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Original Research Article

Exchange Rate and Performance of Manufacturing Industry in Nigeria

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Abstract: This study examines the effect of exchange rate on the performance of manufacturing industry between 1985 and 2022. The study proxied of exchange rate by real exchange rate, external reserve and trade openness while the performance of manufacturing industry was measured by manufacturing sector GDP. The theories adopted comprise: Purchasing Power Parity (PPP), Theory, Optimal Currency Area (OCA) Theory and Theory of Production. Annual temporal data for the study were sourced from Central Bank of Nigeria (CBN) statistical bulletin and Word Development Indicators (WDI) of the Word Bank. The techniques of data analysis adopted are unit root test, co-integration test and error correction model (ECM) approach. The study found that real exchange rate has a substantial unfavourable effect on manufacturing sector GDP in Nigeria, external reserve has a favourable and substantial effect on manufacturing sector GDP in Nigeria while trade openness has a favourable and substantial effect on manufacturing sector GDP in Nigeria. As per the finding, the study concluded that exchange rate plays a substantial role influencing the performance of manufacturing industry in Nigeria. The study recommended that government should formulate efficient and feasible trade policies that will liberalize trade and open the Nigerian manufacturing sector to foreign investors.

Keywords: Real Exchange Rate, External Reserve, Trade Openness Manufacturing Sector Gross Domestic Product.

1. INTRODUCTION

When it comes to industrialisation, job creation, and export diversification, the manufacturing sector is where it is at for any nation's economy. This research defines manufacturing as the part of the economy that uses industrial processes to turn raw materials into finished items. Adebayo (2015) argues that manufacturing drives economic development by creating jobs, advancing technology, and diversifying exports. Olayemi and Ayodele (2018) go on to say that manufacturing is important for sustainable development because it promotes industrialisation and value addition. In congruent with the National Bureau of Statistics (NBS, 2021), manufacturing played a crucial role in the economy in 2020, contributing almost 15% to the GDP.

With its ability to create jobs and fuel economic development, the manufacturing sector is clearly important. Take Nigeria as an example; in

2019, 12% of the nation's official occupations were in this industry (NBS, 2020). Also, it might grow if properly supported, as its contribution to GDP went grown slightly from ₦8.7 trillion in 2018 to ₦9.3 trillion in 2019. The fact that this contribution is lower than the world average highlights the untapped potential of the industry, which is mainly attributable to fluctuations in currency rates. Thus, in congruent with this research, the exchange rate is the value of one currency relative to another. The exchange rate is a key factor in trade competitiveness and macroeconomic stability, in congruent with Olaniyi (2019). Eze and Uchenna (2020) make a similar point, arguing that changes in exchange rates have a major effect on the price of imported materials and, by extension, on production.

Exchange rate volatility has been a persistent problem for Nigeria's industrial industry throughout the years. For example, in congruent with CBN (2017), manufacturing costs augmented by 25% and output declined due to the naira's substantial depreciation during the 2016 recession. There are a lot of obstacles that the Nigerian manufacturing sector must overcome before it can reach its full potential. These comprise things like unstable currency rates, high energy prices, and poor infrastructure. These factors mainly contributed to the decline in manufacturing capacity utilisation from 60% in 2019 to 43% in 2021, in congruent with NBS (2022). Can Nigeria's manufacturing industry overcome the hurdles posed by exchange rate volatility, which is increasing production costs and diminishing competitiveness, and reach its full potential? Examining how the Nigerian currency rate affects industrial output is the primary goal of this research.

2. LITERATURE REVIEW

Conceptual Framework

Exchange Rate

According to Ngerebo-a and Ibe (2013), the current exchange rate is defined as the value of one currency relative to another at a certain point in time. To put it simply, the exchange rate is the number of units that represent the ratio of the buying power of one currency to another (Mordi, 2016). The value of one currency relative to another is the link between domestic and global goods and service prices. Another factor is the potential increase or decrease in the value of one currency compared to another. According to Kenneth and Jonathan (2016), the value of one domestic currency unit relative to another foreign currency unit rises when the exchange rate appreciates, and the value of one domestic currency unit relative to another foreign currency unit falls when the rate depreciates. A currency's exchange rate is its value in relation to another currency. It is a way to quantify the market value of one currency relative to another. The supply and demand for currencies, interest and inflation rates, and global political and economic events are among the many factors that impact the exchange rate (Bordo, Eichengreen & Flandreau, 2016). To put it simply, the value of one currency in relation to another is known as the exchange rate (Adeniran, Yusuf and Adeyemi 2014). As a result, it determines how actively the private sector participates in global trade and how much domestic and foreign goods cost.

Manufacturing Sector

The run "manufacturing" refers to the process of making a product from raw ingredients. Manufacturing creates jobs and improves agricultural output, in congruent with Obioma, Kalu, and Anyawu (2015), whose ideas touch on manufacturing and economic development. "The use of contemporary technology, equipment and machineries for the creation of products and services, easing human suffering and to ensuring continual progress in their welfare" is how Obioma, Anyawu, and Kalu (2015) described manufacturing. The run "manufacturing" refers to the process of making anything useful or sellable by the application of human effort in conjunction with various tools, machinery, chemicals, and biological processes. Investors in the manufacturing sector make things for the home market, either to sell or to use as inputs in other industries like agriculture and manufacturing.

Purchasing Power Parity (PPP) Theory

Swedish academic Gustav Cassel proposed the theory of Purchasing Power Parity (PPP) initially in 1918. The idea holds that the nominal value of the exchange rate should be equal to the ratio of the two countries' total price levels thereby guaranteeing that one nation's currency has the same purchasing power in another. Two currencies have equal purchasing power ratio based on their exchange rate. This theory holds that there are certain situations in which trading US dollars for Euros and then applying the profits to buy a market basket of goods would be as costly as just purchasing the goods with the dollars themselves. Should the purchasing value of any given currency drop, its value in the foreign exchange market would similarly drop in line (Ohiria, Saliu & Schuller, 2008). To find out what the appropriate exchange rate would be for two currencies such that the buying power of the two currencies is equal, one may use the concept of purchasing power parity.

