufacturing sector over a period of 25 years. The study employed the use of descriptive statistics and multiple regressions to examine the impact of exchange rates in Nigeria. The results of the study showed that all the independent variables as stated above have significant and positive relationship with the dependent variable (MGDP). Conclusively, it can be stated that empirical literature supports the claim that exchange rates have positive effects on the sector's productivity. Similarly, Solely, Odior (2013) studied the impact of macroeconomic factors on manufacturing sector in Nigeria over a period of 36 years. The factors used included exchange rates, credit to the manufacturing sector, broad money supply, interest rate, inflation rate and deficit government financing. The analysis involved

the use of ADF test and error correction model. He concluded that credit to the manufacturing sector in the form of loans; advances; and foreign direct investments have the capacity to sharply increase the level of productivity in the sector, while money supply has less impact. The findings were reinforced by the presence of a long run equilibrium relationship by the co-integrating equation of the Vector Error Correction Model.

Vijayakumar (2014) emphasized that the real exchange rate has significantly positive impact on the trade balance of Sri Lanka both in the short- run and the long-run. Anyway considering Sri Lanka and United States, there is no any J-curve effect on trade between those countries. Finally concluded with the trade balance is promoted by the devaluation in short- run and the long run. Regarding the trade, an active major role is played by bilateral exchange rate changes and exchange rate volatility. In measuring the overall imports and exports of two countries, it is impact by changes in the income very low. Senanayake and Alhayky (2014) further suggest using trade between Sri Lanka and China, that the movements of exchange rate between two countries do have significant effects on total trade. Kassie (2015) revealed that the depreciation of the real effective exchange rate improves the export performance. Anyhow it encourages the country' imports. As a result even if there is higher growth of export after a depreciation of the real effective exchange rate, since the growth rate of imports outweigh, it is concluded that there is no improvement in the trade balance account. Aslam (2016) confirmed that the exchange rate positively influenced on the economic growth in Sri Lanka at one percent significant level. The theory of exchange rate was defined that the high exchange rate promotes the economic growth of countries. Bhavan (2016) investigated the determinants of the export performance of Sri Lanka over a period 1980 to 2013. He suggested that all variables are significantly influencing on the export in the long run using gross capital formation, foreign direct investment, interest payment, imports, weighted average per capita income. Ekanayake (2016) added that the global financial crisis and debt crisis had a negative impact on world demand for textiles and garments according to. Ekanayake (2016) added that Trade openness which represents the trade obstacles between Sri Lanka and the global world shows a negative relationship with export demand for textiles and garments industry in developing countries. Also, Soos and Madurapperuma (2016) pointed out the exchange rate regime and foreign policy is a significance measurement of the macroeconomic management in focusing the economic development by improving the export performance of the country. GARCH and Cointegration used to show that trading activities of Sri Lanka can be improved by maintaining a stable competitive real exchange rate. Abinaya and Jerinabi (2018) stated that there is no causal relationship between Exchange Rates and manufacturing output. It also resulted that exchange rate had a negative effect on Exports. There is a positive correlation of the Sri Lankan exports with the increase in domestic income.

From this review it can be deduced that different scholars have analyzed the effect of exchange rate volatility on economic activities from different methodological and analytical perspectives. It can be further revealed that whereas some of the studies concentrated on the impact of exchange on economic growth in Nigerian, to the best of our knowledge very few studies looked at the influence of exchange rate fluctuation in the Nigerian economy. Also from the studies reviewed most research used OLS, Co integration VAR and ECEM as their analytical techniques. Similarly, most of the previous study only focused on the impact of the exchange rate, interest rate and economic growth; this study complement the previous literature by including variables like unemployment and inflation, imports, government capital expenditure and consumer price index which are not solely the aftermath of the exchange rate in the economy. Also following this study differs from majority of the previous research in the sense that it employed the Auto regressive Distributed Lag (ARDL) estimation technique in its analysis.

METHODOLOGY

The methodology examines and specifies the methods and procedures employed in collecting as well as analyzing data in order to analyze the effect of exchange rate fluctuation on the manufacturing sector in Nigeria.

Sources of Data

In order to analyze the effect of exchange rate fluctuation on the manufacturing performance in Nigeria, this study uses annual time series data from 1981-2018 soured from the world development index (2018) and Central Bank of Nigeria (CBN) statistical bulletin (2018). The selection of this period was informed by the era of exchange rate volatility and adverse effect of inflation on the Nigerian economy. Annual data on the manufacturing performance (*MP*) proxed by the ratio of manufacturing output to GDP, exchange rate (*EXCR*), government capital expenditure (*GCE*), consumer price index (*CPI*), interest rate (*INTR*), and import (*IMP*) were used for this research work.

