

Exchange Rate Fluctuations and Manufacturing Sector Performance in Nigeria: Issues and Implication for Economic Recovery

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ABSTRACT

Nigeria's manufacturing sector which is reliant on imports for materials and machinery faces cost and competitiveness challenges due to fluctuating exchange rates. This study therefore examined the impact of the exchange rate on the manufacturing sector in Nigeria covering a period of twenty-five years from 1996 to 2022. The study examined the exchange rate's relationship with the Nigerian manufacturing sector, both in the long run and short run. Manufacturing output as a percentage of GDP, exchange rates, government spending, capacity utilization, import tariffs, and export taxes were used as proxies for the manufacturing sector. The data was sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, the World Bank's World Development Indicators (WDI), and the International Monetary Fund (IMF). The study utilized the Autoregressive Distributive Lag (ARDL) model and E-views 10.0 for regression analysis. Findings revealed a negative and insignificant impact of exchange rate and export tax on Nigeria's manufacturing sector in the long run; while government expenditure has a positive impact on the manufacturing sector in the long run in Nigeria. Thus, the study concluded that the exchange rate has a negative relationship in the long run and the short run which has an insignificant impact on Nigeria's manufacturing sector's output level. Based on the findings, the study concluded and recommended the implementation of export promotion, import substitution, capacity utilization building, and effective exchange rate management policies to enhance the productivity of Nigeria's manufacturing sector and drive economic growth.

Keywords: Exchange Rate, Manufacturing Sector, Government expenditure, Import tariff, Export tax.

JEL CODES: E31, F13,31, H50, O14.

INTRODUCTION

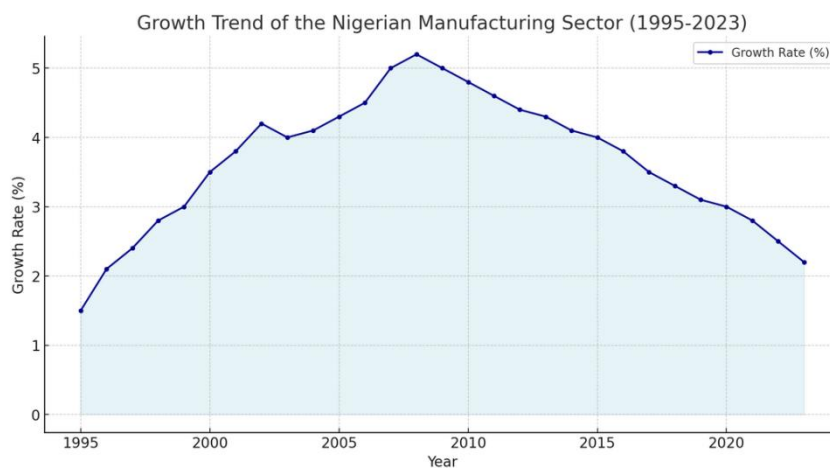
In the pursuit of economic growth, less developed nations like Nigeria are focused on achieving rapid industrialization to drive economic recovery and sustainable progress (United Nations, 2023). The development of a viable manufacturing sector provides a channel for stimulating the growth of other activities and is the key to self-sustaining development through the export of primary products. Mbam, (2018) stressed that the manufacturing industry has, traditionally, been one of the key drivers in most national economies since it serves as a wealth-producing or wealth-creating sector in the economy. Manufacturing, which involves the production of consumer goods and the development of social infrastructure, is vital for economic advancement, addressing unemployment, poverty, social disparities, income inequality, and export earnings. It also fosters welfare, self-reliance, and societal harmony for both the nation and its citizens (Oluwaseun & Oyedokun, 2021). If effectively managed, the sector can provide structural stability to any nation, making it essential for less developed countries aiming to strengthen and expand their manufacturing sectors (WDI, 2023).

For manufacturing firms to achieve a competitive standing, there must be an enabling environment for them to strive and a competitive edge both locally and globally. A strong and healthy manufacturing sector requires a strong and positive approach to bring about an environment conducive to manufacturing investment to grow and create jobs (Orij, Ogbuabor, & Orji, 2019).

To promote the manufacturing sector, Nigeria has implemented various fiscal, monetary, exchange rate, and trade policies designed to work within resource constraints. Recognizing that foreign exchange rates play a crucial role in resource allocation, capital inflows, domestic production, export growth, and import structure, Nigeria introduced the Structural Adjustment Program (SAP) in 1986. SAP aimed to eliminate structural bottlenecks in Nigeria's manufacturing sector by addressing government-imposed distortions and encouraging a favorable balance of payments, improved purchasing power, and external competitiveness (Ayanwale, 2016).