Theory of Production

The economic theory of production serves as the theoretical basis for the majority of empirical investigations that investigate workplace productivity. The concept focusses on the production function, which asserts that there is a directly defined connection between a vector of production inputs

and a vector of maximum producible outputs. This link is what makes the idea possible. According to the conventional understanding of historians, the change in total factor productivity, also known as the vertical shift of the production function, is defined as the change in output level that allows for input levels (Nelson, 1981). Because of this, the word "residual" as well as other phrases that describe factor productivity have come into existence. Some studies have attempted to define productivity transformation as the incorporation of new technology, the changing of employee demographics, the growing of investment on human capital, the transfer of resources from low-productivity jobs to high-productivity tasks, and the utilisation of economies of scale. According to Nadiri (1970), "Productivity change is both the cause and the effect of the growth of the dynamic forces working in an economy." These dynamic forces comprise technical progress, accumulation of human and physical capital, as well as commercial and institutional structures. There are robust and well defined theoretical frameworks that support the theme of trade policy and productivity growth. Despite the fact that the overall problem of productivity is unclear, there exist these frameworks. The x-efficiency argument is a good example of one of these theoretical framework applications.

Empirical Literature

Olukemi and Tayelolu (2023) utilised data from 1981 to 2015 to evaluate the impact of industrial productivity and currency rate volatility on inclusive growth in Nigeria. Incorporating monetary intervention and Neo-Classical theory, they utilised the Cobb Douglas growth model. Applying Normalised Co-integration and the Johansen Co-integration test, the research examined the trajectory of agriculture-driven economic inclusive development. These factors exhibit a continuous link that is compatible with our findings when looking at the big picture. But in the long run, manufacturing is the sector that affects GDP per capita the most.

Orji and Ezeanyaeji (2022) looked at the performance of Nigeria's industrial sector from 1990 to 2020 and how currency rates affected it. The upshots shown that as the exchange rate fluctuates, it hinders manufacturing production, and as the exchange rate depreciation limits the manufacturing sector, in congruent with the canonical cointegrating regression (CCR) framework. Research shows that manufacturers' output drops when prices rise; as a result, the report suggests, among other things, that policymakers should work to bring the value of the currency closer to what manufacturers really require. Additionally, the report recommends giving new approaches to managing currency rates a fair amount of time to settle in. For a sector that relies on foreign inputs, the frequent and arbitrary jettisoning of strategy has clear consequences for the exchange rate.

In a recent study, Akintunde, Akanbi, Oladipo, and Adedokun (2021) looked at 12 different West African nations to see how trade openness affected manufacturing sector production. It looked at the chosen nations' manufacturing sector performance from 1980 to 2019 and tried to determine whether growth in trade, employment, investment, exchange rate, and inflation rate had any effect. While much of the previous research focused on temporal analysis, this study utilised a different approach by analysing panel data series applying econometric approaches i.e. Fully Modified Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS). The goal here was to quantify the extent to which the explanatory factors affected the industrial sector. Thus, all of the co-efficient are favourably and substantially related to manufacturing sector output in congruent with FMOLS and DOLS, with the exception of trade openness, which is not substantial, and inflation rate, which is unfavourably substantial.

Between 1981 and 2018, Irene, Obi, Ezenekwe, and Ukeje (2020) studied the effects of fluctuating currency rates on Nigeria's industrial sector. The research utilised the VAR model to examine the yearly temporal data. We utilised the General Regression with Co-integration (1, 1) model to get the series of exchange rates and to find out how often the volatility stays the same. We estimated the effect of currency rate volatility on the industrial sector applying the VAR model. Exchange rate volatility is persistent, in congruent with the GARCH (1, 1) estimations. Separate categories for manufacturing output were those that had anything to do with oil and those that did not. Exchange rate fluctuation substantially reduces aggregate industrial production in Nigeria, in congruent with empirical evidence derived via VAR estimation.

Godwin and Idaraobong (2019) looked at how deregulation of the Nigerian currency affected production in the industrial sector. Applying an ARDL framework, the research examined yearly temporal data from 1986 to 2017. In congruent with the ARDL upshots, deregulation of exchange rates had an unfavourable correlation with Nigerian manufacturing production, although this impact became statistically substantial at the third period lag. Additionally, at the 10% significance level, the analysis indicated that inflation rate had an unfavourable correlation with manufacturing sector productivity over the long term. Upshots demonstrated a favourable correlation between rising labour employment and productivity over

time, a strong correlation between gross capital formation and manufacturing output, and an improvement in manufacturing productivity as a whole as a result of higher capacity utilisation.

Applying data from Nigeria from 1981 to 2016, Celina, Eze, and Atuma (2018) looked at how exchange rate policy affected industrial production. For this investigation, we utilised the Johansen co-integration test and the Vector ECM model. The analysis utilised temporal data utilised by the CBN statistics bulletin for manufacturing output (MOP), manufacturing sector capacity utilisation (MCU), exchange rate (EXR), and import (IMP). This research aimed to confirm whether the exchange rate-led hypothesis was important to the development of manufacturing sector output in Nigeria by applying a Granger causality test among the pertinent elements after the requisite integration, co-integration, and error correction in the projected equation. According to the data, Nigeria's industrial production dropped because of a surge in the value of the naira relative to the dollar. It turned out to have a negligible effect, nevertheless. As a result, variations in the naira's value do impact the expansion of Nigeria's industrial production.

