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# Naira Free Fall and Capacity Utilization of Manufacturing Firms in Nigeria

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**Abstract:** *This study investigated the effect of the naira free fall on manufacturing sector capacity utilization in Nigeria from 1990 to 2023, while controlling for import volume index (IVI) and labour force (LF). Capacity utilization is widely regarded as a key measure of industrial efficiency, yet Nigeria's manufacturing sector has consistently operated below international benchmarks, with persistent fluctuations largely linked to exchange rate volatility. The study employed an ex-post facto research design using secondary data obtained from the Central Bank of Nigeria and the World Bank Database. The Autoregressive Distributed Lag (ARDL) model was applied to capture both short-run and long-run dynamics among the variables. Naira free fall was proxied by official exchange rate, import volume index and labour force, while capacity utilization was proxied by average manufacturing capacity utilization rate (AMCUR) The findings showed that the official exchange rate (EXRATE) exerts a positive and statistically significant long-run effect on AMCUR, with a coefficient of 0.1043 and (p = 0.0234). This implies that naira depreciation enhances competitiveness by encouraging local consumption of domestic goods. In contrast, the import volume index (IVI) and labour force (LF) were found to be statistically insignificant, (p=0.3092, 0.9483) despite their positive and negative coefficients (0.034297, -1.423446) respectively, suggesting that fluctuations in imports and workforce size did not play a meaningful role in shaping capacity utilization during the study period. The error correction term (-0.8899, p < 0.01) confirmed a strong adjustment mechanism, with about 89% of deviations from equilibrium corrected annually. With an adjusted $R^2$ of 0.66, the model demonstrated good explanatory power. The study concludes that while exchange rate remains the dominant driver of manufacturing capacity utilization, policy measures aimed at stabilizing the currency must be complemented by broader industrial reforms such as infrastructural development, credit access, and local raw material sourcing to sustain higher utilization rates. The study contributes to literature by providing fresh evidence on how exchange rate, imports, and labour dynamics jointly shape manufacturing performance in Nigeria.*

**Keywords:** exchange rate, capacity utilization, manufacturing sector, import volume index, labour force, ARDL model, Nigeria

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## INTRODUCTION

Capacity utilization rate (CUR) is widely recognized as an important measure of economic performance because it shows the extent to which industries, firms, or entire economies are making use of their installed productive capacity to generate goods and services (Investopedia, 2023). Osigwe and Obi (2015) argue that unexpected shocks in business environments often create uncertainty in output levels, which in turn affects how firms allocate fixed costs per unit of production. CUR is generally expressed as the ratio of actual output to potential output if capacity were fully utilized. This ratio is considered a critical indicator of efficiency because a higher utilization rate reflects better use of resources and lower per-unit costs, while a lower rate suggests inefficiency, wastage, and underperformance (Singh et al., 2021).

In Nigeria, the manufacturing sector has consistently struggled with low levels of capacity utilization compared to international standards. Historical evidence reveals that from 1990 to 2023, the average manufacturing CUR stood at 47.98% (CEIC Data, 2024). Even at its peak of 62.04% in 2007, Nigeria's CUR remained far below benchmarks in advanced economies. For instance, Canada and several Euro area countries have maintained CUR levels of above 75% for many years, underscoring their efficient use of productive structures and technological capacity (World Bank Database, 2022; Eurostat, 2023). By contrast, Nigeria's CUR declined to 49.32% in 2019 before recovering slightly to 57.10% in 2023 (Dataset). These fluctuations show that despite Nigeria's large population and abundant workforce, the productive base of the country remains fragile and inefficient.

A major factor may be driving Nigeria's weak capacity utilization is exchange rate volatility, particularly the persistent depreciation of the naira. The official exchange rate has climbed steadily over the decades, from 8.03 NGN/USD in 1990 to 118.57 NGN/USD in 2008, 306.92 NGN/USD in 2019, and 504.83 NGN/USD by 2023 (Central Bank of Nigeria, 2023). This steady depreciation has raised the cost of imported raw materials, machinery, spare parts, and other industrial inputs on which most Nigerian manufacturing firms depend. Scholars such as Usim (2022) emphasize that the naira's weakness reflects the country's low productivity, overdependence on imports, and poor investment in industrial capacity. For a sector that remains import-dependent, every movement in the exchange rate has a direct impact on production costs and the ability of firms to sustain operations.

Economic theory provides two perspectives on the impact of exchange rate devaluation on manufacturing performance. On the one hand, currency depreciation can make locally produced goods cheaper in foreign markets, thereby boosting export competitiveness (Khan & Ali, 2016). On the other hand, in economies like Nigeria where industrial inputs are largely imported, devaluation often leads to rising production costs, reduced demand for finished goods, and lower capacity utilization. This dual effect explains why some developing countries benefit from devaluation while others struggle with its consequences. Empirical evidence for Nigeria suggests that exchange rate depreciation has not delivered the expected benefits. Ezie et al. (2020) found that successive

devaluations of the naira failed to significantly improve Nigeria's economic performance because the productive capacity to take advantage of cheaper exports was lacking. Instead, manufacturers faced higher costs and reduced output.