Despite these initiatives, Nigeria's manufacturing sector faces persistent challenges, such as low foreign investment, limited capacity utilization, high production costs, weak technological foundations, and a minimal GDP contribution. These limitations, compounded by macroeconomic instability and exchange rate fluctuations, have impeded the sector's growth since 1986 (Ohwofasa & Uddin, 2014). The manufacturing industry remains highly dependent on imports and relies on foreign currency for over 64% of its foreign exchange requirements, yet it contributes less than 1% to foreign exchange earnings (Umaru, Aguda, & Davies, 2021).

Fig. 1.1: The growth trend of the Nigerian Manufacturing Sector from 1995-2023.



Source: World Development Indicator (2023).

The above graphical illustration depicts the growth trend of the Nigerian manufacturing sector from 1995 to 2023. This trajectory reflects constant fluctuations over time, showing periods of moderate growth between 1995 to 2002, followed by a sharp decline in 2003. It is obvious that from 2008 the trend depicted a year-on-year decline in output in Nigeria particularly in recent years, the trend highlighted the sector's vulnerability to economic challenges such as money supply, exchange rate values, unemployment, inflation, interest rates, and so on.

Exchange rates, defined as the rate at which one nation's currency is exchanged for another, are central to international transactions (Samuelson, 2020). Exchange rate fluctuations can trigger wider economic impacts, affecting the money supply, employment, inflation, and interest rates (Paul, 2018). In emerging economies like Nigeria, the consequences of exchange rate policies are often debated, as structural adjustments such as import reduction or export growth influence demand and price stability, which can have immediate impacts on the economy. Developing economies with import-dependent production and consumption, like Nigeria, rarely address the distortions that arise from an overvalued exchange rate regime, though improving exchange rates could drive industrial productivity, stimulate exports, and foster broader inter-sectoral linkages (Dada & Oyeranti, 2016; Fakiyesi, 2015). Moreover, currency volatility and inflation continue to increase production costs, while reduced consumer purchasing power weakens domestic demand. In addition, high interest rates and energy costs, alongside issues in infrastructure, further exacerbate the manufacturing sector's struggles in the country.

While studies on exchange rate fluctuations and Nigeria's manufacturing sector have produced mixed findings, most research indicates a negative impact of exchange rate volatility on sector performance (Falaye et al., 2019; Buabeng, Ayesu & Adabor, 2020; Basse & Basse, 2020; Umaru, Aguda & Davies, 2021; Mlambo,

2023). Conversely, some studies have observed positive impacts, highlighting the complex relationship between exchange rates and manufacturing outcomes (Lawal, 2016; Ugwu, 2017; Otokini et al., 2018; Orji et al., 2019; Ayobami, 2020). The Nigerian government has thus continued to implement policies aimed at enhancing industrial productivity, including fiscal, exchange rate, import substitution, and export promotion strategies within available resource limits (Oluwaseun & Oyedokun, 2021).

Despite these efforts, challenges such as high production costs, unfavorable exchange rates, the influx of substandard imports, and low domestic purchasing power continue to hamper the manufacturing sector's growth (MAN, 2016; Uba & Ebiringa, 2019). Although various policies have been implemented, exchange rate fluctuations remain a critical factor influencing sector productivity. This research therefore seeks to clarify the impact of foreign exchange rates on the performance of Nigeria's manufacturing sector during the period under review. The study period from 1996 to 2022 provides an in-depth historical perspective, covering various exchange rate regimes, periods of high volatility in global oil prices, and significant political and economic transitions and will also offer a useful basis for formulating effective policies meant to aid in the recovery and expansion of Nigeria's manufacturing sector. Hence, the study aims to measure how exchange rate fluctuations impact the volume of goods produced and the productivity of the manufacturing sector, which are key indicators of economic recovery and performance.