Studying the influence of exchange rate volatility on the performance of Nigerian manufacturing businesses from 1986 to 2016, Ugwu (2017) utilised company profitability as a proxy for performance and conducted multiple regression analysis according to the OLS approach. Applying the ADF test, the researchers confirmed stationarity; the results demonstrated a one-to-one integration of the components. Results from the Johansen co-integration test corroborate the existence of a long-term relationship between changes in the value of the naira and the success of Nigerian manufacturing firms. Utilising a mix of the T and F tests, together with their respective probability-values, demonstrated a statistically significant association between fluctuations in the naira's value and the profitability of Nigerian manufacturing businesses.

Nwokoro (2017) utilised ordinary least squares (OLS), co-integration (ECM), and a related technique to analyse the effect of interest rate and currency volatility on industrial output in Nigeria from 1983 to 2014. Factors included in the study include interest rate, capacity utilisation, investment in industrial production, government expenditure on manufacturing, foreign exchange rate, and manufacturing output. Interest rates (INTR) and foreign exchange rates (FREX) have a negative and large impact on manufacturing output (MANO), which is in line with the results.

Applying an ARDL model to examine four types of industrial exports, Fetene (2017) looked at how real exchange rates affected exports from ten East African countries. Real exchange rate depreciation substantially affects exports of labour-intensive, low-skill, medium-skill, and technology-intensive industries in the near term, in congruent with the upshots. Real effective exchange rate depreciation harmed exports that relied heavily on technology and high levels of expertise, in congruent with the data. Devaluation of the currency also boosts export performance in East Africa, in congruent with the statistics.

Nnamocha, Obioma, Igwemma, and Nwoko (2017) looked at how the industrial sector in Nigeria grew and how much money the nation made. We utilised the 2015 issue of the CBN Statistical Bulletin to compile secondary data on industrial production, foreign exchange disbursement, foreign exchange rate, and Nigeria foreign reserves from 1981 to 2015. We ran the regression on the gathered data applying the E-view version 9 econometric tool. Research on the correlation between the development of Nigeria's industrial sector and the availability of foreign currency (as measured by disbursement of foreign cash) showed no substantial but beneficial effect. The expansion of Nigeria's manufacturing industry was favourably and substantially affected by the nation's foreign currency rate and foreign reserves.

Applying multiple regression analysis and the ARDL model, Lawal (2016) investigated the effect of changes in the exchange rate on production in Nigeria's manufacturing sector from 1986 to 2014. The World Development Indicators and the CBN bulletin provided the data utilised in the inquiry. The research makes use of the following factors: real effective exchange rate (EXC), consumer price index, government capital expenditure, manufacturing output, and CPI. As per the ARDL upshots, there are both long- and short run correlations between the factors. Additionally, the upshots showed that the exchange rate substantially affects manufacturing sector production for the better. Moreover, the upshots demonstrated that the exchange rate favourably impacts the production of the industrial sector.

Applying a Vector Error Correction Model (VECM) strategy, Akinlo and Lawal (2015) investigated the impact of the exchange rate on industrial output in Nigeria from 1986 to 2010. The upshots demonstrated a correlation between the money supply, inflation rate, industrial output index, and exchange rate over the long term. Additionally, the data demonstrated that exchange rate depreciation had a substantial influence on Nigeria's industrial production in the long run, despite the fact

that it had no discernible effect on industrial output in the short run. Finally, the estimate upshots also showed that the money supply has a big outcome on industrial output in Nigeria.

Applying the Cobb-Douglas production function equation, Anubha (2013) studied the effect of changes in the real exchange rate on the performance of Indian manufacturing enterprises from 2000 to 2012. In congruent with the upshots, actual exchange rate fluctuations substantially affect the performance of Indian manufacturing enterprises via both revenue and cost channels. The time-varying firm-level markup reveals that the impacts are power-market dependent and proportional to export and import shares. However, when the currency rate is overvalued, the favourable impacts of an appreciation via the reduced input cost channel are nullified.

In their 2012 study, Owolabi and Adegbite looked at how different currency regimes affected industrial development in Nigeria. The study's aims necessitated the use of secondary data culled from the CBN Statistical Bulletin, which runs from 1985 to 2005. Data on factors comprising GDP, WPI, per capita income, and net export were examined applying multiple regressions to conclude the study. An adjusted R2 of 69% indicates that the three different ways of defining the exchange rate—"broadly define," "narrowly define," and "quasi money"—both substantially and favourably affect economic growth.

Applying multiple regression analysis, Opaluwa, Umeh, and Abu (2010) looked at the impact of currency changes on Nigeria's manufacturing sector from 1986 to 2005. Industrial production, FDI, and the unemployment rate are the study's independent factors. All of the independent factors had a favourable effect on the dependent factor, in congruent with the upshots.

Problems and Enhancement

This paper has performed a thorough review of the body of research on the subject of how variations in the exchange rate affect manufacturing sector efficiency in Nigeria. Review comprises empirical, conceptual, and theoretical literature. Studies of the pertinent empirical data showed that pertinent research generated contradicting results and lacked agreement on the nature of the correlation between changes in exchange rates and the performance of the manufacturing sector. Not one single study we examined contained temporal data spanning beyond 2022. This study aimed to close such gap in the body of knowledge already in publication. This study aimed to find the effects of such variations on the performance of Nigeria's manufacturing sector from 1985 to 2022 applying the real exchange rate as surrogates for trade openness and exchange rate volatility.

3. METHODOLGY

Applying secondary data collected from the CBN Statistical Bulletin on different topics, this article utilised an ex-post facto research approach to examine the real exchange rate, trade openness, and manufacturing sector GDP. The information spanned 38 years (1985 - 2022).

Model Specification

The revised version of Lawal's (2016) research on how changes in the value of the naira affect production in Nigeria's industrial sector forms the basis of this report. In this study, we utilised a log variant of the multiple regression model with some minor adjustments to the original model. We can enhance the model's linearity and prevent errors from varying between samples by comprise log in the model.

