



Exchange Rate and Industrial Productivity: Evidence From Nigeria

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Abstract

From 1982 to 2023, studies explored the effect of currency value fluctuations on industrial sector productivity in Nigeria. Time series data and PP, Autoregressive Distribution Lag, and Error Correction Term were used in the study to achieve the objective. The variable analysed were currency rate, inflation rate, capacity utilisation and industry value added. The result of analysis, revealed that currency rate, inflation rate, capacity utilisation and industry value added possess the evidence of negative short (of 0.074%, 0.099%, and 5.89%, respectively) and long term (exchange rate - 5.9%) relationship but lacks strong predictive power or significance in explaining industry value added in the short run and a critical influence of the official exchange rate on industry value added and highlights the robustness of the long-term model. The error correction term confirms a long-term relationship among the variables, with an adjustment speed of approximately 1.02% per period, indicating that the model converges to equilibrium over time. The study recommended that policymakers should prioritize measures to stabilize the official exchange rate, as fluctuations negatively and significantly impact industry value added. This can be achieved through sound monetary policies, managing foreign exchange reserves effectively, and encouraging inflows of foreign investment to reduce exchange rate volatility. Also, long-term reforms aimed at aligning the exchange rate with market fundamentals should be implemented. Transparent and consistent exchange rate policies will help build investor confidence and reduce uncertainty for industries. Lastly, programs aimed at building resilience to external shocks, such as exchange rate fluctuations, should be developed.

Keywords: *Exchange rate, Industry Value-Added, Inflation rate, Capacity utilisation and Error Correction Model*

Background to the Study

Currency rate fluctuations have been a persistent economic issue for many developing countries, including Nigeria. These fluctuations, often driven by a combination of domestic economic policies, global financial market dynamics, and geopolitical events, can significantly affect national economic performance. In Nigeria, a country heavily dependent on both oil exports and imports of industrial inputs, the volatility of exchange rates plays a crucial role in shaping the industrial sector's productivity. Currency in Nigeria has been depreciating all the year especially after COVID 19. The Nigerian currency, the naira, has experienced devaluation throughout the year. It has progressively lost its purchasing power, leading to the ability to purchase fewer goods with the same amount of money each year. This devaluation is primarily attributed to the increase in prices of goods and services in Nigeria following the outbreak of the COVID-19 pandemic. Economists refer to this situation as inflation, which has detrimental effects on the economy. Inflation negatively impacts economic activities in several ways. Firstly, it discourages investment and limits exports. The uncertainty caused by inflation makes investors hesitant to commit their resources, resulting to a decrease in the growth of the country. Moreover, the rising prices of products reduce the competitiveness of exports, hindering external trade. Additionally, inflation creates problems in terms of income distribution and erodes purchasing power. The persistent reduction in the quantity of products that can be purchased with a given income diminishes the value of individuals' earnings. Consequently, people's income becomes increasingly worthless as inflation continues, eroding their purchasing power. This situation ultimately leads to a decline in the standard of living for the population and poses significant challenges for the overall growth and development of the economy (Okonkwo & Chigbu, 2016).

The industrial sector is a key part of the economy in most developed nations. It creates potentials for enhanced output and quality of export promotion and import substitution, as well as job generation, foreign exchange earning capability, and capital growth, as well as promoting an efficient and deeper connection across other segments in the country. The industrial sector is a significant and crucial industry that may significantly lead to growth in the economy, employment creation, and export revenues. In addition, the industrial sector might be regarded a wealth-creating component of the economy. Nevertheless, in order for the industrial sector to generate beneficial outcomes, organizations need to adopt competitive strategies. In fact, for industries to achieve competitiveness, they must have access to an ideal environment that creates a competitive advantage both locally and globally. A working and thriving industrial sector necessitate positive and effective system for promoting and encouraging industrial investment and employment creation (Courage, 2020).