Estimation Techniques

The estimation techniques comprise the descriptive statistics to analyze the statistical characteristics of the series under investigation. The conventional unit root tests, namely the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests to identify the order of integration at levels and first difference and this is due to the fact that economic theories have it that time series data should be stationary before applying any linear econometrics estimation techniques. The lag selection criteria in order to estimate the optimal lag to select in the ARDL estimate. The ARDL bound test to examine the long run relationship of the variables after checking for the healthiness of the model. Finally, the estimate of the long run and short run coefficients as well as the stability test of the ARDL model.

Unit Root Test

It is very important in regression analysis to test for stationarity of the series to avoid spurious regression analysis that is associated with non-stationary time series because, confirming the order of integration is a pre-requisite for almost all time series analysis. Unit root test are test for stationarity in a time series data, a time series has stationarity if a shift in time doesn't cause a change in the shape of distribution. It is used to determine the order of integration of a variable which many times it has to be differenced to make the variable stationary. It used to check for the presence of a unit roots in the variable i.e. whether the variable is stationary or not. The null hypothesis is that there is no unit root. The most popular stationarity tests are, Augmented Dickey-Fuller (ADF) test developed by Dickey and Fuller (1979-1981) and the Philip-Perron (PP) developed by Phillips and Perron (1988). If the augmented Dickey-Fuller (ADF) test statistic is greater than the 5 percent critical value we accept the null hypothesis i.e. the variable is stationary but if the ADF test statistic is less than the 5 percent critical value i.e. the variable is non-stationary we reject the null hypothesis. The test is conducted with and without a deterministic trend (t) for each of the series. The general form of ADF and PP testsarerespectively estimated by the following regressions.

$$\Delta Y_t = a_0 + a_1 Y_{t-1} + \Sigma^{n}_{i-1} a\Delta Y_i + e_t \quad (1)$$

$$\Delta Y_t = a_0 + a_1 Y_{t-1} + \Sigma^{n}_{n-1} a\Delta Y_i + \delta_{t+} e_t \quad (2)$$

Co-Integration Test

The next step is the testing of the presence or otherwise of co integration between the series of the same order, which is done through co-integration test. Co-integration test is a test for testing the existence of a long run relationship among variables. The basic idea behind co integration is that if, in the long-run, two or more series move closely together. Even though the series themselves are trended. The difference between them is constant. It is possible to regard these series as defining a long-run equilibrium relationship, as the difference between them is stationary (Hall and Henry, 1989). If this test established that at least one co-integration vector exist among the variable under investigation, then a long-run equilibrium relationship exist among the variables. A lack of co-integration suggests that such variables have no long-run relationship.

Autoregressive Distributed Lag (ARDL)

To empirically analyze the relationship between the dependent and the independent variables, the Autoregressive Distributed Lag (ARDL) model specification was used to show the long run relationships and dynamic interactions between exchange rate fluctuations and manufacturing performance in Nigeria. The choice of ARDL is informed because it deals with variables that are co-integrated, or the combination of the both I(0) and I(1), and it is robust when there is a single long run relationship between the underlying variables in a small sample size. Other advantages that the ARDL has over other estimation techniques includes: it allows the variables to have different optimal lags which is practically impossible with other conventional co-integration

techniques; it is more appropriate when faced with small sample size unlike other estimation techniques that requires large data set for validity.

In general, the following ARDL model was specified to test the co-integration relationship among manufacturing performance, exchange rate, consumer price index, government capital expenditure, and import. The ARDL functional form is:

$$\Delta MP_t=C_0+\delta_1 MP_{t-1}+\delta_2 EXCR_{t-1}+\delta_3 GCE_{t-1}+\delta_4 CPI_{t-1}+\delta_5 INF_{t-1}+\delta_6 IMP_{t-1}+\Sigma\phi_1\Delta MP_{t-i}+\Sigma\phi_2\Delta EXCR_{t-j} +\Sigma\phi_3\Delta GCE_{t-i}+\Sigma\phi_4\Delta CPI_{t-j}+\Sigma\phi_5\Delta INTR_{t-i}+\Sigma\phi_6\Delta IMP+\mu_t \quad (1)$$

Where Δ is the first difference operator, *t* denotes time period, $\delta_1 - \delta_6$ are the long run coefficients, and $\phi_1 - \phi_5$ are the short run coefficients while μ_t is the white noise error term.