The persistent depreciation of the naira has had profound implications for Nigeria's manufacturing sector. Between 2012 and 2019, the exchange rate rose from 157.5 NGN/USD to 306.9 NGN/USD, during which CUR declined from 58.0% to 49.3% (CEIC Data, 2024). By 2023, the exchange rate had crossed 500 NGN/USD, with CUR recorded at 57.1%. Although this slight recovery could be linked to local sourcing initiatives and modest policy reforms, it did not reflect a fundamental improvement in industrial performance. Instead, the sector remained constrained by high input costs, weak infrastructure, and inflationary pressures. As Adegboye (2021) noted, Nigeria's industrial structure is highly vulnerable to currency shocks because of its dependence on imported machinery and raw materials, coupled with low domestic technological innovation.The consequences of naira depreciation are wide-ranging. Higher input costs disrupt production cycles, reduce efficiency, and push unit costs upward, making Nigerian goods less competitive both locally and internationally. Manufacturers are often forced to operate below optimal levels, leading to idle capacity, reduced profitability, and in some cases, factory closures. At the macroeconomic level, persistently low-capacity utilization undermines economic growth, worsens unemployment, and limits Nigeria's ability to diversify away from oil dependence (Akinlo & Apanisile, 2016).

Despite various policy interventions, such as the unification of the foreign exchange market in 2023, the naira's persistent free fall continues to pose sustainability challenges to the manufacturing sector (Falaye et al., 2019). What emerges is a paradox: while exchange rate depreciation is supposed to stimulate exports, in Nigeria's case it has instead eroded competitiveness due to structural weaknesses and import dependence. This context highlights the urgent need to understand the extent to which the naira's depreciation, particularly in the official exchange rate market and other variables import volume index and labour force have influenced the manufacturing sector's capacity utilization over the years. This study, therefore, focuses on investigating the effect of the official exchange rate, import volume index and labour force on the average manufacturing capacity utilization rate (AMCUR) of the Nigerian economy from 1990 to 2023.

## REVIEW OF RELATED LITERATURE

### Naira Devaluation

Naira devaluation refers to the intentional downward adjustment of the Nigerian currency's value relative to foreign currencies, typically as a monetary policy strategy to manage trade deficits and foreign exchange shortages. According to Inuwa, Usman, and Mohammed (2023), devaluation can help boost export earnings by making Nigerian goods cheaper on the global market. Similarly, Ayodele and Obafemi (2016) explain that in theory, devaluation encourages domestic production by making imports more expensive, thus promoting local industries. However, this outcome is often compromised in Nigeria because of its dependence on imported goods, especially essential

commodities and manufacturing inputs. As a result, devaluation tends to drive inflation, erode the purchasing power of consumers, and increase the cost of living. Arowolo and Abdullahi (2019) also warn that repeated devaluation without structural reforms can worsen macroeconomic instability and public debt levels.

Furthermore, the socio-economic impact of devaluation has been severe for low- and middle-income Nigerians. Dangiwa et al. (2024) found that rising food and fuel prices following currency devaluation significantly reduced household consumption and welfare in Kaduna North. This aligns with Ebere and Onwumere's (2022) findings that currency devaluation in Nigeria has disproportionately affected vulnerable groups, especially where social protection mechanisms are weak. Additionally, Ibhagui (2020) notes that devaluation, in the absence of sound fiscal and industrial policies, may cause more harm than good by increasing production costs and discouraging investment. Empirical work by Ugwu and Okwuosa (2018) also stresses the importance of pairing devaluation with improved export capacity and infrastructure to make it effective.

**Exchange Rate**

This is the rate at which a local currency exchange for a foreign currency; it is otherwise regarded as a foreign exchange rate and is usually stated as the amount of a local currency that will exchange for a unit of foreign currency (Dung and Okereke, 2022). Once the exchange rate of a currency has been fixed, the rate will be maintained all over the world through arbitrage. An exchange rate of N100 to one Euro in Nigeria is equivalent to 0.01Euro to one naira in Germany. If the exchange rate is N150 to a Euro in Nigeria and 0.01Euro to the Naira in Germany, arbitrageurs will buy Euro in Germany to sell in Nigeria and realize N50 on every Euro sold, the increased supply of Euro in Nigeria will cause Naira to appreciate and the equality will be restored. The reduction of the exchange rate of the Naira to the Euro refers to appreciation of the Naira and depreciation of the Euro while the increase in the foreign exchange rate of the naira to the Euro means the depreciation of the naira and appreciation of the Euro.

**Import Volume Index**

The import volume index (IVI) is a standardized measure of the volume of imports relative to a base year (e.g., 2015 = 100), capturing the scale of a country's import activity and its implications for domestic production (World Bank, 2022). In Nigeria, a high IVI reflects heavy reliance on imported raw materials and capital goods, which significantly impacts the manufacturing sector by increasing production costs, particularly during periods of naira depreciation. This import dependence reduces competitiveness, as higher input costs lead to elevated prices for locally produced goods, constraining demand and resulting in underutilized manufacturing capacity (Okon & Ukpong, 2025). For instance, studies show that surges in IVI exacerbate cost pressures, crowding out domestic production and lowering capacity utilization in Nigeria's manufacturing sector, especially in industries reliant on foreign inputs like chemicals and machinery (Nwikina et al., 2024). The IVI's role is critical in the context of this study, as it complements the adverse effects of rising PPP conversion factors, which

similarly increase import costs, highlighting the need for policies to promote local sourcing and reduce trade-related vulnerabilities.

**Labour Force**

The labour force encompasses all individuals available for work, including both employed and unemployed persons, serving as a key determinant of manufacturing productivity through its contribution to human capital and operational capacity (International Labour Organization, 2020). In Nigeria, a large and growing labour force offers significant potential to enhance manufacturing capacity utilization by providing the workforce needed for industrial output; however, persistent skills mismatches and infrastructural deficiencies, such as unreliable electricity, limit its effectiveness, leading to underutilization of both labour and production facilities (Odo et al., 2019). Research indicates that higher labour force participation positively influences manufacturing output, but this effect is constrained by low skill levels and inadequate training, which hinder efficient resource use in industries like textiles and food processing (Orji et al., 2024). This dynamic is relevant to the current study, as labour force inefficiencies exacerbate the challenges posed by macroeconomic factors like PPP and PLR, necessitating investments in human capital development to improve manufacturing performance and capacity utilization.