The industrial sector is among the sectors whose achievement is measured by exchange rate. Conversely, in an emerging economy like Nigeria, the rate of exchange is crucial for achieving sustainable levels of production. Despite the fact that Nigeria began on a succession of devaluations to encourage export and regulate the currency value, the objective of every nation is to have a consistent currency rate with other trade relations. The objective was not

realized, and as a result, Nigeria's industrial sector was faced with the difficulty of a consistent shifting of currency value. As a result of the industrial sector's reliance on imported intermediate products, the influence of currency values on the sector is significant. In many ways, most advanced nations rely on the industrial sector in boosting output and employment; it also encourages quicker investment growth than any other sector of the economy, as well as broader and more effective import substitution and export expansion, generating capacity to earn foreign currency connections between sectors (Ojeyinka, 2019). Manufacturing enterprises in Nigeria, on another hand, are confronted with the issue of currency rate instability, which has adverse effects on the production. This is due to an over reliance on imports of intermediate inputs and capital products. As a result, industry is exclusively reliant on the external sector for non-labor resource imports, which reduces the sector's competitiveness. For example, the Naira to Dollar exchange rate has risen from N0.6 in 1981 to N243.49 in 2016 and N607.00 in May 2022. This clearly demonstrates the country's exchange rate fluctuation.

Manufacturers' production costs are rising as they must charge more for imported inputs as a result of the continuous appreciation of the dollar. According to Ojeyinka, he defines real exchange rate in 2019 as the risk of an unforeseen turn in the rate of exchange. As a result, the fluctuation of rate of exchange discourages investment and stifles economic output. Industrial capacity utilization has been fluctuating over the years as a result of change in inflation rate and currency rate example, 73.3 per-cent of capacity utilization in 1982 to an average of 38.8 per-cent in 1986, to 54.6 per-cent in 2020. In 1977, the industrial sector added roughly 4% of GDP, 13% in 1982, 15% in 2012, and 16% in 2015, while inflation rate roughly 8% in 1982, 12% in 2012, 9% in 2015, 11% in 2019 and 16% in 2021. Also, exchange rate was #0.35 in 1982, #158 in 2012, #192.4 in 2015, #372.1 in 2019 and #403.6 in 2021 and industrial output was roughly 55 in 1982, 17,853 in 2012, 22,213 in 2015, 33,218 in 2019 and 43,531 in 2021. This figure indicates that as currency rate increases, it doesn't have any negative effect on industrial performance in Nigeria but it is glaring that the more exchange rate increases, inflation rate also increases progressively.

Exchange rate volatility impacts industrial productivity in several ways. First, when the domestic currency depreciates, the cost of imported inputs for industries rises, leading to increased production costs and reduced profit margins. This often results in higher prices for locally produced goods, which can weaken competitiveness in both local and international markets. On the other hand, an appreciating currency may benefit import-dependent industries by lowering input costs but can negatively affect the export competitiveness of local goods, potentially leading to reduced industrial output and income. Despite numerous policy efforts by the Nigerian government and the Central Bank of Nigeria (CBN) to stabilize the currency and mitigate adverse impacts on the economy, exchange rate volatility remains a critical concern. Policies such as exchange rate pegs, interventions in the foreign exchange market, floating exchange rate system and adjustments in interest rates have been implemented with varying degrees of success.

Objectives of the Study

The broad objective of this study is to examine the effect of exchange rate on industrial performance in Nigeria. Specifically, to;

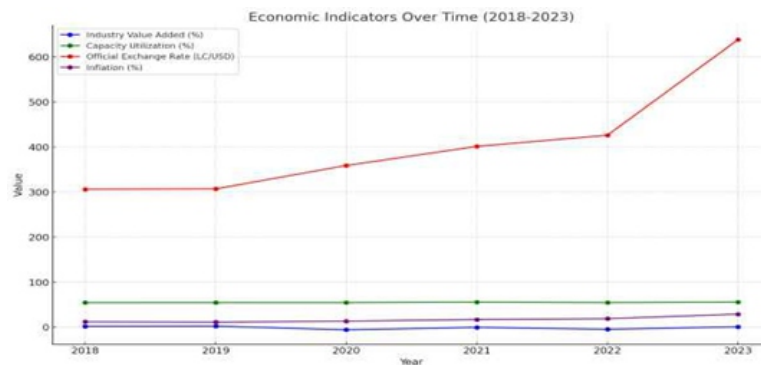
- i. Examine the relationship between exchange rate, inflation rate, industrial capacity utilization, and industrial productivity in Nigeria.
- ii. Evaluate the short-run effect of exchange rate, inflation, industrial capacity utilization on industrial productivity in Nigeria.
- iii. Examine the long-run effect of exchange rate, inflation, industrial capacity utilization on industrial productivity in Nigeria.