Empirical Evidence

With respect to empirical investigations, several studies have been undertaken to identify the possible effects of the manufacturing sector in Nigeria and the exchange rate and its variables. Umaru, Aguda, & Davies (2021) was one of the studies that investigated the effects of exchange rate volatility on manufacturing firms in Nigeria. The study used data obtained from the World Bank Data Stream between 1980 and 2018 and analyzed using ARDL. The results show that the real exchange rate and imports are statistically significant and negatively related to the manufacturing firms in Nigeria in both the short run and long run while exports, government expenditure, and FDI had a positive relationship with manufacturing firms in Nigeria. Similarly, Gayweh (2024) investigated the effects of exchange rate volatility on sectoral output in Liberia spanning from 2010 to 2022. The study employed the GARCH model, and it found a strong sector-specific impact along with an overall economic impact on output. We found that the agriculture and manufacturing sectors proxied by value-added as a percentage of GDP are negatively affected by exchange rate fluctuations due to their heavy reliance on imported raw materials, which increases production costs and reduces output. Conversely, the mining sector has shown a positive relationship with exchange rate volatility, as global demand for gold rises in response to currency instability. The findings underline that policy interventions are needed to stabilize the exchange rate.

Amri (2022) explored the effect of the exchange rate and the manufacturing industry sector in Indonesia starting from 2011:Q1 to 2020:Q4 using the Error Correction Model to analyze the data obtained from the Central Statistics Agency, Bank Indonesia, and the Ministry of Trade of the Republic of Indonesia. The complex variables of interest are inflation, exchange rates, labor, and the money supply. The study shows a positive and significant influence exists between the exchange rate and the manufacturing industry sector in the long and short run. The money supply has a positive and significant effect on the manufacturing industry sector in the long run only, While, inflation has a negative but not significant effect both in the long run and short run. Therefore, the government needs to pay attention to policies related to labour as the main factor in increasing the output of the manufacturing industry.

Buabeng, Ayesu & Adabor (2020) conducted a study in Ghana and it revealed that exchange rate and monetary policy rate has a negative and significant relationship with manufacturing firm performance whereas inflation, trade openness, and investment have a significant positive relationship. Based on the negative and significant relationship between the exchange rate and manufacturing firm performance, it recommends that government and private partnerships should ensure effective management of the exchange rate fluctuation and also encourage manufacturing firms to patronize locally made capital goods for their production in the face of a depreciating exchange rate. Similar studies like Orji & Ezeanyaeji (2023) for the Nigerian economy and Abdallah (2016) for Ghana reported an insignificant and negative nexus between exchange rate fluctuations and the manufacturing sector productivity. It equally revealed that exchange rate appreciation will increase

domestic output and promote growth in the sector.

Mlambo (2021) examined the exchange rate and manufacturing sector performance in South Africa and the study employed the panel group FMOLS and PMG approaches, and the results revealed that the exchange rate, imports, and FDI have a negative relationship with manufacturing performance while exports and inflation had a positive relationship with manufacturing performance. Based on the findings of the study, it is recommended that South Africa need to formulate informed policies that align the exchange rate to the actual needs of the manufacturing sector. Akinlo & Lawal (2015) found a long-run relationship between the exchange rate, industrial production index, inflation rate, and money supply. It also shows that exchange rate depreciation has an insignificant effect on industrial production in the short run while exchange rate depreciation positively influences industrial production in Nigeria. Bassey & Bassey (2020) conducted a study on the effect of exchange rate deregulation on the manufacturing output in Nigeria using the Autoregressive Distributed Lag (ARDL) framework. Results indicated that exchange rate deregulation negatively influenced the manufacturing output while government expenditure related positively to sector productivity in the long run.

Model Specification

To achieve the objectives of the study, the paper employed a multiple regression technique to estimate the impact of exchange rate fluctuation on the manufacturing sector. Based on a modified Cobb-Douglas production function, the model specification for the study utilized the manufacturing sector as the dependent variable was proxy by manufacturing sector output as a percentage of Gross Domestic Product (GDP) while the explanatory variables include exchange rate, capacity utilization, government capital expenditure, import tariffs, and export taxes. The Cobb-Douglas production function is expressed as: $Q = AL^{\alpha}C^{\beta}$ (3.1)

Where Q is output and L and C are inputs of labour and capital respectively. A , α , and β are positive parameters where $\alpha > 0$, $\beta > 0$. Cobb-Dougllass stated that the production function follows constant returns to scale, which denotes that when factor inputs are increased by 1%, the output will equally increase by 1% ($\alpha + \beta = 1$). The baseline model that links exchange rate fluctuation to the Manufacturing sector is modified from the work of Bassey & Bassey (2020) which is stated as follows:

$$\text{ManGDP} = f(\text{EXR}, \text{GEX}, \text{CUT}) \quad (3.2)$$

The functional form of the model for this study is stated as follows:

$$\text{MAN} = f(\text{EXR}, \text{GEX}, \text{CUT}, \text{IMT}, \text{EXT}) \quad (3.3)$$