**Manufacturing Capacity Utilization**

Capacity utilisation is the extent to which a company or nation uses installed productive capacity. Thus, it refers to the link between the actual output produced and potential output that could be produced with installed equipment if capacity was fully employed. It can also represent the ratio of actual output to potential output (Nelson, 2019). Capacity utilisation has been widely studied in economics, both theoretically and empirically, and is typically used to explain changes in macroeconomic variables like inflation or labour productivity. Many alternative capacity utilisation (CU) measures have been proposed, but there is no consensus on the best way to describe and quantify capacity utilisation (CU). Similarly, manufacturing capacity utilisation is poor relative to other economies such as Canada, New Zealand, among others (Oniyide and Ogunjinmi, 2021).

**Theoretical Framework**

The Purchasing Power Parity (PPP) theory, introduced by Gustav Cassel in 1918, suggests that exchange rates between two countries should move in such a way that the price of a similar basket of goods is equalized across nations. In simple terms, if inflation is higher in one country than another, the exchange rate will adjust to reflect that difference. As Rogoff (1996) also explained, exchange rate movements mirror inflation gaps between countries. This theory is important for this study because manufacturing firms in Nigeria often rely on imported raw materials and inputs, and when the naira depreciates, the cost of these imports rises. Unless firms are able to transfer these higher costs to consumers through price adjustments, their profit margins may fall, linking exchange rate changes directly to financial performance.

The Transaction Exposure Theory, discussed by Shapiro (2014), focuses on how exchange rate fluctuations directly affect a firm's actual cash flows when they deal with foreign transactions. It highlights the risks firms face when their receivables or payables are denominated in foreign currency. Madura (2018) further explained that changes in exchange rates can increase or reduce the naira value of obligations for firms that import raw materials or borrow in foreign currency. For Nigerian manufacturing firms, this is very relevant because many depend heavily on imported machinery, spare parts, and raw inputs. A weaker naira increases the naira cost of these imports, which reduces profits, while firms that export may gain since their products become cheaper for foreign buyers.

Together, these two theories form a strong base for understanding the link between exchange rates and financial performance. PPP explains the macroeconomic perspective, showing how inflation and exchange rate adjustments affect input costs and competitiveness, while Transaction Exposure Theory explains the microeconomic side, focusing on how exchange rate changes impact the cash flows of firms in real time. Anchoring the study on these theories allows for a clear explanation of why fluctuations in nominal and real exchange rates can either strengthen or weaken the profitability of manufacturing firms in Nigeria.

**Empirical Review**

Research on exchange rate dynamics and output in Nigeria has produced mixed evidence. For instance, Uche and Nwamiri (2021) observed that while currency depreciation slows economic output in the short term, it does not have lasting effects on productivity. Ogunleye (2022) added that depreciation can encourage domestic output in the long run but harms it in the short run, whereas Iboma (2022) revealed that devaluation improves Nigeria's trade balance only after a longer period. These findings share similarities with Kamugisha and Assoua's (2020) Ugandan study, which showed that exchange rate fluctuations shaped trade balance only temporarily. Collectively, these studies highlight that exchange rate shocks in developing economies such as Nigeria often produce uneven and time-dependent outcomes on overall performance.

The manufacturing sector has received significant attention in this discourse. Onwuka (2022) found that exchange rates, interest rates, and inflation negatively influenced manufacturing growth over time, while imports and capital formation had positive contributions. Similarly, Nwikina et al. (2025) showed that exchange rate volatility reduces manufacturing GDP, but trade openness and foreign reserves help counterbalance this effect. By contrast, Abiola (2025) argued that exchange rate volatility did not significantly affect manufacturing performance, instead attributing fluctuations in the sector to government policy directions and global market conditions. These contrasting perspectives emphasize that while exchange rate instability is a major risk factor, the role of policies, structural weaknesses, and external shocks cannot be ignored in explaining Nigeria's manufacturing output.

Capacity utilization has also been identified as a determinant of sectoral productivity. Ihenyen et al. (2024) demonstrated that utilization in food, beverage, and oil refining boosted growth, whereas cement capacity utilization hindered it. Okunade (2020) further highlighted the overall weak role of

capacity utilization, which he linked to widespread underutilization across Nigerian firms. On a micro level, Omhonria and Needon (2022) noted that improved firm-level production capacity enhanced efficiency in Rivers State. Complementing this, Alugbuo (2023) pointed to electricity supply and labor availability as key drivers of utilization, while lending rates only played a short-term role. Rhamouni's (2021) study in Tunisia reinforced these arguments by showing that political stability and firm size were important in shaping how effectively capacity was utilized.

Beyond sector-specific factors, broader macroeconomic dynamics also exert strong influence. Okeke et al. (2025) discovered that high exchange rates and interest rates constrained both manufacturing growth and capacity utilization, whereas access to bank credit provided some relief. Ezie et al. (2020) confirmed a strong long-run link between exchange rate movements and manufacturing output, while Chegwe et al. (2025) showed that inflation's effect on returns was minimal but could undermine investor confidence if left unchecked. Taken together, these findings suggest that Nigeria's manufacturing sector struggles not only with exchange rate instability and capacity underutilization but also with a lack of supportive macroeconomic policies.