Literature Review

The rate of exchange is the cost or value at which citizens of those nations transact with one another, and it is also described as the proportion at which one nation's currency value is stated in relation to the value of other nation's currency value. Egolum *et al.* (2020) described rate of exchange as the cost of one currency of another country in relation to local currency, so it also serves as a connection between the domestic and international markets for various goods, services, and financial assets. According to Ndu-Okereke & Nwachukwu (2017), the rate of exchange is an important economic factor that plays a key position in an economy, and currency rate fluctuation have a huge impact on every aspect of the economy, such as inflation, trade, and import-export performance, all of which affect the economy's performance. Additionally, Ndubuaku *et al.* (2019) explain rate of exchange as the price of one currency against the other, as well as the number of values of a currency needed to acquire the currency of another country. The risk associated with unpredicted swings in rate of exchange that have a direct impact on a nation's economic strategy is termed as exchange rate volatility. (Hussaini *et al.* 2018).

According to Ezenwakwelu *et al* (2019), the term "exchange rate volatility" refers to the rising and falling changes in currency rates resulting from market conditions such as demand and supply. When the cost of one of the various countries' banknotes varies, exchange rates fluctuate. When need for a country's currency exceeds the supply at any given period, the currency appreciates or strengthens. Financial flows, such as interest rate changes, inflation, the balance of payments, the budget, and trade imbalances or balances, cause currency rate swings. When debit or credit transactions are made in the fixed investment accounts of the BOP, the need or availability for U.S. dollars is increased, and the domestic currency increases. Rise in rates of interest provide greater rates to lenders, attracting additional foreign currency, causing currency rates to increase and the local currency to appreciate. Furthermore, an increase in the home currency stimulates exports of goods and services while reducing import costs. Falling interest rates limit the availability of overseas funds and cause the home currency to decline in value, resulting in a reduction in the exchange rate. Furthermore, during inflation, local or house products and services become more costly than foreign goods and services, causing imports to increase and the country's external reserve to diminish. It also causes a deterioration of the local currency. Furthermore, low inflation makes domestic goods and services affordable, as well as increasing exports and

decreasing imports. The currency strengthens if the country recognizes and accumulates foreign currency. Exchange rate fluctuations have enormous effects on any economy's industrial efficiency.



From the diagram above;

Industry value added Shows significant volatility as there was positive growth recorded in 2018 and 2019, peaking at 2.31%. A sharp negative dip occurred in 2020 (-5.85%) due to potential economic disruptions. Recovery attempts are visible from 2021 to 2023, with fluctuations but positive growth resuming at 0.72% in 2023, while capacity utilization remains relatively stable, starting at 54.52% in 2018 and ending at 55.9% in 2023. A minor dip in 2022 (54.6%) is visible, but the overall trend is steady, suggesting moderate changes in industrial capacity. Official exchange rate illustrates a consistent depreciation of the local currency over time. A significant jump is evident from 2022 (425.98) to 2023 (638), indicating potential economic stress and currency devaluation. Inflation displays a generally upward trend, beginning at 12.09% in 2018 and surging to 28.92% by 2023. Notable jumps occur between 2020 and 2021 and again from 2022 to 2023, reflecting increasing inflationary pressures.

Hassen (2024) explore the non-linear relationship between exchange rates and u.s. industrial production. His finding shows that while small fluctuations in exchange rates have minimal impact on U.S. industrial production, significant deviations trigger substantial changes in output, often with delayed effects and that impact of exchange rate changes varies across different industries, depending on their exposure to international markets and currency risk. The study was further examine using threshold regression models and non-linear time series analysis. Also, according to Umoru and Tedunjaiye (2024) study, they investigate the impact of energy supply, aggregate capital stock, exchange rate and labour as factors of industrial production in 18 SSA countries. Using mean group and Pooled mean group, findings show both first and second lags of megawatts of electric power supplied had contributed ineffectively to industrial production in SSA and capital flows had been significantly impactful to industrial output of SSA countries unlike what it was in the past. The current stock of capital flows to SSA could positively and meaningfully contribute to the

growth of industrial output in the coming years. The research also shows that, using Hausman's test statistic of 29.679 with zero probability value provided us with the rejection of homogenous long-run coefficients.