The mathematical form of the model is:

$$\text{MAN} = \beta_0 + \beta_1 \text{EXR} + \beta_2 \text{GEX} + \beta_3 \text{CUT} + \beta_4 \text{IMT} + \beta_5 \text{EXT} \quad (3.4)$$

Expressing the above equation in an econometric form, the following functional model guided the study:

$$\text{MAN}_{it} = \delta_0 + \delta_1 \text{EXR}_{it} + \delta_2 \text{GEX}_{it} + \delta_3 \text{CUT}_{it} + \delta_4 \text{IMT}_{it} + \delta_5 \text{EXT}_{it} + \xi_{it} \quad (3.5)$$

Where: MAN = Manufacturing output as a percentage of Gross Domestic Product (GDP), EXR = Exchange Rate fluctuation, GEX = Government Expenditure as a percentage of Gross Domestic Product (GDP), CUT = Capacity Utilization, IMT = Import tariffs, EXT = Export taxes, f = Functional relationship, δ_0 = intercept of the model, δ_0 - δ_5 = parameters of the regression coefficients, ξ_{it} = Stochastic error term, while δ_1 , δ_2 , δ_3 , δ_4 , and δ_5 are parameters to be estimated.

Data Analysis and Interpretation

The time series data sourced from the Nigerian Bureau of Statistics, Central Bank of Nigeria Statistical Bulletin, World Development Indicators, and the International Monetary Fund and the variables of interest

includes manufacturing GDP, exchange rate, government expenditure, import tax, export tax, and capacity utilization. These variables were analyzed using EViews version 10.

Descriptive Statistics: The descriptive statistics was done using the raw data of the variable and not the transformed data. The descriptive statistics of the study are presented in Table 4.1 below.

Table 4.1: Summary of Descriptive Statistics Result

	MGDP	EXR	GEX	CUT	IMT	EXT
Mean	11.27808	165.1346	22.72923	55.41154	15.61329	21.10379
Median	9.855000	140.1500	19.52000	55.35000	14.15140	21.13515
Maximum	19.20000	402.0000	40.55000	85.20000	22.81126	36.02327
Minimum	6.550000	21.90000	14.17000	30.40000	8.233875	8.118312
Std. Dev.	3.641826	99.32897	8.929040	15.41200	4.140044	7.490932
Skewness	0.860989	0.811144	0.714697	0.249653	0.302505	0.018300
Kurtosis	2.696474	3.037159	2.104093	2.629028	1.937104	2.188851
Jarque-Bera	3.312117	2.852631	3.082965	0.419170	1.620435	0.714243
Probability	0.190890	0.240192	0.214064	0.810921	0.444761	0.699687
Sum	293.2300	4293.500	590.9600	1440.700	405.9456	548.6986
Sum Sq. Dev.	331.5724	246656.1	1993.194	5938.247	428.4990	1402.852
Observations	26	26	26	26	26	26

*Source: Author’s computation using E-views 10

From the table above, export tax (EXT), import tax (IMT) and government expenditure (GEX) showed a platykurtic distribution as their respective values are lower than 3, capacity utilization (CUT) and manufacturing GDP (MGDP) mirrors a mesokurtic distribution as their respective values are equal to 3 and it shows a normal distribution. While the exchange rate (EXR) mirrors a leptokurtic distribution as its value is greater or higher than 3. The Jarque-bera statistics measure the difference of the skewness and kurtosis of the series with those from the normal distribution. If the probability value of the Jarque-bera statistics is greater than or equal to the significance level of 0.05, it shows that the data is normally distributed and from the table above, all the variables are normally distributed since they exceed the significance level of 0.05.

Table 4.2: Summary of ADF Unit Root Test Results

Variables	ADF Statistic @ 1st Difference	ADF Critical Value @ 1st Difference	Order of Integration
MGDP	-4.360242	-3.632896	I(1)
EXR	-2.536030	-1.955681	I(1)
GEX	-4.012398	-1.955681	I(1)

CUT	-5.074677	-1.955681	I(1)
IMT	-7.087392	-1.955681	I(1)
EXT	-6.470259	-1.955681	I(1)

Source: Author’s computation using E-views 10.0

The result presented above shows that the variables do not contain a unit root at 1st difference therefore we reject the null hypothesis and accept the alternative hypothesis indicating that the variables are stationary. Manufacturing GDP, exchange rate, government expenditure, capacity utilization, import tax, and export tax were all stationary at first difference integration I(1).