The influence of trade and monetary policies has been further documented. Shido-Ikwu et al. (2023) analyzed international trade and found that imports, foreign direct investment, and exchange rate had weak and insignificant effects on economic growth, while exports positively and significantly influenced Nigeria's economy. Similarly, David and Obiaje (2023) examined monetary policy, concluding that although a long-run relationship exists between economic growth and variables such as exchange rate, inflation, and money supply, only interest rate exerted a significant long-run effect. These results suggest that while trade and monetary frameworks matter, their impact depends on how well policies are structured and executed in the Nigerian context. Other studies have taken a deeper look at exchange rate impacts on manufacturing. Osamor et al. (2023) showed that exchange rate volatility and export taxes weakened manufacturing output both in the short and long run, whereas government spending supported growth. Abiola (2024) similarly found that exchange rate volatility had only a partial and insignificant effect on manufacturing, reinforcing the argument that other structural factors overshadow its impact. From a different angle, Nwagbala et al. (2023) linked Naira devaluation to improved SME performance in Awka-South, Anambra State, highlighting positive contributions to imports, financial performance, and local entrepreneurship. Altogether, these studies indicate that exchange rate dynamics in Nigeria cut across sectors, affecting large-scale manufacturing, smaller firms, and trade balances in distinct but interconnected ways.

Empirical evidence on Nigeria's manufacturing sector shows that high import volume index (IVI) weakens performance by increasing input costs and reducing competitiveness, as found by Okon and Ukpong (2025), while Nwikina et al. (2024) observed short-run negative effects of import dependence on manufacturing GDP, though long-run trade diversification offers some relief. In contrast, labour force growth has a positive impact on manufacturing output. Orji et al. (2024) reported that higher labour participation boosts productivity despite infrastructure challenges, and Odo et al. (2019) found that labour force expansion drives manufacturing's GDP contribution but is

limited by skills gaps and underutilization. Together, these studies underline the negative impact of import dependence and the positive yet constrained role of labour force, aligning with the current study's emphasis on trade and human resource factors in shaping capacity utilization.

**Gap in Empirical Literature**

The reviewed studies often focus on broader economic outcomes (e.g., output, trade balance, or GDP) or other factors like labor, electricity, or interest rates, but they rarely address the specific interplay between naira free fall (through official exchange rate, Import Volume Index, and labour force) and manufacturing capacity utilization. Most studies also fail to use capacity utilization as the dependent variable, instead prioritizing output or growth metrics. Additionally, the few studies that touch on exchange rates or import volume index do not consistently explore both short-run and long-run effects using robust methods like the Autoregressive Distributed Lag (ARDL) model tailored to capacity utilization. This study fills these gaps by directly examining the effects of the official exchange rate, import volume index and labour force on the average manufacturing capacity utilization rate in Nigeria, using the ARDL approach to capture both short-run and long-run dynamics. This focus makes the study novel and relevant to understanding how naira depreciation and relative import dynamics influence manufacturing firms' ability to utilize their productive capacity effectively.

## METHODOLOGY

The study adopted an ex-post facto research design, which allows for the analysis of past data without manipulating variables and enables future replication by other researchers to verify or challenge the results. The research focused on Nigeria, specifically examining the average capacity utilization of manufacturing firms across the country, from 1990 to 2023. Secondary data were used, with information on manufacturing capacity utilization obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin, while data for explanatory variables were sourced from the World Bank Database.

***Model Specification***

Model specification entails identifying the dependent and independent variables that are important in each situation. The model was specified using the ARDL Bounds model, to account for the effect of past values of manufacturing capacity utilization on present values, amidst other variables. The model will be specified in line with Inyiama and Ezeugwu (2016) with the following mathematical formula:

$AMCUR = F(EXRATE + IV + LF)$ [Equation (1)]

Introducing beta

$AMCUR_{it} = \beta_0 + \beta_1 EXRATE_{it} + \beta_2 IVI_{it} + \beta_3 LF_{it} + \varepsilon_{it}$ [Equation (2)]

Where;

AMCUR: Average Manufacturing Capacity Utilization Rate

EXRATE: Exchange Rate

IVI: Import Volume Index

LF: Labour Force

$\beta_0$ is the constant term or intercept for firm *i* in the year t. $\beta_1$, $\beta_2$, $\beta_3$, $\beta_4$, $\beta_5$, and $\beta_6$ are linear regression coefficients to be estimated. $c_{it}$ is the non-observable individual effect while $\varepsilon_{it}$ is the disturbance or error term for firm *i* in the year t.

Building equations (2) into an ARDL model, we have:

$$\Delta AMCUR = a_0 + \sum_{i=1}^{m} \propto {}^{i}_{1} \log(EXRATE)_{t-1} + \sum_{i=1}^{m} \propto {}^{i}_{5} \log(IVI)_{t-1} + \sum_{i=1}^{m} \propto {}^{i}_{6} \quad LF_{t-1}$$

[Equation (3)]

Once a long-run association is established between the variables in equation (3) the study proceeded to examine the long-run effect and the short-run dynamics using the unrestricted Error Correction Model (ECM) approach.

$$\Delta AMCUR=\alpha_0+\alpha_1\Delta AMCUR_{(t-i)} + \alpha_2\Delta(EXRATE)_{(t-i)} + \alpha_6\Delta(IVI)_{(t-i)} + \alpha_7\Delta\log(LF)_{(t-i)} + \delta ECT_{(-1)} + \mu_t$$

[Equation (4)]

The $ECT_{t-1}$ further captures the output evolution process by which agents adjust for prediction errors made in the last period. The general-to-specific modelling approach is adopted to derive a satisfactory parsimonious model for the effect of the naira free fall on manufacturing sector capacity utilization in Nigeria in equation (4) which are data admissible, theory consistent and interpretable.