According to Peter (2024), he looks into the effect of exchange rate on the performance of the manufacturing sector. Yearly data were used from 1996 to 2020. The Auto Regressive Distributed Lag (ARDL) was used to analyze the data. export values of clothing and textiles were negatively statistically significant, import inputs of food and beverages were also negatively statistically significant, total manufacturing output was negatively statistically significant, while value added of medium and high-tech products was positively significant in explaining manufacturing performance. This means that the exchange rate has both negative and positive effects on manufacturing performance. Other related research examining the relationship among currency rate and industrial production, and the influence of currency rate volatility on industrial production, include Fatbardh *et al.* (2020), whose research evidence for panel data using fixed effects assessment demonstrates that currency rate fluctuation has a significant adverse effect on real economic growth. Duc *et al.* (2019) assessing industrial sector and 10 of its subgroups among Vietnam and 26 key export partners, they discovered that there is negative and significant correlation among manufacturing exports and currency rate in Vietnam, also that the variations in currency rate has no effect on exports in Asia, Europe, and America. Akinmulegun & Falana (2018) checking for causality, they found a one-way connection between currency rate and industrial production. In other words, industrial production responded positively and significantly to the exchange rate shock. Ezenwakwelu *et al* (2019), the results of the multiple regression test demonstrate that currency rate instability has a detrimental effect on manufacturing firm performance. Also, Ndubuaku *et al.* (2019), using the ARDL model, they reported that the currency rate does not have any significant effect on, MGD, SGD, or AGD, and that the currency rate had an additional and significant impact on PGD in Nigeria.

Theoretical Review

Purchasing Power Parity (PPP) theory

The Purchasing Power Parity (PPP) theory in relation to rates of exchange essentially asserts that for every given currency, it should have the ability to purchase an equivalent number of commodities in all nations. Some analysts feel that PPP accurately represents the mechanisms that shape currency rates over time. Consequently, the nominal rate of exchange among two currencies should mirror the disparity in price levels between the two countries. PPP asserts that the currency rate between currencies of two nations and their rates of inflation are proportionately linked, which forms a fundamental aspect of the theory of exchange rate determination. This theory is builds on the principle of a cost, which states that where there are no barriers to trade and costs of transportation, spatial commodity pricing make sure that the cost of given commodities is equal all over the nations.

There are two methods to convey the PPP concept: absolute and relative forms. The optimum exchange rate adjusts a particular income's general purchasing power in terms of relative market values, according to the absolute form of PPP. It thereby establishes a link between the level of the currency rate and the level of comparable pricing. According to the relative form, fluctuations in currency rates calculated from a base period indicate price variations. While scholars speculate whether the costs of goods will remain consistent when expressed in a single currency, PPP is a theory of persistent currency rate adjustments that says that price levels in two nations must be similar after currency exchange modifications. According to Frenkel (1976), the equilibrium currency corresponds the ratio of local to world prices (in its absolute form). The concept is founded on the basis of a price, which says that the product price should be the equal in every nation. To put it differently, if a given article costs one dollar in the United States and 1 naira in Nigeria, the EXCH must be 1 naira per a dollar. According to the model, if the costs of the same product in different economies differ significantly after EXCH adjustment, an arbitrage opportunity exists. Purchasing Power Parity (PPP) holds predicts that exchange rate appreciation will raise output and short-term, it will boost the BOP, Nevertheless, that the monetary outcome of the devaluation will ensure that the boost in production and increase in the balance of payment will be counteracted by long-term price rises.

Neoclassical Growth Theory

Neoclassical growth theory is an economic framework that explains how steady economic growth arises from the interplay of three key factors: labour, capital, and technology. According to the National Bureau of Economic Research, Robert Solow and Trevor Swan are credited with developing and introducing the long-run economic growth model in 1956. Initially, the model incorporated exogenous population growth to determine the growth rate, but in 1957, Solow expanded it to include technological change. The theory asserts that short-term equilibrium is influenced by varying levels of labour and capital in the production process. It also emphasizes that technological progress plays a critical role in driving economic growth, as sustained growth is unattainable without advancements in technology.

Neoclassical growth theory highlights the three essential factors for economic expansion labour, capital, and technology while distinguishing between temporary equilibrium and long-term equilibrium, the latter being independent of these factors. This theory proposes that the accumulation and effective utilization of capital are vital for economic growth. Moreover, the relationship between capital and labour determines an economy's output, with technological progress enhancing labour productivity and expanding output capacity. The production function of neoclassical growth theory serves as a tool to assess an economy's growth and equilibrium. This function is expressed as:

$$Y = AF(K, L). \quad (1)$$

Where; Y denotes an economy's gross domestic products (GDP); K represents its share of

capital; L describes the amount of unskilled labour in an economy; A represents a determinant level of technology.

