International Journal of Business and Management Review, 13(8), 82-101, 2025

Print ISSN: 2052-6393(Print)

Online ISSN: 2052-6407(Online)

Website: https://www.eajournals.org/

Publication of the European Centre for Research Training and Development-UK

Purchasing Power Parity Conversion Factor and Price Level Ratio as Determinants of Manufacturing Sector Capacity Utilization in Nigeria

Priscilia Ngozi Ugwu
Department of Accountancy, Enugu State Polytechnic, Aguobu-Iwollo

doi: https://doi.org/10.37745/ijbmr.2013/vol13n882101 Published October 06, 2025

Citation: Ugwu P.N. (2025) Purchasing Power Parity Conversion Factor and Price Level Ratio as Determinants of Manufacturing Sector Capacity Utilization in Nigeria, *International Journal of Business and Management Review*, 13(8), 82-104

Abstract: *This study examined the effect of purchasing power parity (PPP) conversion factor and price level ratio (PLR) on manufacturing sector capacity utilization in Nigeria from 1990 to 2023. The study employed an ex-post facto research design; secondary data were sourced from the Central Bank of Nigeria Statistical Bulletin and the World Bank Database. The dependent variable, capacity utilization, was proxied by average manufacturing utilization rate (AMCUR), while the independent variables were PPP conversion factor and PLR. Control variable included lending interest rate (LINTR). The Autoregressive Distributed Lag (ARDL) bounds test model was used to analyze the short-run and long-run relationships between the variables. Findings showed that the PPP conversion factor has a significant negative effect (coefficient = -0.3242, p = 0.0372), suggesting that rising domestic prices relative to foreign prices hinder manufacturing competitiveness. The PLR has a significant positive effect (coefficient = 68.5624, p = 0.0152), which may indicate that higher relative price levels (making Nigeria less affordable compared to international benchmarks) paradoxically enhance capacity utilization, potentially due to nominal output growth or data artifacts; however, this finding is counterintuitive and warrants further investigation. Control variables LINTR, was insignificant in the long run. The error correction term (-0.8899, p = 0.0000) confirms a stable long-run equilibrium, with 89% of deviations corrected per period. The model explains 66% of AMCUR variation (Adjusted R² = 0.66). Recommendations include stabilizing the exchange rate, strengthening the naira's purchasing power, and controlling inflation to improve manufacturing capacity utilization.*

Keywords: Manufacturing capacity utilization, purchasing power parity, price level ratio, ARDL model

INTRODUCTION

The rate of capacity utilization generally known as capacity utilization rate (CUR) is a critical measure of industrial performance as it reflects the extent to which firms or economies are using their installed capacity to generate goods and services (Klenton & Murry, 2022). It represents the ratio of actual output to potential output if full capacity were deployed. This measure has important implications for efficiency, as higher CUR values reduce per-unit production costs and enhance competitiveness, while lower CUR values indicate inefficiency, wastage, and underperformance (Singh, Sharma & Kaur, 2021). Scholars such as Osigwe and Obi (2015) argue that business shocks often disrupt production, thereby affecting how firms allocate fixed costs and utilize available capacity. In this way, CUR serves as a vital indicator of both firm-level and economy-wide efficiency.

The history of manufacturing sector in Nigeria, has witnessed a dwindling capacity utilization rate compared to advanced economies of the world. Between 2008 and 2022, Nigeria averaged about 55% capacity utilization, far below countries such as New Zealand (91.65%) and Canada (83.8%), despite their smaller populations (World Bank, 2022). This underperformance is linked to several structural challenges, including weak infrastructure, poor financing, inadequate investment in technology and innovation, policy environment and high production costs. The inability to fully mobilize industrial resources has left the Nigerian manufacturing sector fragile and import-dependent. As a result, fluctuations in macroeconomic indicators such as the purchasing power parity (PPP) conversion factor and the price level ratio have significant implications for manufacturing performance.

The purchasing power parity conversion factor is used to compare the relative value of currencies by adjusting for price differences across countries. A rising PPP conversion factor often indicates that a domestic currency is weaker in real terms, leading to higher costs for imported inputs critical to production. In Nigeria's case, the persistent depreciation of the naira, when measured through PPP, reflects low productivity and overdependence on imports (Usim, 2022). This condition raises input costs for manufacturers, reduces competitiveness, and contributes to low-capacity utilization. Instead of benefiting from cheaper exports as predicted by standard devaluation theory (Khan & Ali, 2016), Nigerian manufacturers often face declining productivity and efficiency due to structural constraints.

Similarly, the price level ratio, which measures the relative cost of goods and services across countries, influences both the demand for manufactured goods and the cost of production. A high domestic price level ratio makes locally produced goods less competitive both at home and abroad, while also eroding consumer purchasing power. This often results in lower demand, reduced production quotas, and underutilization of capacity (Ezie, Eze & Agbo, 2020). Thus, fluctuations in Nigeria's price level ratio directly affect how efficiently firms are able to operate. When inflation and cost pressures remain unchecked, firms are unable to maintain optimal utilization of their production facilities.