Functional Model

The model is described in a functional form below:

$$\mathbf{MGDP} = (\mathbf{RER}, \mathbf{ERV}, \mathbf{TON}) \quad (3.1)$$

Mathematical Model

It is possible to represent the model mathematically as:

$$\mathbf{MGDP}_t = {}_0 + {}_1\mathbf{RER}_t + {}_2\mathbf{ERV}_t + {}_3\mathbf{TON}_t \quad (3.2)$$

Econometric Model

We may express the model in its econometric form as:

$$\mathbf{MGDP}_t = {}_0 + {}_1\mathbf{RER}_t + {}_2\mathbf{ERV}_t + {}_3\mathbf{TON}_t + \boldsymbol{\mu}_t \quad (3.3)$$

Follow these steps to convert the econometric form of the aforementioned model to a logarithmic model:

$$\text{Log}\mathbf{MGDP} = {}_0 + {}_1\text{Log}\mathbf{RER}_t + {}_2\text{Log}\mathbf{ERV}_t + {}_3\text{Log}\mathbf{TON}_t \quad (3.4)$$

A Priori Expectation: ${}_1 < 0$; ${}_2 > 0$.

Where;

RER = Real Exchange Rate, **TON** = Trade Openness, **MGDP** = Manufacturing sector GDP, **ERV** = External Reserve.

${}_0$ = Regression Intercept

${}_1$ = Co-efficient or parameter attached to real exchange rate (RER)

${}_2$ = Co-efficient or parameter attached to external reserve (ERV)

${}_3$ = Co-efficient or parameter attached to trade openness (TON)

Log = Logarithm/log linear

$_t$ = Time

$\boldsymbol{\mu}_t$= Stochastic or error run to account for factors not incorporated into the model.

Factor Description

Manufacturing Sector Gross Domestic Product (Dependent Factor): This sector of the economy comprises businesses, enterprises, and establishments that are involved in the production of products through manufacturing processes. It encompasses a wide variety of activities, spanning a variety of subsectors and industries, from small-scale artisanal production to large-scale industrial manufacturing operations.

Real Exchange Rate (Independent Factor): This is a metric that accounts for the pricing disparities between two countries in an effort to determine the relative purchasing power of the two currencies. It compares the price of a basket of goods and services in one nation to the price of the same basket of goods and services in another nation, accounting for changes in relative prices and fluctuations in exchange rates.

External Reserves (Independent Factor): These are assets that a central bank or monetary authority, typically in various reserve currencies (e.g., the U.S. dollar, euro, yen), holds and uses to support its liabilities and influence monetary policy. Foreign currencies, sovereign bonds, gold, special drawing rights (SDRs), and International Monetary Fund (IMF) reserve positions comprise these reserves.

Trade Openness (Independent Factor): This pertains to the extent to which an economy is integrated into the global economy through international trade and investment flows. As a proportion of its GDP, it quantifies the degree to which a nation engages in trade activities, i.e. the import and export of products and services.

4. UPSHOTS AND DISCUSSION

Unit Root Test

The study employed ADF to verify the presence of an unit root. The objective of this testing procedure is to prevent spurious regression, which is the result of regressing one non-stationary factor against another non-stationary factor. Table 1 below illustrates the outcomes of the Augmented Dickey-Fuller test:

Table 1: Upshots of Augmented Dickey-Fuller Test

	At Levels		At First Differences			
Factors	**ADF Statistic**	**5% Critical**	**ADF Statistic**	**5% Critical**	**Decision**	**Order of Integration**
	-1.543668	-2.936942	-6.053830	-2.938987	Stationary	I(1)
	-2.157494	-2.936942	-8.075397	2.938987	Stationary	I(1)
	-1.375524	-2.936942	-8.555493	-2.938987	Stationary	I(1)
	-2.134628	-2.936942	-5.362390	-2.938987	Stationary	I(1)

Source: *Computation done by researchers, 2025.*

Table 1 shows the Unit Root Test upshots, which imply that absolute value of the ADF test statistic for Manufacturing sector GDP (MGDP) is higher than the individual crucial values at the significance level of 5%. This implies, therefore, that at the starting difference [I(1), the GDP of manufacturing sector was stationary.

Moreover, as Table 4.3 shows, the Unit Root Test upshots imply that the ADF test statistic for the RER has absolute value higher than the individual crucial values at the significance level of 5%. This implies, therefore, that at the beginning of the difference [I(1), the degree of trade openness (RER) was stable.

Furthermore shown by the Unit Root Test upshots from Table 4.3 is that the ADF test statistic for external reserve (ERV) has absolute value higher than the individual crucial values at the 1%, 5%, and 10% level of significance. This implies, therefore, that at the beginning difference [I(1), the external reserve (ERV) was stable.

At last, the Unit Root Test upshots, as shown in Table 4.3, imply that the ADF test statistic (7.2866) for trade openness (TONNE) has absolute value higher than the individual crucial values at the significance level of 5%. This implies therefore that at the starting difference [I(1), trade openness (TONNE) was stationary.

Lag Selection Criteria

Estimating our models in econometric analysis requires the inclusion of the ideal latency as the amount of delays to constitute in a model substantially affects the result of the study. Considered as the ideal latency length is the number of delays suggested by the plurality of the many criteria. Lag selection criteria abound, however. Table 2 shows the result of the latency choosing criteria:

Table 2: Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-999.0580	NA	9.95e+17	52.79252	52.96490	52.85385
1	-861.3606	239.1586	1.65e+15*	46.38740*	47.24929*	46.69405*
2	-851.5785	14.93063*	2.37e+15	46.71466	48.26605	47.26663
3	-841.3730	13.42824	3.47e+15	47.01963	49.26054	47.81693

Source: *Computation done by researchers, 2025.*

In congruent with the lag selection criteria upshots in Table 2, the majority of the criteria selected a latency of one as the optimal lag length. Subsequent analyses will implement the optimal latency length of one due to this.