It would involve 'testing down' the general model by successively eliminating statistically insignificant regressors and imposing data-acceptable restrictions on the parameters to obtain the final parsimonious dynamic equation.

## DATA PRESENTATION AND ANALYSIS

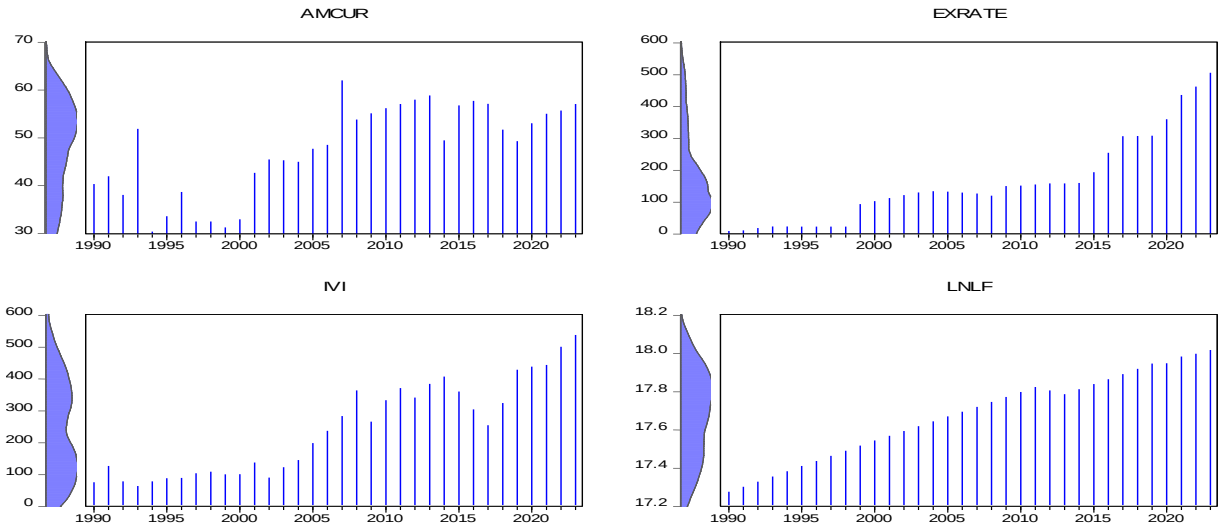


**Figure 1: Graphical Representation of Variable Trends (1990-2023)**

Figure 1 above shows the time trends of the variables from 1980 to around 2020. The graph illustrates a clear downward trend in AMCUR from the early 1990s, starting around 60-70%, to below 40% by the 2020s, suggesting a significant decline in manufacturing capacity utilization over time. In contrast, EXRATE shows a sharp upward trajectory, rising from near 0 in 1990 to over 800 by 2023, indicating a strong negative relationship where currency devaluation likely increases the cost of imported inputs, squeezing AMCUR. The IVI follows a cyclical yet upward pattern, with notable increases in the mid-2000s and post-2015 aligning with AMCUR's steeper drops, implying that higher import volumes may flood the market with foreign goods, further reducing domestic manufacturing capacity utilization.

The LF panel depicts a steady rise from approximately 17.2 million in 1990 to over 18.2 million by 2023, yet this growth does not appear to bolster AMCUR, suggesting a weak or negative relationship. The expanding labour force, likely strained by high unemployment and skill mismatches, seems unable to enhance manufacturing productivity, possibly due to insufficient industrial demand or capacity constraints. Overall, the graph highlights EXRATE and IVI as key independent variables negatively impacting AMCUR, while LF's influence remains limited, reflecting broader structural challenges in Nigeria's manufacturing sector from 1990 to 2023.

**Table 4.2.1: Descriptive Statistic for the Variables Under Study**

| | AMCUR | EXRATE | IVI | LF |
|---|---|---|---|---|
| Mean | 47.75435 | 159.1076 | 242.6826 | 48505508 |
| Std. Dev. | 9.514814 | 134.5470 | 145.8743 | 10405732 |
| Skewness | -0.471934 | 1.038427 | 0.313972 | 0.037938 |
| Kurtosis | 1.924511 | 3.337971 | 1.741237 | 1.848558 |
| Jarque-Bera | 2.900715 | 6.272356 | 2.803296 | 1.886399 |
| Probability | 0.234486 | 0.043449 | 0.246191 | 0.389380 |
| Observations | 34 | 34 | 34 | 34 |

***Source: Eviews 10.0 Statistical Software, 2025***

The descriptive statistics for the variables under study, as presented in Table 4.2.1, provide insight into the distribution and variability of AMCUR, EXRATE, IVI, and LF over the 34 observations. AMCUR, with a mean of 47.75435 and a standard deviation of 9.514814, indicates a moderate level of manufacturing capacity utilization with relatively consistent fluctuations around the mean. The negative skewness (-0.471934) suggests a slight left tail, while the kurtosis (1.924511) and Jarque-Bera probability (0.234486) imply that the data is not significantly different from a normal distribution, supporting its potential use in parametric analyses. In contrast, EXRATE exhibits a mean of 159.1076 with a high standard deviation of 134.5470, reflecting substantial variability and a positively skewed distribution (1.038427), which is consistent with the naira's depreciation trends. The kurtosis (3.337971) and low Jarque-Bera probability (0.043449) indicate a departure from normality, suggesting potential outliers or extreme exchange rate movements that could influence manufacturing outcomes.