Methodology

Model Specification

This study is based on the Solow-Swan growth model, developed by Robert Solow and Trevor Swan in 1956, which considers capital (K) and effective labour (L) as deterministic variables driving output under the assumption of constant returns to scale. In this model, capital stock is defined as the accumulated savings from the previous period, net of depreciation, while the labour supply is fixed. Savings are modelled as a fixed fraction of output. Starting with an initially low capital stock, savings incrementally increase the economy's capital stock over time until a steady state is reached, where savings equate to depreciation.

The model aligns with the standard production function framework, which deterministically combines labor and capital to produce goods, as specified below:

$$Y_t = K_t L_t \quad (2)$$

The function represents output Y as a product of the current state of knowledge, the range of available techniques, and the array of capital, intermediate goods, and consumption goods. Under the assumption of constant returns to scale, output per worker (labour productivity), $y = Y/L$, depends on the capital stock per worker (capital intensity), $k = K/L$. This implies that the relationship between each unit of labour and capital in production remains unchanged, regardless of the overall quantity of labour or capital in the economy. A key feature of the aggregate production function is the presence of diminishing returns to capital accumulation. Specifically, as additional units of capital are provided to a worker, the output generated by each additional unit of capital decreases. This relationship is often expressed using the Cobb-Douglas production function:

$$Y = L^{1-a} K^a, 0 < a < 1 \quad (3)$$

Alternatively the per worker production function can be written as:

$$Y = f(k) = K^a \quad (4)$$

This above model is adapted in order to achieve the objective of the study, which examine the short-run and long-run effect among exchange rate, capacity utilization, inflation rate and industry value added, the specification of the model is as follows;

$$IVA = f(EXR, INFR, CU) \quad (5)$$

Restating the model in an econometric form:

$$IVAt = \beta_0 + \beta_1 EXRt + \beta_2 INFRt + \beta_3 CUt + \mu t \quad (6)$$

$$INOUT = \beta_0 + \beta_1 EXRt + \alpha_0 \beta_2 + \alpha_1 \beta_2 EXR^2 t + \alpha_2 \beta_2 INFRt + \alpha_3 \beta_2 CUt + \beta_3 GDPINFR^2 t + \beta_4 q_1 + \mu t \quad (7)$$

Where;

IVA = Industrial output; OER = Official Exchange rate; INFR = Inflation rate; CU = Industrial capacity utilisation; Ut = Error term or stouhastic random variable; $\beta_1 - \beta_4$ = Parameter estimates of the model

Data Analysis

Descriptive Statistics

Descriptive statistics of the parameters in the research are shown in Table 1. The mean value of industry value added and inflation rate are approximately 1% and 19%, meaning that, on average, there was 1% value added and 19% increase in industry and inflation rate between January 1984 and December 2023. The 6.5 percent and 16.53percent standard deviation suggests that there is a low level of volatility in the changes in industry value added and relatively high volatility in the changes in inflation rate in Nigeria. The lowest figures showed that the entire value of industry value added and inflation rate in Nigeria is approximately -19 percent and 5.4 percent respectively, while the largest increase are 18 percent and 73 percent.

From 1984 to 2023, the average depreciation of the Nigerian currency and industry capacity utilization are around 47.455 and #130.83 respectively, as indicated by the mean value of the exchange rate and industry capacity utilization, which is approximately 47 percent and #131. A significant degree of volatility in the fluctuations in the Nigerian currency rate is suggested by the standard deviation of 142% and a relatively low volatility in industry capacity utilization (10%). The currency rate and industry capacity utilization in Nigeria are approximately ₦0.7 and 30.4 percent at its lowest and ₦638 and 73 percent at its greatest, as indicated by the minimum and maximum numbers. Furthermore, the probability of the Jarque-Bera shows that industry value added, inflation rate and official exchange rate are normally distributed and of which the industry capacity utilization is not. Also, official exchange rate is the most volatile variable among the variable under study as suggested by the standard deviation (142 percent), while industry value added volatility is relatively low.

Table 1. Descriptive Statistics.