Co-integration Test

The upshots of the co-integration test are presented in Table 3 below:

Table 3: Co-integration Test Upshots

	Trace			Maximum Eigen Value		
Hypothesized No. of CE(s)	**Statistic**	**0.5 Critical Value**	**Prob.****	**Statistic**	**0.5 Critical Value**	**Prob.****
None*	42.00466	40.17493	0.0323	26.03085	24.15921	0.0276
At most 1*	15.97381	24.27596	0.3815	9.944156	17.79730	0.4911
At most 2*	6.029658	12.32090	0.4324	4.820167	11.22480	0.5030
At most 3*	1.209491	4.129906	0.3166	1.209491	4.129906	0.3166

Source: *Computation done by researchers, 2025.*

Table 3 shows the Johansen co-integration upshots, which imply that for the trace and maximum eigenvalue equations there is a single cointegrating equation. This is so because at certain values the Eigenvalue statistic and the trace statistic above the 5% critical threshold. Then the null hypothesis—that there is no co-integration among the factors—was disproved. To sum up, it is clear that every study factor shows a long run correlation. Particularly suggesting a long run correlation between the RER, trade openness (TONNE), external reserve (ERV), and manufacturing sector GDP (MGDP), are the upshots of the Johansen co-integration tests. Still, the ECM criteria call for a long run correlation as well as first degree of stationarity.

Error Correction Model (ECM) Analysis

The upshots of the estimation of parsimonious ECM are presented in table 4. below:

Table 4: Error Correction Model (ECM) Upshots

Factor	Co-efficient	Std. Error	t-Statistic	Prob.
C	0.001700	0.017841	0.095296	0.9247
	0.127396	0.162142	0.785708	0.4382
	-0.099672	0.048119	-2.071362	0.0470
	0.046948	0.053363	0.879780	0.3860
	0.253442	0.051310	4.939469	0.0000
	0.052800	0.027116	1.947239	0.0609
	0.781131	0.146214	5.342382	0.0000
	-0.016543	0.046775	-0.353676	0.7261
ECM (-1)	-0.227379	0.101828	-2.232964	0.0332

R-squared = 0.601115; Adjusted R-squared = 0.541412; F-statistic = 0.541412;
Prob(F-statistic) = 0.032103; Durbin-Watson stat = 1.910392

Source: *Computation done by researchers, 2025.*

Interpretation of the Parameters/Co-efficient: Table 4 shows that the GDP (MGDP) of the manufacturing sector suffers at the first RER level. This suggests that the manufacturing sector GDP (MGDP) will grow by 0.099656 for every unit drop in the RER and fall by 0.099656 for every unit increase in the RER. This fits with a priori anticipation as well as economic theory. Still, the original RER level was statistically substantial as its probability-value of 0.0470 falls below 0.05 at the 5% threshold of significance. Thus, it can be deduced that the RER has a substantial and unfavourable effect on the short run GDP of the manufacturing sector (MGDP).

Furthermore, Table 4 shows that the GDP of the manufacturing sector (MGDP) benefits from the

starting level of external reserve (ERV). This suggests that although the Manufacturing sector GDP (MGDP) would drop by 0.253442 in reaction to a unit drop in external reserve (ERV), the Manufacturing sector GDP (MGDP) will increase by 0.253442 in response to a unit rise in external reserve (ERV). This fits with a priori anticipation as well as economic theory. Still, the first level of external reserve (ERV) was statistically substantial as its probability-value of 0.0000 falls below 0.05 at the 5% threshold of significance. Thus, it may be deduced that, in the near run, the external reserve (ERV) favourably and substantially influences the Manufacturing Sector GDP (MGDP).

Moreover, Table 4 upshots show that the GDP of the manufacturing sector (MGDP) benefits from the starting level of trade openness (TONNE). Stated differently, an increase in trade openness (TONNE) will cause the manufacturing sector GDP (MGDP) to grow by 0.781131; a unit drop in trade openness would cause the manufacturing sector GDP (MGDP) to drop by 0.781131. This lines up theoretical a priori anticipation with economic theory. Still, the first level of trade openness (TONNE) was statistically substantial as its probability-value of 0.000 is below 0.05 at the 5% threshold of significance. Thus, it may be deduced that, in the near future, trade openness (TONNE) has a favourable and substantial impact on the GDP of the manufacturing sector (MGDP).

b. Interpretation of Adjusted R-Squared: Table 4's empirical upshots of the ECM analysis show an adjusted R-squared of 0.541412. This suggests that, following an adjustment to the co-efficient of determination, the error term—unknown factors outside the model—captures the remaining forty-six percent (46%) of the variation in the model, while almost fifty-four percent (54%) of the changes in manufacturing sector GDP are attributable to changes in RER, external reserve, and trade openness.

c. Significance of Overall Parameter (Estimated Model): This assesses the combined substantial effects of the independent factors on the dependent factor as well as the general relevance of the model at a significance level of 5%. We seek this by comparing the alpha value of 0.05 with the prob(F-statistic value). The alpha value according to the ECM result is 0.05 and the prob(F-statistic value) is 0.032103. Still, the model calculated is statistically substantial as the prob(F-statistic) value falls below the alpha value. This also suggests that trade openness, external reserve, and RER directly affect the GDP of the manufacturing sector.

d. Interpretation of ECM Co-efficient and Probability-value: The ECM terms co-efficient are clearly unfavourable and substantial based on the ECM upshots shown in Table 4. This implies that the ECM will be able to effectively bring any departures from the long run equilibrium back under control. Furthermore, the ECM co-efficient of -0.227379 indicates that, should any prior deviation be corrected in the present era, the rate of adjustment to long run equilibrium is 22%. This suggests that changes in the RER, external reserve, and trade openness cause the GDP of the manufacturing sector to move somewhat slowly.