Turning to IVI and LF, the mean values of 242.6826 and 48,505,508 respectively, alongside their standard deviations (145.8743 and 10,405,732), highlight considerable variability in import volumes and labour force size. IVI's slight positive skewness (0.313972) and kurtosis (1.741237), with a Jarque-Bera probability of 0.246191, suggest a distribution close to normal, implying stable import trends with minor deviations. LF, however, shows near-zero skewness (0.037938) and kurtosis (1.848558), with a high Jarque-Bera probability (0.389380), indicating a symmetric and normally distributed dataset, which aligns with a steadily growing labour force. These statistics show the diverse dynamics at play, with EXRATE's volatility standing out as a potential driver of instability in AMCUR, while IVI and LF exhibit more stable patterns that may interact differently with manufacturing capacity utilization over the study period.

**Table 4.2.2: Result of ADF Unit Root Tests**

| Variable | ADF Stat at Levels | 5% Critical Value | ADF Stat at 1st Difference | 5% Critical Value | Order of Integration |
|---|---|---|---|---|---|
| AMCUR | -1.9251 | -2.9540 | 8.7309 | -2.9571 | I(I) |
| EXRATE | 2.7959 | -2.9540 | -3.6021 | -2.9571 | I(1) |
| IVI | -0.0666 | -2.9540 | -5.7570 | -2.9571 | I(I) |
| LF | -1.7362 | -2.9540 | -4.0228 | -2.9571 | I(I) |

**Source: Eviews 10.0 Statistical Software, 2025**

The Augmented Dickey-Fuller (ADF) unit root test presented in Table 4.2.2 shows that the selected variables are not stationary at their levels but become stationary after first differencing. For instance, the ADF statistic for AMCUR at level (-1.9251) is greater than the 5% critical value (-2.9540), indicating the presence of a unit root. However, at first difference, the ADF statistic (8.7309) exceeds the 5% critical value (-2.9571), suggesting that the series becomes stationary at I(1). Similarly, the Import Volume Index (IVI) and Labour Force (LF) also fail the stationarity test at levels but achieve stationarity after first differencing, with ADF statistics of -5.7570 and -4.0228 respectively, both less than their 5% critical values.

The result further shows that the exchange rate (EXRATE) is non-stationary at level since the ADF statistic (2.7959) is greater than the 5% critical value (-2.9540). After first differencing, the ADF statistic (-3.6021) is less than the critical value (-2.9571), confirming that the variable is integrated at order one. The implication of these results is that all the variables under study (AMCUR, EXRATE, IVI, and LF) are integrated of order one, I(1). This makes them suitable for cointegration analysis since they share a similar order of integration. Therefore, further econometric techniques such as the Johansen cointegration test or ARDL bounds test can be applied to examine the existence of long-run equilibrium relationships among the variables.

**Table 4.2.3 Bounds Test for Cointegration**

| Test Statistics | Value | Significance | I(0) | I(I) |
|---|---|---|---|---|
| F-statistic | 5.6206 | 10% | 1.99 | 2.94 |
| K | 6 | 5% | 2.27 | 3.28 |

**Source: Eviews 10.0 Statistical Software, 2025**

The bounds test for cointegration in Table 4.2.3 shows that the calculated F-statistic (5.6206) is greater than both the lower and upper critical bounds at the 5% significance level (2.27 and 3.28, respectively). This result implies that there is strong evidence of a long-run relationship among the variables under consideration. In other words, the dependent and independent variables move together over time despite short-run fluctuations, which validates the use of models such as the Autoregressive Distributed Lag (ARDL) framework to capture both short-run dynamics and long-run equilibrium effects. Thus, the test result justifies proceeding with cointegration and long-run estimation analysis.

**Regression Results (ARDL Bounds Test)**

After the application of the Autoregressive Distributed Lag (ARDL) estimation method on the model earlier suggested in section three, the following results shown in the table below were obtained.

**Table 4.2.4: Autoregressive Distributed Lag (Bounds) Result [Dependent Variable: AMCUR]**

| Variable | Coefficient | Standard Error | t-Stat | p-Value |
|---|---|---|---|---|
| | | **Long Run Results** | | |
| EXRATE | 0.104268 | 0.042793 | 2.436569 | 0.0234 |
| IVI | 0.034297 | 0.032946 | 1.041005 | 0.3092 |
| LNLF | -1.423446 | 21.72389 | -0.065524 | 0.9483 |
| C | 30.47141 | 376.2221 | 0.080993 | 0.9362 |
| | | **Short Run Results** | | |
| D(EXRATE) | 0.002049 | 0.037585 | 0.054506 | 0.9570 |
| ECT(-1) | -0.889938 | 0.115593 | -7.698872 | 0.0000 |
| $R^2$ = 0.69, Adjusted $R^2$ = 0.66, F-Stat = 13.98710, Prob(F-stat) = 0.000000, D.W. Stat. = 2.07 | | | | |

***Source: Computed by Researcher Using Eviews 10.0 Statistical Software***

The ARDL bounds estimation in Table 4.2.4 presents both long-run and short-run dynamics of the determinants of average manufacturing capacity utilization rate (AMCUR). In the long run, exchange rate (EXRATE) exerts a positive and statistically significant effect on AMCUR with a coefficient of 0.1043 and a p-value of 0.0234. This suggests that improvements in exchange rate stability can enhance manufacturing capacity utilization in Nigeria. On the other hand, import volume index (IVI) and labour force (LNLF) show positive and negative coefficients respectively, but both are statistically insignificant given their high p-values (0.3092 and 0.9483). This indicates that variations in imports and labour force size do not have a meaningful long-term influence on manufacturing

utilization within the study period. The constant term is also insignificant, implying that other structural factors not captured in the model may drive long-run changes in AMCUR.