Variables	Obs	Mean	Maximum	Minimum	Jarque-Bera	Prob.
IVA	42	0.6782	18.0589	-18.9746	5.0356	0.0806
INFR	42	19.1405	72.8400	5.3900	32.2329	0.0000
CU	42	47.4550	73.2588	30.400	0.2638	0.8764
OER	42	130.8314	638.000	0.6735	25.6426	0.0000

Source: Authors Computation, 2022 (Eviews 9.0). Note: Variable Definition: Exchange Rate (EXR), Capacity Utilization (CU), Inflation Rate (INFR) and Industry Value Added (IVA).

Unit Root

Table 2 displays unit root test findings for the parameters using Philips Peron unit root test, revealing that all variables exhibit integration at various orders. Specifically, a combination of stationary levels and first differences is observed. Given these results, it is necessary to conduct a bound test since both the variables display stationary at both the first and second differentiation.

Table 2: Unit Root Test Result.

Variable	t-Statistics	Prob	Decision
At Level (With Constant)			
IVA	-5.6814	0.0000***	Sig. at 1%
LOGOER	-2.6233	0.0966*	Sig. at 10%
CU	-3.1819	0.0284**	Sig. at 5%
INF	-2.9399	0.0495**	Sig. at 5%
At First Difference (With Constant)			
IVA	-11.5798	0.0000***	Sig. at 1%
LOGOER	-5.4491	0.0001***	Sig. at 1%
CU	-7.6609	0.0000***	Sig. at 1%
INF	-10.2176	0.0000***	Sig. at 1%

Source: Author Computation, 2024

Bound Test

Table 3 displays the co-integration outcome of the bound test. The result revealed that there is a long-term connection among the variables under study since F-statistic is higher than the $I(1)$ bound, at both 1% and 5% critical level.

Table 3: Bound Test Result

F-Bound Test	Value	Signif.	I(0)	I(1)
F-statistic	15.01	10%	2.72	3.77
K	3	5%	3.23	4.35
		2.5%	3.69	4.89
		1%	4.29	5.61

Source: Author Computation, 2024

Autoregressive Distributed Lag

Table 4 show that, industry capacity utilization, inflation rate and official exchange rate has a negative effect on industry value added. This shows that a unit increase in industry capacity utilization, inflation rate and official exchange rate leads to a short-term 0.074 percent, 0.099 percent and 5.89 percent decline in industry value added. Furthermore, the Durbin-Watson stat indicates that the variables in the model are normally distributed but none of the variables are significant at the conventional 5 percent in the short run. The F-statistics also show that the variables in the model have no effect on industry value added in the short run since its probability is not significant.

Table 4: Autoregressive Distributed Lag Result

Variable	Coefficient	Std. Error	t-Statistics	Prob.
CU	-0.0739	0.1250	-0.5916	0.5582
INFR	-0.0988	0.0517	-1.9102	0.0648
LOGOER(-1)	11.0072	4.3614	2.5238	0.0166
C	8.8815	5.9562	1.4911	0.1454
R-square	0.2346			
Adjusted R-square	0.0955			
DW stat				
F-statistic	2.1211			
Prob(F-stat)	1.6861			
	0.1555			

Source: Authors Computation, 2024

Error Correction Model

Table 5 displays industry value added negatively and significantly affected by official exchange rate. This suggests that, over time, a unit increase in official exchange rate rate will translate into a 5.9 percent decrease in industry value added at 5% significant level. Also, the error correction term indicated a long-term connection among the variables under study and that the equilibrium speed adjustment is 1.0183. This suggests that roughly 1.02% of the current periods are rectified, demonstrating the convergence of the model in the long-run.

The coefficient of determination (R²) that has been modified to be 0.67974. This suggests that 68% of the variance in the dependent variable can be explained by the independent variable alone. In addition, the Durbin-Watson stat indicates that the variables in the model

are normally distributed. The F-statistics also show that the variables in the model have effect on industry value added in the long run since its probability is significant at 1 % critical level.

Table 5 Error Correction Model Result

Variable	Coefficient	Std. Error	t-Statistics	Prob.
D(LOGOER(-1))	5.6109	2.8032	2.0016	0.0536
CointEq(-1)*	-1.0183	0.1258	-8.0920	0.0000
C	8.8815	1.4983	5.9277	0.0000
R-square	0.6797			
Adjusted R ²	0.6530			
DW stat	2.1211			
F-statistic	25.4691			
Prob(F-stat)	0.0000			

Source: Authors Computation, 2024.