Post Estimation Tests

Table 4.: Post Estimation Tests Upshots

Test	F-Statistic	Probability	Null Hypothesis	Decision
Serial Correlation LM Test	0.080972	0.9224	**H_0:** No serial correlation	Retain H_0
Normality Test	0.321507	0.8515	**Ho:** Normal distribution	Retain H_0
Heteroskedasticity Test	1.239718	0.3110	**H_0:** Homoscedasticity	Retain H_0
Ramsey RESET test	2.403847	0.1367	**H_0:** Correctly specified	Retain H_0

Source: *Computation done by researchers, 2025.*

Table 4.6 displays the data from the diagnostic tests conducted on the GDP of the manufacturing sector. In particular, the Breush-Godfrey LM test yielded no evidence of autocorrelation, as the probability value was greater than 0.05. Furthermore, the error run was found to be normally distributed by the normality test. Furthermore, the heteroscedasticity test result indicated that the model was devoid of it, which substantiated the hypothesis of homoscedasticity. The Ramsey RESET test resulted in the correct specification of the model, and no factor was absent. In conclusion, the diagnostic test upshots in Table 4.7 demonstrate that all factors in model one (manufacturing sector GDP, RER, external reserve, and trade openness) adhere to the fundamental assumptions of OLS estimation.

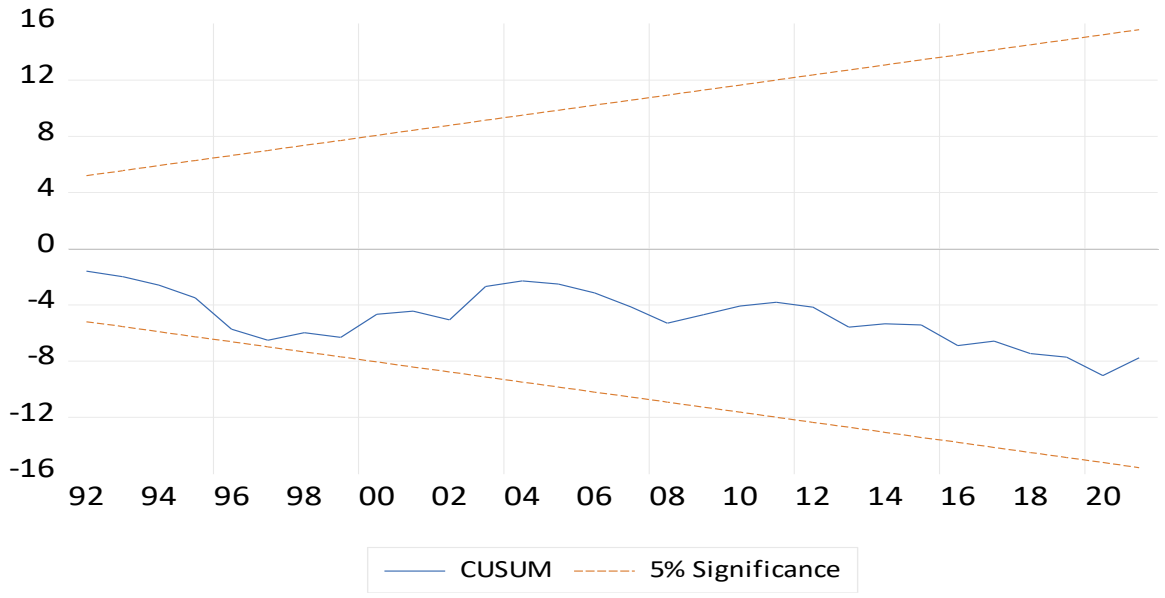

Figure 1: CUSUM Test

Empirically analysing the cumulative of cumulative sum (CUSUM) of recursive residuals allows one to examine the stability of the long run co-efficient in line with Pesaran and Pesaran (2009) in combination with the short run dynamic model. Stability of the parameters in the model is investigated applying the plots of the cumulative sum (CUSUM) of recursive residuals. The null hypothesis holds that the regression model's parameters are stable. Denying the null hypothesis is the rule of choice based on the CUSUM staying outside the 5% critical line (dotted lines). The cumulative sum of recursive residuals (CUSUM) test upshots shown in Figure 4.2 above show that the plots of CUSUM test statistics fall within the limits at the 5% substantial level. The CUSUM does not overlap the five percent critical line. This thereby supports the stability and lack of any disruption in the long run co-efficient of trade openness factors in the manufacturing sector GDP model over the sample period.

DISCUSSION OF RESULTS

The effect of currency rates on manufacturing industry performance between 1985 and 2022 was investigated in this research. Applied data analysis approaches include ECM, Unit Root testing, Co-integration tests, and descriptive statistical methods. Data analysis was done applying data from the CBN and the World Bank Development Index utilising econometric views (EVIEWS) statistics program 12. This part explores the investigation's top results:

The favourable value of the actual exchange rate implies that it would unfavourably affect Nigerian manufacturing and agriculture sectors' GDP. Furthermore, the probability-value of the RER—which is below 0.05 at a five percent significance level—indicates that the real GDP of the industrial and agricultural sectors in Nigeria would be somewhat different depending on this value. This result implies, therefore, that the RER has a substantial unfavourable effect on the GDP of Nigeria's industrial and agricultural sectors. This finding fits the upshots of Lawal and Ezeuchenne (2017), who showed a long run correlation between the RER and economic progress. Furthermore found by Ejike, Anah, and Onwuchekwa (2018) is a substantial and unfavourable effect on the GDP of the Nigerian manufacturing sector of the RER.