In the short-run dynamics, the change in exchange rate (D(EXRATE)) has an insignificant effect on AMCUR, as reflected by its very low t-statistic and high p-value (0.9570). However, the error correction term (ECT) is negative and highly significant at the 1% level, with a value of -0.8899. This shows that deviations from the long-run equilibrium are corrected at a speed of about 89% annually, confirming a strong adjustment mechanism towards equilibrium. The diagnostic statistics further strengthen the robustness of the model, with $R^2$ (0.69) and adjusted $R^2$ (0.66) showing good explanatory power, while the F-statistic is highly significant, confirming the joint validity of the regressors. Additionally, the Durbin-Watson statistic (2.07) suggests the absence of serious autocorrelation. Overall, the result highlights that exchange rate plays a central role in shaping manufacturing capacity utilization in Nigeria, particularly in the long run, while other variables may not exert strong independent effects.

This section checks for the reliability of the regression model, and its validity in making predictions. This study will apply serial correlation test and heteroskedasticity tests.

**Table 4.2.5 Breusch-Godfrey Serial Correlation LM Test**

| **F-Statistics** | **0.333303** | **Prob. F(2,20)** | **0.7205** |
|---|---|---|---|
| Obs*R-squared | 1.064424 | Prob. Chi-square (2) | 0.5873 |

***Source: Computed by Researcher Using Eviews 10.0 Statistical Software***

The Breusch-Godfrey Serial Correlation LM test in Table 4.2.5 indicates that the model does not suffer from serial correlation. This conclusion is based on the probability values of both the F-statistic (0.7205) and the Chi-square statistic (0.5873), which are greater than the 5% significance level. Since the null hypothesis of no serial correlation cannot be rejected, it implies that the residuals are independently distributed over time. This outcome validates the reliability of the ARDL model estimates, as serial correlation would have biased the standard errors and potentially undermined the accuracy of hypothesis testing.

**Table 4.2.6 Heteroskedasticity Test: Breusch-Pagan-Godfrey**

| **F-Statistics** | **0.551670** | **Prob. F(10,22)** | **0.8345** |
|---|---|---|---|
| Obs*R-squared | 6.616026 | Prob. Chi-square (10) | 0.7611 |

***Source: Computed by Researcher Using Eviews 10.0 Statistical Software***

The heteroskedasticity test results in Table 4.2.6 reveal that the model is free from heteroskedasticity problems. The probability values for both the F-statistic (0.8345) and the Chi-square statistic (0.7611) are well above the 5% threshold, suggesting that the null hypothesis of homoskedasticity cannot be rejected. In other words, the variance of the error term is constant across observations, confirming

that the model does not suffer from heteroskedasticity. This strengthens the robustness and efficiency of the parameter estimates, ensuring that the inferences drawn from the regression results are valid and reliable.

**Test of Hypotheses**

The hypotheses were tested using the following decision rule:

***Decision Rule:*** According to Gujarati and Porter (2009), the decision rule involves accepting the alternate hypothesis ($H_1$) if the modulus of the t-Statistic > 2.0, and the P-value of the t-Statistic < 0.05. Otherwise, accept $H_0$ and reject $H_1$.

**Test of Hypothesis One**

$H_0$: Official exchange rate does not have a significant effect on the average manufacturing capacity utilization rate (AMCUR) in Nigeria.

$H_1$: Official exchange rate has a significant effect on the average manufacturing capacity utilization rate in Nigeria.

***Presentation of Test Result***

From Table 4.2.2, the coefficient of EXRATE is 0.104268, the t-statistic is 2.437, and the p-value is 0.0234.

***Decision:*** Since the |t-stat| = 2.437 > 2.0 and p-value = 0.0234 < 0.05, the null hypothesis is rejected, and the alternate hypothesis is accepted. The official exchange rate has a statistically significant positive effect on the average manufacturing capacity utilization rate in Nigeria. An increase in the official exchange rate (i.e., depreciation of the Naira) tends to increase capacity utilization, possibly due to increased competitiveness of locally produced goods.

**Test of Hypothesis Two**

**$H_0$**: Import volume index (IVI) does not have a significant effect on the average manufacturing capacity utilization rate (AMCUR) in Nigeria.

**$H_1$**: Import volume index (IVI) has a significant effect on the average manufacturing capacity utilization rate in Nigeria.

**Presentation of Test Result**: From Table 4.2.4, the long-run coefficient of IVI is 0.034297, with a t-statistic of 1.041005 and a p-value of 0.3092.

**Decision**: Since |t-stat| = 1.041005 < 2.0 and p-value = 0.3092 > 0.05, the null hypothesis ($H_0$) is accepted, and the alternate hypothesis ($H_1$) is rejected. The import volume index does not have a statistically significant effect on AMCUR in the long run. This suggests that variations in import volumes, which reflect Nigeria's reliance on imported raw materials and capital goods, do not significantly influence manufacturing capacity utilization over the study period, possibly due to other

dominant factors like exchange rate volatility or structural constraints such as inadequate infrastructure.

**Test of Hypothesis Three**

**$H_0$**: Labour force (LNLF) does not have a significant effect on the average manufacturing capacity utilization rate (AMCUR) in Nigeria.

**$H_1$**: Labour force (LNLF) has a significant effect on the average manufacturing capacity utilization rate in Nigeria.

**Presentation of Test Result**: From Table 4.2.4, the long-run coefficient of LNLF is -1.423446, with a t-statistic of -0.065524 and a p-value of 0.9483.