Post-Estimation Test

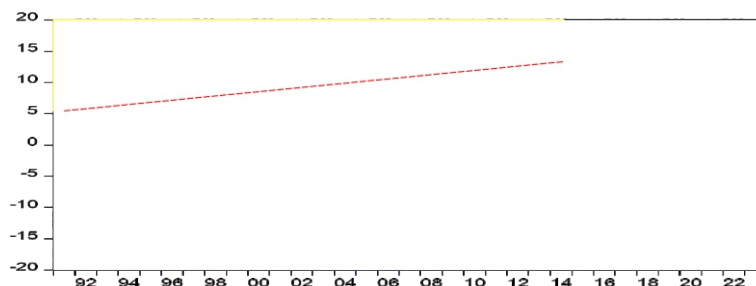
The model data were normally distributed, according to the Jarque-Bera value of 1.2991 with a probability value of 0.5223, because its probability value is above the 10% level. The normalcy assumption is thus approved. Since the probability value is greater than the 10% level of significance, the Breusch-Godfrey statistic of the serial correlation LM test demonstrated that there was no serial correlation issue with the time series data used in the analysis. Moreover, the alternative hypothesis of no constant variance is accepted as the Breusch-Pagan-Godfrey heteroskedasticity probability value is greater than the 10% level of significance. Because the blue line falls in between the red line, the stability test result, as indicated by the graph shows that the series is free from non-linearity.

Table 6: Summary of Post Estimation Tests

Test	Stat.	F-stat (Value)	Prob.
Serial Correlation LM	Breusch-Godfrey	0.7086	0.5002
Heteroskedasticity	Breusch-Pagan-Godfrey	0.2763	0.9441
Normality	Jarque-Bera	1.2991	0.5223

Source: Authors Computation, 2024.

Stability Test



Discussion of Findings

The study examines the effect of exchange rate on industrial performance in Nigeria through 1982 to 2021, and then the findings suggest that industry capacity utilization, inflation rate, and official exchange rate have a negative impact on industry value added in the short term, with a unit increase in these variables leading to declines of 0.074%, 0.099%, and 5.89%, respectively. However, these effects are not statistically significant at the conventional 5% level, as indicated by the Durbin-Watson statistic and F-statistics. This implies that while there is evidence of negative short-term relationships, the model lacks strong predictive power or significance in explaining industry value added in the short run. Consequently, other factors or structural considerations might play a more critical role in influencing industry value added, requiring further investigation or model refinement. Overall, the analysis underscores the critical influence of the official exchange rate on industry value added and highlights the robustness of the long-term model. This result affirmed those of Isiaq et al. (2019), Akinmulegun & Falana (2018), Amadi, et al. (2018) and Eichengreen, et al., (2023), who showed an inverse association between rate of exchange volatility and growth in their nation-specific analyses. Furthermore, the findings showed that rate of exchange fluctuation has a considerable impact on industrial productivity in Nigeria, are consistent with those of Fapetu & Oloyede (2018) and Okafor et al. (2018) and Isiaq et al (2019). However, this research finding contradicted the result of Ogunmuyiwa & Adelowokan (2018) who discovered that there is no long-run association between the exchange rate and industrial production in Nigeria.

Conclusion and Recommendation

The study concluded that industry capacity utilization, inflation rate, and official exchange rate negatively affect industry value added in the short term. However, these short-term effects are not statistically significant at the conventional 5% critical level, suggesting the model's limited explanatory power for short-term industrial performance. This highlights the likelihood of other structural and contextual factors playing a critical role in influencing industry value added, warranting further investigation.

In contrast, the study underscores the significant long-term impact of the official exchange rate on industrial productivity, affirming the robustness of the long-term model. Therefore, it is recommended that policymakers should prioritize measures to stabilize the official exchange rate, as fluctuations negatively and significantly impact industry value added. This can be achieved through sound monetary policies, managing foreign exchange reserves effectively, and encouraging inflows of foreign investment to reduce exchange rate volatility. Also, long-term reforms aimed at aligning the exchange rate with market fundamentals should be implemented. Transparent and consistent exchange rate policies will help build investor confidence and reduce uncertainty for industries. Furthermore, industries should be supported to enhance their competitiveness in the face of exchange rate fluctuations. This could involve providing incentives for innovation, technological upgrades, and diversification of export products to minimize dependency on exchange rate-sensitive inputs. Finally, programs aimed at building resilience to external shocks, such as exchange

rate fluctuations, should be developed. These could include financial risk management tools, hedging mechanisms, and training for businesses in adaptive strategies.

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