RESULTS AND ANALYSIS

This section seeks to present the data used for this research and also the analysis of the data. It seeks to present the empirical analysis made to evaluate the effect of exchange rate fluctuation on the manufacturing performance in Nigeria for the period 1981 to 2018. It begins with the descriptive statistics, the unit root tests based on the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests, the lag selection criteria, the ARDL bound test, and the estimate of the long run and short run coefficients as well as the stability test of the ARDL model.

Table 1: Descriptive Statistics

	MP	EXCR	GCE	CPI	INTR	IMP
Mean	6.275676	84.08703	90.18135	19.42270	17.58595	20.42109
Median	5.750000	92.34000	91.13000	12.22000	17.59000	19.65000
Maximum	10.44000	306.1000	106.7900	72.84000	31.65000	36.48000
Minimum	2.410000	0.620000	60.98000	5.380000	8.920000	7.900000
Std. Dev.	2.591351	83.83285	9.594113	17.48267	4.984180	8.093545
Skewness	0.059694	0.874633	-0.980555	1.705684	0.274133	0.453828
Kurtosis	1.714902	3.314699	4.365933	4.682939	3.436401	2.331632
Jarque-Bera	2.568000	4.870072	8.805582	22.30747	0.757022	1.958774
Probability	0.276927	0.087595	0.012243	0.000014	0.684881	0.375541
Sum	232.2000	3111.220	3336.710	718.6400	650.6800	755.5804
Sum Sq. Dev.	241.7435	253006.1	3313.692	11003.17	894.3139	2358.197
Observations	37	37	37	37	37	37

Source: Author's Computation

From Table 1, it can be observed that the mean of manufacturing performance (*MP*), exchange rae (*EXCR*), government capital expenditure (*GCE*), consumer price index (*CPI*), interest rate (*INTR*), and import (*IMP*) are 6.275676, 84.08703, 90.18135, 19.42270, 17.58595, and 20.42109 while the standard deviation are 2.591351, 83.83285, 9.594113, 17.48267, 4.984180, and 8.093545 respectively. The skewness of the *MP*, *EXCR*, *CPI*, *INTR*, and *IMP* is positive while that of *GCE*is negative. However, the series *MP*, *INTR*, and *IMP* are close to normal distribution since the skewness is almost zero in each case while *EXCR, GCE,* and *CPI* are not. The kurtosis statistic shows that *MP* and *IMP* are platykurtic with kurtosis of less than 3 in numeral values; while *EXCR, GCE, CPI,* and *INTR* are leptokurtic which implies that its distribution is peaked relative to normal distribution. The Jarque-Bera statistic of each of the series *MP*, *INTR*, and *IMP* indicates normality of the series in terms of distribution at 5% level while *EXCR, GCE,* and *CPI* are not normally distributed.

Table 2 presents the result of the unit root test conducted on the selected variables for this research work using the ADF unit root test. Before going any further, the decision rule as to whether a variable is stationary or not is that when the ADF statistics in absolute terms are greater than the critical values in absolute term, we reject the null hypothesis of the presence of unit root test and accept the alternative hypothesis that the series are stationary. The decision rule can also go in such a way that when the ADF statistic values are lesser than the critical values, we reject the null hypothesis of the presence of unit root test and thus accept the alternative hypothesis of stationarity of time series. A level, the results presented reject the null of unit root hypothesis at 10% for *GCE* and 1% for both *CPI,* and *IMP* while *MP*, *EXCR,* and *INTR* accept it. However, at first difference all the variables are stationary at 1% level except *INTR* which is at 5% level. Hence, I can be said that the series are integrated of orders zero and one, i.e. I(0) and I(1).