Table 4.4: ARDL Bound Test Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	5.249582	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Author’s computation using E-views10

From Table 4.4, the value of the F-statistic which shows the joint significance of the lagged level variables is 5.249582 and is greater than the upper bound I(1)) at a 5% level of significance. Therefore, we reject the null hypothesis and conclude that a long-run relationship exists between the dependent variable economic development and the independent variables under study.

Table 4.5 Summary of Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Software				
EXR	-0.012567	0.014677	-0.856241	0.4141
GEX	0.584492	0.070429	8.299053	0.0000
CUT	-0.034368	0.053739	-0.639535	0.5384
IMT	-0.126895	0.159323	-0.796466	0.4463
EXT	-0.181549	0.099820	-1.818769	0.1023
C	7.476182	5.051785	1.479909	0.1730

Source: Author’s computation using E-views10

Table 4.5 above presents the estimated long-run coefficients for the specified model. The result shows that

exchange rate, government expenditure, import tax, and export tax conform to theoretical a priori expectations while capacity utilization does not conform to theoretical expectations in the long run.

The analysis indicates that exchange rate fluctuations have adversely influenced the manufacturing sector performance in Nigeria, with a negative and statistically insignificant effect in both the short run and long run. This aligns with the a priori expectation of a negative relationship between exchange rate values and manufacturing performance, as shown by the negative coefficient in both periods. Moreover, the study found that government expenditure positively and significantly impacts the manufacturing sector in the long term, which implies that increased government spending boosts manufacturing output. It conforms with the prior expectations and it's in line with the findings by Lawal (2016), Ugwu (2017), Otokini et al. (2018), Orijii et al. (2019), Bassey & Bassey (2020), and Umaru, Aguda & Davies (2021). Meanwhile, capacity utilization shows a negative and insignificant effect on the manufacturing sector both in the short run and long run, indicating that changes in capacity utilization do not significantly impact the sector.

Conclusively, the study found that import tariffs have a positive but insignificant effect on the manufacturing sector in the short run and a negative, also insignificant, impact in the long run. Export tax, however, has a positive and significant short-run impact on the manufacturing sector, though this effect turns negative and insignificant in the long run. The Error Correction Model (ECM) shows that approximately 0.52% of short-run deviations are corrected annually, indicating that it takes about a year for the sector to return to equilibrium after a short-run disruption. The ARDL regression analysis results are strong, with an R^2 of 0.90 and an adjusted R^2 of 0.85, indicating high explanatory power of the independent variables. The F-statistic confirms that the regression models are statistically significant overall.

CONCLUSION AND RECOMMENDATIONS

This study examined the relationship between exchange rate fluctuations and the manufacturing sector performance in Nigeria, assessing their impact on economic recovery. The findings indicated that exchange rate fluctuations negatively influenced the manufacturing sector, both in the short run and long run, showing an insignificant impact on sector growth. This aligns with previous expectations of an adverse effect on manufacturing, suggesting that unpredictable exchange rates make it challenging for manufacturers to plan effectively, raise capital, or expand operations. Additionally, government expenditure was found to have a positive and significant long-run impact on the manufacturing sector, underlining its potential role in supporting growth and recovery. In contrast, other factors, such as capacity utilization, import tariffs, and export taxes, revealed mixed effects, with short-run benefits often offset by long-run insignificance or negative impact. Overall, exchange rate instability emerges as a key barrier to manufacturing sector recovery and economic stability in Nigeria. In the light of the key findings and in consonance with the objectives and policy implications of the study, the paper recommends that:

- ❖ The government should prioritize policies aimed at stabilizing exchange rates to encourage investment in the manufacturing sector. A predictable exchange rate environment will support manufacturers in managing costs and planning for long-term growth, which is essential for economic recovery.
- ❖ Given the positive impact of government spending, there should be an increased focus on budget allocations specifically directed toward infrastructure, energy supply, and industrial incentives for the manufacturing sector. Such expenditure can provide the foundational support needed for industry growth.
- ❖ The government should encourage a balanced approach that supports domestic production while making imports of raw materials needed by the manufacturing firms affordable in order to reduce production costs and enhance competitiveness.
- ❖ The government should enhance productivity in the manufacturing sector by initiating policies that support resource optimization and operational efficiency to strengthen the sector's output.

Declaration of Competing Interest

The authors declare that they have no known competing interests.

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