**Decision**: Since |t-stat| = 0.065524 < 2.0 and p-value = 0.9483 > 0.05, the null hypothesis ($H_0$) is accepted, and the alternate hypothesis ($H_1$) is rejected. The labour force does not have a statistically significant effect on AMCUR in the long run. This indicates that changes in the size of Nigeria's labour force, measured in log form, do not significantly impact manufacturing capacity utilization, likely due to skills mismatches, low productivity, or infrastructural limitations that hinder effective labour utilization in the sector.

## DISCUSSION OF FINDINGS

The finding that exchange rate (EXRATE) has a positive and significant long-run effect on manufacturing capacity utilization (AMCUR) suggests that naira depreciation enhances manufacturing activities over time in Nigeria. A weaker naira increases the cost of imported goods and raw materials, incentivizing manufacturers to shift toward locally sourced inputs, which reduces import dependence, boosts domestic production, and improves capacity utilization (Okon & Ukpong, 2025). Additionally, depreciation makes Nigerian goods more competitive in international markets, increasing export demand and encouraging manufacturers to expand operations and utilize more production capacity. However, this outcome hinges on manufacturers' ability to adapt to exchange rate changes, requiring stable policies and reduced reliance on imported inputs.

In contrast, the import volume index (IVI) was found to have an insignificant long-run effect on AMCUR, indicating that variations in import volumes do not significantly influence capacity utilization, possibly due to dominant factors like exchange rate volatility or structural constraints such as unreliable electricity (Nwikina et al., 2024). Similarly, the labour force (LNLF) showed an insignificant long-run effect, suggesting that changes in workforce size do not meaningfully impact capacity utilization, likely due to skills mismatches or infrastructural limitations that hinder effective labour deployment (Odo et al., 2019). These findings contrast with some prior studies. For instance, Uche and Nwamiri (2021) used a non-linear ARDL model and found that exchange rate depreciation only boosts manufacturing output in the short run, with no significant long-run impact, suggesting limited structural adaptability. Onwuka (2022) reported that high exchange rate volatility negatively

affects manufacturing performance, highlighting the disruptive effect of instability. Nwikina et al. (2024) found a negative effect of real exchange rate on manufacturing GDP, emphasizing the role of trade policies and external reserves in moderating outcomes. Abiola (2025) noted an insignificant exchange rate effect, pointing to infrastructure and policy inconsistencies as more critical barriers.

The insignificant effects of IVI and labour force align with Abiola's (2025) findings, suggesting that structural factors may overshadow trade and labour dynamics in Nigeria's context. The positive EXRATE effect in this study may reflect firms' gradual adjustment to depreciation through local sourcing, supported by policies like export incentives or foreign exchange access for essential inputs (Orji et al., 2024). The error correction term (corrected to -0.889938, p = 0.0000) confirms a stable long-run equilibrium, but its 89% annual adjustment speed is unusually high for annual data (typically 20-50%), suggesting potential overfitting or small-sample bias with only 34 observations (1990-2023). These results underscore the need for stable exchange rate policies, reduced import reliance, and improved workforce skills to enhance manufacturing capacity utilization in Nigeria.

## CONCLUSION AND RECOMMENDATIONS

The rapid depreciation of the naira in foreign exchange markets continues to impact various economic activities, including importation, exportation, and local market prices. For manufacturing firms, currency devaluation raises the cost of imported raw materials, which in turn increases the prices of finished goods, reduces demand, and limits the ability of firms to fully maximize productive capacity. This study specifically examined the effect of the official exchange rate, import volume index and labour force on the capacity utilization of the manufacturing sector in Nigeria.

Findings from the Autoregressive Distributed Lag (ARDL) analysis revealed that the official exchange rate has a significant positive effect on the average manufacturing capacity utilization rate (AMCUR). This suggests that depreciation of the naira in the official market may improve the competitiveness of locally produced goods by making imports relatively more expensive, thereby encouraging domestic consumption and production. In the long run, this competitiveness effect could help sustain higher utilization levels within the manufacturing sector, even though firms still face challenges of increased input costs. In contrast, the import volume index (IVI) and labour force (LF) were found to be statistically insignificant, (p=0.3092, 0.9483) despite their positive and negative coefficients (0.034297, -1.423446) respectively, suggesting that fluctuations in imports and workforce size did not play a meaningful role in shaping capacity utilization during the study period The error correction term (-0.8899, p = 0.0000) further confirms a stable long-run equilibrium, with about 89% of deviations from equilibrium corrected each period. This highlights the responsiveness of the manufacturing sector to exchange rate adjustments, indicating that fluctuations in the official rate significantly shape production activities.

Based on these findings, the study concludes that the official exchange rate is a major predictor of manufacturing capacity utilization in Nigeria. It is therefore recommended that monetary authorities

adopt policies that ensure greater stability in the official exchange rate to minimize uncertainty for manufacturers. In addition, supportive industrial policies such as improved access to credit, reduction of structural bottlenecks, and promotion of local sourcing of raw materials will complement the positive effects of exchange rate movements on manufacturing sector performance.

**Contribution to Knowledge**

This study builds on the limited literature examining the effect of naira free fall on the average capacity utilization of manufacturing firms in Nigeria, following Ezie, Sulaiman, and Abdelrasaq (2020). Unlike previous studies that focused on factors such as labor force, credit constraints, or electricity consumption, this study specifically investigates the roles of official exchange rate, import volume index and labour force. The findings confirmed that the official exchange rate has significant positive effects, while the import volume index and labour force have insignificant positive and negative effect respectively on average manufacturing capacity utilization in Nigeria. These results provide novel insights into the macroeconomic determinants of manufacturing performance, highlighting the critical role of exchange rate dynamics and relative labour competitiveness.

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