Table 2: Augmented Dickey-Fuller Unit Root Test Results

Null Hypothesis: the variable has a unit root

	At Level						
		MP	EXCR	GCE	CPI	INTR	IMP
With Constant	t-Statistic	-1.4904	1.7365	-6.4369	-2.8848	-2.3400	-2.7500
	Prob.	***0.5273***	***0.9995***	***0.0000***	***0.0568***	***0.1654***	***0.0755***
		n0	n0	***	*	n0	*
With Constant & Trend	t-Statistic	-1.1552	-1.9490	-5.9757	-3.9622	-2.1105	-2.7106
	Prob.	***0.9051***	***0.6084***	***0.0001***	***0.0193***	***0.5232***	***0.2384***
		n0	n0	***	**	n0	n0
Without Constant & Trend	t-Statistic	-0.6435	3.3046	-0.2392	-1.8971	-0.1427	-0.8991
	Prob.	***0.4317***	***0.9996***	***0.5919***	***0.0560***	***0.6273***	***0.3199***
		n0	n0	n0	*	n0	n0
	At First Difference						
		d(MP)	d(EXCR)	d(GCE)	d(CPI)	d(INTR)	d(IMP)
With Constant	t-Statistic	-6.4272	-4.2117	-5.5228	-5.5941	-5.2075	-8.2206
	Prob.	***0.0000***	***0.0021***	***0.0001***	***0.0000***	***0.0001***	***0.0000***
		***	***	***	***	***	***
With Constant & Trend	t-Statistic	-7.0555	-4.5445	-5.6026	-5.5232	-5.6084	-5.1198
	Prob.	***0.0000***	***0.0046***	***0.0004***	***0.0003***	***0.0003***	***0.0012***
		***	***	***	***	***	***
Without Constant & Trend	t-Statistic	-6.5167	-3.6852	-5.6336	-5.6761	-2.5416	-8.3280
	Prob.	***0.0000***	***0.0005***	***0.0000***	***0.0000***	***0.0126***	***0.0000***
		***	***	***	***	**	***

Source: Author's Computation

Notes:

a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant
b: Probability based on MacKinnon (1996) one-sided p-values.

Table 3 presents the unit root test results from the Phillips-Perron unit root test. For easy decision making, the rule of thumb also follows that of the ADF unit root test which states that we reject the null hypothesis of the presence of unit root when the t-statistics is higher than the critical value in absolute terms. From the table, the null hypothesis of the presence of unit root at level was rejected for *GCE*, *CPI*, and *IMP* as the *t*-statistics was found to be higher than the critical value at 10% and 1% levels of significance. However, at first difference all the series are stationary at 1% level.

Table 3: Phillips-Perron Unit Root Test Results

Null Hypothesis: the variable has a unit root

		At Level					
		MP	EXCR	GCE	CPI	INTR	IMP
With Constant	t-Statistic	-1.6156	1.5311	-6.3839	-2.7564	-2.3343	-2.7809
	Prob.	***0.4648***	***0.9991***	***0.0000***	***0.0745***	***0.1671***	***0.0708***
		n0	n0	***	*	n0	*
With Constant & Trend	t-Statistic	-1.0852	-1.1244	-5.9592	-2.8248	-2.0058	-2.7430
	Prob.	***0.9181***	***0.9110***	***0.0001***	***0.1979***	***0.5791***	***0.2264***
		n0	n0	***	n0	n0	n0
Without Constant & Trend	t-Statistic	-0.6646	3.0452	0.3410	-1.7719	-0.2941	-1.1572
	Prob.	***0.4224***	***0.9991***	***0.7782***	***0.0727***	***0.5730***	***0.2209***
		n0	n0	n0	*	n0	n0
		At First Difference					
		d(MP)	d(EXCR)	d(GCE)	d(CPI)	d(INTR)	d(IMP)
With Constant	t-Statistic	-6.4212	-4.1673	-13.2732	-9.4486	-6.6478	-14.1572
	Prob.	***0.0000***	***0.0024***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***
With Constant & Trend	t-Statistic	-7.0573	-4.3738	-17.5261	-10.3408	-6.9479	-16.4054
	Prob.	***0.0000***	***0.0071***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***
Without Constant & Trend	t-Statistic	-6.4998	-3.6832	-13.4735	-9.8320	-6.7334	-13.7247
	Prob.	***0.0000***	***0.0005***	***0.0000***	***0.0000***	***0.0000***	***0.0000***
		***	***	***	***	***	***

Source: Author's Computation

Notes:

a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant

b: Probability based on MacKinnon (1996) one-sided p-values.

Both the results obtained from the ADF and PP unit root tests confirmed that the variables are a mixture of I(0) and I(1). Therefore, this paved away to employ the autoregressive distributed lag (ARDL) model. However, before engaging into the estimation of the ARDL model, there is need to estimate the optimal lag to use in the estimation.