Moreover, the favourable value of the external reserve implies that the Nigerian GDP in the industrial and agricultural sectors is in a good condition. Furthermore, the probability-value of the foreign reserve—which falls below 0.05 at a five percent significance level—indicates that the reserve has a substantial impact on Nigerian industrial and agricultural sectors' GDP. This finding thus implies that Nigeria's industry and agriculture sectors provide substantial economic development. This revelation is in line with Adigwe's (2015) observation that a crucial trade openness indicator—external reserve—may improve the real sector GDP performance for Nigeria. Furthermore found by Olukemi and Tayelolu (2016) is how much the external reserve (ERV) influences the growth of the Nigerian economy.

Finally, the favourable value of trade openness implies that trade openness would help the GDP of the industrial and agriculture sectors in Nigeria to be higher. Furthermore, the probability-value of trade openness—which is below 0.05 at a five percent significance level—indicates that trade openness has a substantial impact on the GDP of the

industrial and agricultural sectors of Nigeria. This conclusion therefore implies that trade openness has a substantial favourable effect on Nigerian industrial and agricultural sectors' GDP. Consistent with this revelation, Awolaja and Okedina (2020) also verified that genuine trade openness has a substantial impact on industrial production in Nigeria. Moreover, Ibekwe (2020) showed that trade openness favourably influences the production of the manufacturing sector in Nigeria.

5. CONCLUSION AND RECOMMENDATION

Conclusion

The impact of exchange rates on the manufacturing industry's performance was the focus of this investigation. The study specifically investigated the impact of trade openness, external reserve, and RER on the GDP of the manufacturing sector. Empirical data generated by the study shows that the performance of Nigerian manufacturing sector is substantially influenced by the exchange rate.

Recommendations

These recommendations are contingent upon the research upshots and the conclusions reached:

i. In an effort to liberalise trade and facilitate the entry of foreign investors into the Nigerian manufacturing sector, the government should establish trade policies that are both efficient and feasible.
ii. The government and monetary authorities should develop policies and programs that will motivate investors to engage in the Nigerian manufacturing sector by promoting trade liberalisation.
iii. In an effort to enhance the performance of the manufacturing sector in Nigeria, the government and relevant agencies should implement measures that will promote the export of manufacturing sector products.
iv. In an effort to mitigate the impact of exchange rate volatility on the Nigerian manufacturing sector, the government should promote the production and consumption of products and services domestically.

REFERENCES

- Agu, C. (2020). Real exchange rate distortions and external balance position of Nigeria: issues and policy options. *Journal of African Finance and Economic Development,* Institute of African-American Affairs, New York University, New York.
- Aidi, H. O., Saidu, I. A. & Suleiman, H. I. (2018). Exchange rate volatility and the Nigerian industrial sector performance. *Saudi Journal of Economics and Finance,* 2(5), 208-215
- Akpan, P.L. & Atan, O. (2017). Foreign exchange market and economic growth in an emerging petroleum based economy. *Evidence from Nigerian. African economic and business review,* 6(2), 46-58.
- Aliyu, S.R.U. (2013). Impact of oil price shock and exchange rate volatility on economic growth in Nigeria: An empirical investigation. *Research Journal of International Studies*, 1(1), 1-12.
- Amassoma, D. & Odeniyi, B. D. (2016). The nexus between exchange rate variation and economic growth in Nigeria. *Singaporean Journal of Business Economics, and Management Studies,* 4(12), 8-28
- Anifowose, O. K. (2014). *Management of Foreign Exchange*. A Peep into the Next Decade Bullion Publication of C.B.N. Vol. 21, No. 4 Oct/Dec.
- Annaek, J. (2007). *Foreign capital inflows and development in less developed countries*. New York: McGraw-Hill Book Company.
- Asinya, F. A. & Takon, N. (2014). Exchange Rate depreciation and government policy in Nigeria: An Empirical Evidence. *The Business and Management Review*, 4(3), 161-170.
- Beaumont, R. (2009). *Research methods and experimental design*: A set of Suitable Notes for Seminar Use, 1-48.
- Cassel, G. (1918). Abnormal deviations in international exchanges. *The Economic Journal*, 28(7), 413-415.
- Central Bank of Nigeria (2013). *Annual report and statement of account*, CBN, Abuja.
- Central Bank of Nigeria (2014). *Major economic, financial and banking indicator.* Published by Research Department, Central Bank of Nigeria.
- Central Bank of Nigeria (2016). Monetary credit, foreign trade and exchange policy guideline. *Economic and Financial Reviews*, 31(4), 49-82.
- Danmola, O. A. (2012). Exchange rate and macroeconomic aggregates in Nigeria. *Journal of economics and sustainable development,* 3(2), 111-121.
- Edame, G. E. and Okoro, U. (2010). *The impact of capital market on economic growth in Nigeria*. Calabar, Unpublished BSc Economics Project Department of Economics University of Calabar Nigeria.
- Emerah, A. A., Adeleke, E. & David, J. O. (2015). Exchange rate volatility and economic growth in Nigeria (1986-2013). *Journal of Empirical Economics*, 4(2), 109-115.
- Engle, C. & Rogers, J. H. (2011). Deviation from purchasing power parity: Causes and welfare costs. *Journal of International Economics*, 55(6), 29-57.
- Ewa, A. (2011). *The impact of exchange rate fluctuation on the Nigeria economic growth (1980*