Table 4: Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-670.1492	NA	9.08e+10	42.25932	42.53415	42.35042
1	-497.1074	270.3778	18075474	33.69421	35.61799*	34.33189
2	-468.4265	34.05854	36863698	34.15166	37.72439	35.33592
3	-404.1861	52.19540*	13737274*	32.38663*	37.60831	34.11747*

Source: Author's Computation

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Table 4 shows that the information criteria LR, FPE, AIC, and HQ indicate 3 lags while SC specifies 1 lag. However, following majority criteria 3 lags were selected for the ARDL estimate.

Table 5: Cointegration Test (ARDL Bound Test)

Lag Length	F-Statistics	
ARDL (2,3,3,3,3,0)	8.801642	
	Critical Values	
Significance Level	*Lower Bounds I(0)*	*Upper Bounds I(1)*
10 percent	2.331	3.417
5 percent	2.804	4.013
1 percent	3.9	5.419

Source: Author's Computation

Table 5 presents the cointegration test. The null hypothesis here is that there is no co-integration, i.e., absence of long run relationship among the variables of choice while the alternate hypothesis states that there is co-integration, i.e., existence of long run relationship. The decision rule goes thus; when the F-statistics is greater than the Narayan critical values, we reject the null hypothesis of no long run relationship and accept the alternative hypothesis of the existence of long run relationship. From the table, the F-statistics (8.801642) is greater than the critical values at both lower and higher bounds at 1% level, thus, indicating the rejection of the null hypothesis of no long run relationship among variables. Hence, we can conclude from the result that there exist long run relationships among the variables.

Owing to the fact that, a long run relationship was established among the variables from the bound test, the ARDL was estimated in co-integrating form for both the long and short run coefficients.

Table 6: Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXCR	-0.055447	0.007889	-7.028091	0.0000
GCE	-0.060210	0.076052	-0.791700	0.4439
CPI	0.001479	0.025059	0.059027	0.9539
INTR	-0.230225	0.090272	-2.550344	0.0254
IMP	-0.204465	0.028956	-7.061362	0.0000
C	18.96848	8.134061	2.331982	0.0379

Source: Author's Computation

Table 6 above presents the long run coefficients of the ARDL estimates. From the table, *EXCR* was found to be impacting manufacturing performance negatively and the impact is significant at 1% level. It shows that a unit increase in *EXCR* will cause a 0.06 decrease in manufacturing performance. *GCE* was found to be impacting manufacturing performance negatively but the impact is not significant. It shows that a unit increase in *GCE* will cause a 0.06 decrease in manufacturing performance. *CPI* was found to be impacting manufacturing performance

positively but the impact is not significant. It shows that a unit increase in *CPI* will cause a 0.001 increase in manufacturing performance. *INTR* was found to be impacting manufacturing performance negatively and the impact is significant at 5% level. It shows that a unit increase in *INTR* will cause a 0.2 decrease in manufacturing performance. *IMP* was found to be impacting manufacturing performance negatively and the impact is significant at 1% level. It shows that a unit increase in *IMP* will cause a 0.2 decrease in manufacturing performance.Therefore, in the long run, rise in exchange rate, interest rate, and import are hindering manufacturing performance in Nigeria but government capital expenditure and consumer price index have no significant role.
Moreover, the study proceeds with the estimation of the short run dynamics associated with the long run estimation for the selected ARDL model.

Table 7: Short Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MP(-1))	-0.136758	0.098163	-1.393170	0.1888
D(EXCR)	0.006350	0.007185	0.883818	0.3942
D(EXCR(-1))	0.061297	0.009453	6.484286	0.0000
D(EXCR(-2))	0.064372	0.012936	4.976321	0.0003
D(GCE)	0.084703	0.012251	6.914084	0.0000
D(GCE(-1))	0.121171	0.018794	6.447247	0.0000
D(GCE(-2))	0.046705	0.014585	3.202266	0.0076
D(CPI)	0.173899	0.051144	3.400179	0.0053
D(CPI(-1))	0.148224	0.068964	2.149298	0.0527
D(CPI(-2))	0.357906	0.063192	5.663769	0.0001
D(INTR)	-0.055196	0.032362	-1.705610	0.1138
D(INTR(-1))	0.138972	0.032647	4.256802	0.0011
D(INTR(-2))	0.104407	0.035852	2.912175	0.0130
CointEq(-1)*	-0.803775	0.083610	-9.613389	0.0000
R-squared	0.906682			
Adjusted R-squared	0.839287			
Breusch Godfrey Serial Correlation Test	4.591029 (p = 0.1007)			
Breusch-Pagan Godfrey Test for Heteroscedasticity	14.40048 (p = 0.7599)			
Jaque Bera Normality Test	1.814051(p = 0.4037)			

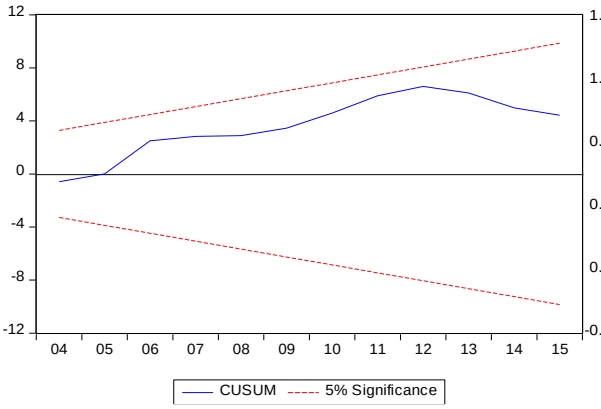
Source: Author's Computation

Table 7 presents the short run coefficients associated with the long run coefficients. From the table, the error correction term (ECT) was found to be negative and significant at 1% level and thus, in conformity with the theoretical expectation. From the table, the value of the ECTis -0.803775 which shows that in the event of any disequilibrium, the system will converge to long run equilibrium at a speed of about 80%. The short run coefficients of the marginal impact revealed that, in the short run, exchange rate, government capital expenditure, consumer price index, are

encouraging the manufacturing performance in Nigeria but the coefficient of the interest rate that satisfies economic theory indicates no significant impact.

Furthermore, the lower part of the table presents the results of the various diagnostic tests. The R^2 normally regarded as the coefficient of determination which measures the goodness of fit of the model is estimated to be 91%, which implying that the model is fit and therefore, 91% of the variation in the manufacturing performance is explained by the explanatory variables used. However, from the table the Breusch-Godfrey serial correlation test failed to reject the null hypothesis of no serial correlation with a *p*-value of 0.1007, while the result of the Breusch-Pagan-Godfrey heteroscedasticity also failed to reject the null hypothesis of no heteroscedasticity in the residuals with a *p*-value of 0.7599 indicating that the residuals are homoscedastic. Similarly, the Jaque-Bera normality test confirms that the residuals are normally distributed with the rejection of the null hypothesis of the residuals not normally distributed with a *p*-value of 0.4037.

Stability Tests:**CUSUM and CUSUMSQ tests**



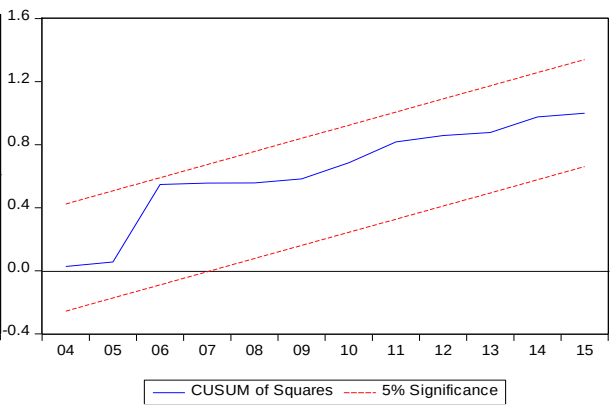


Figure 1: CUSUM Test ***Figure 2: CUSUMQ Test***

The cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) tests estimated to test for the stability of the long run coefficients of the estimate. As it shown Figures 1 and 2, the CUSUM and CUSUMSQ plots did not cross the 5% critical boundary of the gaph. Thus, there exists stability in the coefficients over the sample period.

CONCLUSIONS AND POLICY RECOMMENDATIONS

This investigation has endeavored to survey the effect of exchange rate fluctuations on manufacturing performance in Nigeria for a period 37 years, using ARDL model with bound test for examining the long run relationship of the variables after checking for the healthiness of the model. Finally, the estimate of the long run and short run coefficients as well as the stability test

of the ARDL model. From the analysis of this study, it could be reasonably stated that the Jarque-Bera statistic some of the series (MP, INTR) affirm the normality of the series in terms of distribution at 5% level, whereas others (EXCR, GCE, and CPI) have not been normally distributed. Thus the series are proven to be stationarity. A level, the results presented reject the null of unit root hypothesis at 10% for GCE and 1% for both CPI, and IMP while MP, EXCR, and INTR accept it.