– *2010)*. Unpublished B.Sc Thesis of Caritas University Emene, Enugu State, Nigeria.
- Fapetu, O. C. (2013). Foreign exchange management and the Nigerian economic growth (1960-2012): An empirical investigation. *Journal of Finance and Economics*, 2(2), 78-85.
- Fetene, B. H. (2017). Real exchange rate and manufacturing export competitiveness in Eastern Africa. *Journal of Economic Integration*, 32(4), 932-953.
- Gbosi, A. (2015). *Inflation – Impacts on the economic growth of Nigeria.* Pack publishers.
- Gillman, E., Harris, J. & Matyas, H. (2002). Exchange rate and the money market. *Journal of Monetary Economics,* 23(5), 245-255.
- Gokal, G. & Hanif, I. (2004). Fundamental share price and aggregate real output: *European Economic Review*: pp. 132-136.
- Hill, I. (2003). *Theory of multinational corporations in world development.* Ann Arbor: University of Michigan Press.
- Iyeli, I. I. & Clement, U. (2017). Exchange rate volatility and economic growth in Nigeria. *International Journal of Economics, Commerce and Management,* 5(7), 583-595.
- Kenneth, O. O. & Jonathan, O. O. (2016). The impact of exchange rate regimes on economic growth in Nigeria. *Journal of Economics and Sustainable Development*, 7(12), 115-127.
- Ku, H., Mustapha, U. M. & Goh, S. (2010). A literature review of past and present performance of Nigerian manufacturing sector. *Journal of Engineering Manufacture*, 224(12), 1894-1904.
- Lawal, E. O. (2016). Effect of exchange rate fluctuations on manufacturing sector output in Nigeria. *Journal of Research in Business and Management*, 4(10), 32-39.
- Mallampally, P. & Sauvant, K. P (2009). Foreign direct investment in developing countries. *Finance & development*, 36(1), 222-231.
- Majekodunmi, O. (2000), Exchange rate volatility: Its impact on Nigeria economy 1990-1998. *Asian Journal of Business Management*, 3(5), 89-97.
- Mary, B. O. & Fagite, B. A. (2014). Exchange rate volatility and sectoral export of Nigeria: Case of oil and non-oil sectors. *Journal of Economics and Sustainable Development,* 5(10), 66-74.
- Montiel, P. & Reinhart, C. (2001). *The dynamics of capital movements to emerging economies during the 1990s*. In Stephany Griffith-Jones, Manuel Montes, and Anwar Nasution eds. Short-term Capital Flows and Economic Crises Oxford: Oxford University Press, page 3–28.
- Mordi, C.N. O (2006). Challenges of exchange rate volatility in economic management in Nigeria. *Central Bank of Nigeria Bullion*, 30(3), 215-225.
- Ladeinde, K. (2001) *Nigerian Manufacturing Sector*: The Big Picture. BusinessNews, November 12th, 2011.
- Nadiri, M. I. (1970). Some approaches to the theory and measurement of total factor productivity: A survey. *Journal of Economic Literature*, 8(4), 1137–1177.
- Nelson, R. R. (1981). Research on productivity growth and differences. *Journal of Economic Literature*, 14(3), 1029–1064.
- Ngerebo-a, T. A. & Ibe, R. C. (2013). Exchange rate and macroeconomic performance in Nigeria: A causal post structural adjustment programme investigation. *Global Journal of Management and Business Research Finance*, 13(7), 43-48.
- Nnamocha, M., Obioma, A., Igwemma, O. & Nwoko, I. (2017). Exchange rate volatility and economic growth in Nigeria. *Journal of Business Management*, 3(2), 54-68.
- Obadan, I. O. (2004). *Towards exchange rate stability in Nigeria*. Nigerian Economic Society (NES), University of Ibadan, Nigeria.
- Obansa, S. A. J., Okoroafor, O. K. D., Aluko, O. O. & Millicent, E. (2013). Percieved relationship between exchange rate, interest rate and economic growth in Nigeria: 1970-2010. *American Journal of Humanities and Social Sciences,* 1(3), 116-124.
- Ogunrinola, I. O. & Osabuohien, E. S. C. (2010). Globalization and employment generation in Nigerian manufacturing sector (1990 – 2006). *European Journal of Social Sciences,* 12(4), 20-32.
- Ohiria, O., Saliu, T. S. & Schuller, B. (2008). *Exchange rate variation and inflation in Nigeria.* University of Skovde.
- Olorunshola, S. (2009). Manufacturing performance in Nigeria: Implication for sustainable development. *Asian Economic and Financial Review*, 3(9), 1195-1213.
- Olukemi, D. & Tayelolu, E. (2023). Exchange rate volatility and sectoral export of Nigeria: Case of oil and non-oil sectors. *Journal of Economics and Sustainable Development, 5*(10), 66-75.
- Omoke, P. C. & Opuala–Charles, S. (2020). Trade openness and economic growth nexus: Exploring the role of institutional quality in Nigeria. *Cogent Economics & Finance,* 9(2), 1-17.
- Orji, M. C., & Ezeanyaeji, C. I. (2022). Exchange rate and manufacturing sector performance in Nigeria. *Lapai Journal of Economics, 6*(2), 13-33.
- Owolabi, A. U. & Adegbite, T. A. (2012). The effect of foreign exchange regimes on industrial growth in Nigeria. *Global Advanced Research Journal of Economic, Accounting and Finance,* 1(1), 1-8.
- Raji, T. & Olubiyi. I. (2016). Foreign direct investment and economic growth in Nigeria. *Journal of Economics and Business Management,* 2(1), 11-21.

- Sagagi, M. S. (2007). *Public-private dialogue: myth or reality*. Paper Presented at the Joint Annual General Meeting of the Manufacturers Association of Nigeria held at Royal Tropicana hotel on 13th December, 2007.
- Sagosanya, A. O. (2011). Firms growth dynamics in Nigeria's manufacturing industry: A panel Analysis. *Journal of Applied Econometric Review,* 1(1), 1-15.
- Uduakobong, S. I. & Enobong, C. U. (2021). An empirical analysis of the relationship between exchange rate movements and economic growth in Nigeria. *European Journal of Business and Management*, 7(30), 191-199.
- Ugwu, L. (2021) Manufacturing firms and economic growth in Nigeria. *Journal of Applied Econometric Review,* 5(3), 67-77.
- World Bank (2006). *Nigeria policy options for growth and stability*. Report No. 26215 NGA, Washington DC: The World Bank.