Similarly, the null hypothesis of the presence of unit root at level was rejected for GCE, CPI, and IMP as the t-statistics was found to be higher than the critical value at 10% and 1% levels of significance. The null hypothesis here is that there is no co-integration, i.e., absence of long run relationship among the variables of choice while the alternate hypothesis states that there is co-integration, i.e., existence of long run relationship. From the analysis it can also be seen that the F-statistics is greater than the critical values at both lower and higher bounds at 1% level, thus, indicating the rejection of the null hypothesis of no long run relationship among variables. Hence, we can conclude from the result that there exist long run relationships among the variables.

For the ARDL estimates, it can be seen that EXCR was found to be impacting manufacturing performance negatively and the impact is significant at 1% level. It shows that a unit increase in EXCR will cause a 0.06 decrease in manufacturing performance. GCE was found to be impacting manufacturing performance negatively but the impact is not significant. It shows that a unit increase in GCE will cause a 0.06 decrease in manufacturing performance. CPI was found to be impacting manufacturing performance positively but the impact is not significant. It shows that a unit increase in CPI will cause a 0.001 increase in manufacturing performance. INTR was found to be impacting manufacturing performance negatively and the impact is significant at 5% level. It shows that a unit increase in INTR will cause a 0.2 decrease in manufacturing performance. IMP was found to be impacting manufacturing performance negatively and the impact is significant at 1% level. It shows that a unit increase in IMP will cause a 0.2 decrease in manufacturing performance. Table 7 presents the short run coefficients associated with the long run coefficients.

On the error correction term was found to be negative and significant at 1% level and thus, in conformity with the theoretical expectation. From the table, the value of the ECT is -0.803775 which shows that in the event of any disequilibrium, the system will converge to long run equilibrium at a speed of about 80%. The cumulative sum of recursive residuals and cumulative sum of squares of recursive residuals tests estimated to test for the stability of the long run coefficients of the estimate. As it shown Figures representing the CUSUM and CUSUMSQ plots did not cross the 5% critical boundary of the graph.

Finally, from the results of the empirical study, this study proposes recommendations for encouraging and improving exchange rate stability in Nigeria as this may help improve the capacity of the country's manufacturing sector, hence expand its contribution to GDP growth. Moreover, there an urgent need to design and implement an appropriate exchange rate policies and strategies capable of improving the manufacturing performance. More importantly, the

government should direct it expenditure to the key productive sectors of the economy, this will go a long way in increasing the production of goods and services thereby stabilizing the prices and consequently exchange rate. It is also essentially important for the government arms to adequately monitor and address the country's budget allocation, as more of the country's budget is recurrent than capital. Theoretically and indeed practically it is not healthy for a country with 70% recurrent expenditure because it shows that, the country' expenditure is more of consumption than investment which will definitely spark up inflation rate in the country. In addition, efforts should be geared towards reducing prime lending rate to an affordable acceptable level, as that would boost the credit facilities for the productivity in the country.

References

Abinaya, K. and Jerinabi, U. (2018). Causal Relationship between Exchange Rate and Exports of SAARC Nations, *International Journal of Business and Management Invention,* Vol 06,

Aghion, P. and Howitt, P. (1992). A model of growth through creative destruction. Econometrica 60.

Aslam, A.L.M. (2016), Impact of Exchange Rate on Economic Growth in Sri Lanka, *World Scientific News,* WSN 54

Ayinde, T. O. (2014). The Impact of Exchange Rate on Manufacturing Performance: New Evidence from Nigeria. *Fountain Journal of Management and social sciences*. Vol. 3(2)

Azid, T. J and Kousar, A. (2005). Impact of Exchange Rate Volatility on Growth and Economic Performance: A Case Study of Pakistan, 1973-2003''. *The Pakistan Development Review, Vol. 44, No 4, Papers and Proceedings part II, Twenty-First Annual General Meeting and Conference of the Pakistan Society of Developmen*t.

Bhavan, T. (2016). The Determinants of Export Performance: The Case of Sri Lanka, *International Research Journal of Social Sciences,* Vol 5(8)

Chit, M.M. Rizov, M.and Willenbockel, D. (2008). Exchange Rate Volatility and Exports: New Empirical Evidence from the Emerging East Asian Economies, *MPRA Paper,* Vol 9014

Ehinomen, C. and Oladipo, T. (2012). "Exchange Rate Management and the manufacturing Sector Performance in the Nigerian Economy''. *Journal of Humanities and Social Science (JHSS) ISSN: 2279-0837,* ISBN: 2279-0845. Volume 5, Issue 5 (Nov. - Dec. 2012)

Ekanayake, E.M. and Chatra, D. (2010). The Effects of Exchange Rate Volatility on Sri Lankan Exports: An Empirical Investigation, *Journal of International Business and Economy,* Vol 11(1).

Ekanayake, N. (2016). Determinants of External Demand for Textiles and Garments of Sri Lanka. Staff *Studies Central Bank of Sri Lanka*, Vol 43

Ekanayake, N. (2016). Determinants of External Demand for Textiles and Garments of Sri Lanka, *Staff Studies Central Bank of Sri Lanka*, Vol 43

Enekwe. C.I, et al. (2013). Effects of Exchange Fluctuations on Nigeria's Manufacturing Sector. *European Journal of Business and Management*. Vol.5, Nov 2013.

Engel R.F. and Granger, C.W.J. (1987). Co-Integration and Error Correction: Representation, Estimation and Testing. Econometrica 55

Falaye, J. A. (2017, pp. 56). Government financial policies and emerging countries' small scale enterprises. *Lap Lambert Academic Publishing, EU*. ISBN/978-3-659-88901-1

Granger C.W.J. (1986) Developments in The Study of Co-integrate Economic Variables. Oxford Bulletin of Economics and Statistics 48, 3

Granger C.W.J. and Ding Z. (1996). Modelling Volatility Persistence of Speculative Returns: A New Approach. Journal of Econometrics 73 (1996)

Granger C.W.J., and Newbold (1989). Forecasting Economic Time Series, Second Edition Academic Press

Gujaraty D.N. and Porter D.C. (2009). Basic Econometrics. McGraw – Hill International *Fifth Edition* Singapore.

Habibur, R. and Ismail, H. (2003). Exchange Rate and Investment in the Manufacturing Sector of Bangladesh. *The Bangladesh Development Studies Vol.29, pp. 111-124*. Retrieved from www.jstor.org/stable/25825263

Hooy, C.W. and Choong, C.K. (2010), Export Demand within SAARC Members: DOES Exchange Rate Volatility Matter, *International Journal of Economics and Management*, Vol 4(2),

Jayasinghe, P. (2016). Time-Varying Exchange Rate Exposure: Evidence from Emerging Markets, *NSBM Journal of Management*, Vol 2

Jayasinghe, P. Tsui, A. and Zhang, Z. (2011), Modelling exchange rate exposure in the Japanese industrial sectors, *International Congress on Modelling and Simulation*, 12-16

Jongwanich, J. (2007). Determinants of Export Performance in East and Southeast Asia, *ERD Working Paper*, WP 106

Kassie, N.M. (2015). Assessment on Real Effective Exchange Rate and External Sector Development of Ethiopia, *International journal of business and economics research,* Vol 4(4)

Kathleen, C. (2018). *What is an Exchange Rate and What Does It Mean?* Edited by Joe Cortez, March 2018 Downloaded on 18 July 2018

Kimberly, A. (2018). *Exchange Rates Explained* Downloaded on 18 July 2018

Komolafe, S.O. (1996) Co-Integration Theory and Application. Journal of Economic Literature, 35

Mukhtar, T. and Malik, S.J. (2010). Exchange Rate Volatility and Export Growth: Evidence from Selected South Asian Countries", *Fatima Jinnah Women University, Rawalpindi*, Vol 60

Pandey, I. M. (2010, pp: 807). Financial Management. *Vikas Publishing House PVT Ltd.*

Senanayake, A.A.K. and Alhayky, A.A.A. (2014), Exchange rate movements' effect on Sri Lanka-China trade, *Journal of Chinese Economic and Foreign Trade Studies,* Vol 03

Senhadhi, A. and Montenegro, C. (1998), Time Series Analysis of Export Demand Equations: A Cross Country Analysis, *Imf Working Paper*, WP 98

Soos, M.Y.M. and Madurapperuma, M.W. (2016). Impact of Exchange Rate Volatility on Sri Lanka's Trade Growth, *International Conference on Business, 07*

Vijayakumar, S. (2014). The Effects of Exchange rate on the Trade Balance in the Sri Lankan Context after Post Liberalization, *International Journal on Global Business Management and Research,* Vol 2

Weliwita, A. and Tsujii, H. (2000). The Exchange Rate and Sri Lanka's Trade Deficit, *Journal of Economic Development,* Vol 25

Weliwita, A. Ekayake, E.M. and Tsujii, H. (1999). Real Exchange Rate Volatility and Sri Lanka's Exports to the Developed Countries, 1978-96, *Journal of Economic Development,* Vol 24