The persistent underperformance of Nigeria's manufacturing capacity utilization can be traced to both domestic inefficiencies and adverse macroeconomic conditions. While structural problems such as poor power supply and insecurity continue to constrain production, international competitiveness is further eroded by unfavorable trends in PPP and price level ratios. Nigeria's capacity utilization, which peaked at 61% in 2019, declined to 55% in June 2023 (CEIC Data, 2024). These fluctuations underscore the need to investigate how PPP conversion factors and price level ratios determine the extent of capacity utilization in the manufacturing sector. This study therefore examines these two variables as key drivers of capacity utilization in Nigeria's manufacturing sector from 1990 to 2023.

REVIEW OF RELATED LITERATURE

Naira Devaluation

Naira devaluation refers to the decrease in the value of the Nigerian currency, the naira in relation to foreign currencies, 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.

Purchasing Power Parity

Purchasing power parity (PPP) is the measurement of prices in different countries that uses the prices of specific goods to compare the absolute purchasing power of the countries' currencies, and, to some extent, their people's living standards. In many cases, PPP produces an inflation rate equal to the price of the basket of goods at one location divided by the price of the basket of goods at a different location. The PPP inflation and exchange rate may differ from the market exchange rate because of tariffs, and other transaction costs (Kadochnikov, 2013). The Purchasing Power Parity indicator can be used to compare economies regarding their Gross Domestic Product, labour productivity, and actual individual consumption, and in some cases to analyse price convergence and to compare the cost of living between places (OECD, 2022). The calculation of the PPP, according to the OECD, is made through a basket of goods that contains a "final product list which covers around 3,000 consumer goods and services, 30 occupations in government, 200 types of equipment goods and about 15 construction projects" (OECD, 2022).

Price Level Ratio

The price level ratio is the ratio of a purchasing power parity (PPP) conversion factor to the market exchange rate, and it is used to compare price levels across countries. It shows how many units of a common currency, such as the US dollar, are needed to purchase the same quantity of goods and services in each country. This ratio is essential for making accurate international comparisons of living standards, cost of living, and real income (World Bank, 2022). A price level ratio higher than 1 means that a country is more expensive than the base country, while a ratio below 1 indicates that it is cheaper. This makes it a useful tool for economists, investors, and policymakers who want to understand economic conditions beyond what exchange rates alone can reveal (OECD, 2022). PPPs help eliminate distortions caused by price level differences, offering a more realistic comparison of economic indicators like GDP, household consumption, and poverty levels across countries (Deaton & Heston, 2010; Ravallion, 2012). For instance, two countries may have the same nominal GDP, but when adjusted for PPP and price level ratio, one may turn out to have a significantly higher or lower real standard of living (World Bank, 2021). This is particularly important in developing countries, where exchange rates often do not reflect domestic purchasing power due to inflation, currency controls, or market inefficiencies (Sulaiman et al., 2020). Therefore, the price level ratio plays a vital role in capturing the true economic value of money and goods across different economies.

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 study is anchored on the Purchasing Power Parity (PPP) Theory developed by Gustav Cassel in 1916. This theory seeks to explain how exchange rates between two currencies adjust to reflect equal purchasing power. In essence, the cost of a similar good should be the same in both currencies when adjusted by the exchange rate. This process defines the purchasing power of each currency. PPP implies that a unit of currency should purchase the same quantity of goods in any country. According to Sulaiman et al. (2020), many economists agree that PPP explains long-term exchange rate movements. The nominal exchange rate must mirror price levels between two currencies. PPP also links exchange rates to inflation, stating that currency values adjust in line with relative inflation rates. If there are no trade restrictions or transport costs, prices of goods become equal across nations. PPP can be expressed in absolute terms. Absolute PPP states that the exchange rate equates purchasing power of income based on relative prices. It provides a basis for comparing prices through exchange rates. The relative form states that exchange rate movements from a base year mirror inflation difference.

Assumptions of Purchasing Power Parity Theory

PPP is a widely used macroeconomic tool for comparing productivity and living standards between countries. It uses a “basket of goods” method to assess currency values. Under PPP, currencies are equal when the basket of goods costs the same in both nations, after accounting for exchange rates. This study on Naira devaluation is tied to the theory due to the significant gap between the purchasing power of the naira and the US dollar. For instance, the $100 equivalent in Nigeria equals ₦75,000 in value for similar goods. Therefore, this study relies on the PPP theory as it best explains the naira’s persistent fall in the parallel exchange market.

Empirical Review

Scholars have devoted considerable attention to the relationship between exchange rates, capacity utilization, and manufacturing performance in developing economies, particularly Nigeria. Uche and Nwamiri (2021) used a non-linear autoregressive distributed lag model to examine asymmetric pass-through effects of exchange rates on productivity. Their findings showed that while depreciation of the naira reduced output in the short run, neither depreciation nor appreciation had any long-run effect, reflecting a structural misalignment between exchange rate movements and productivity growth in Nigeria. In Tunisia, Rhamouni (2021) analyzed firm-level capacity utilization using fractional regression models and found that while larger firms tended to utilize capacity better, political instability and reliance on export experience reduced efficiency, emphasizing the influence of institutional and firm-specific factors on utilization outcomes.

Several Nigerian studies have also highlighted the consequences of exchange rate volatility. Onwuka (2022) employed ARCH/GARCH and ARDL models to establish that exchange rate volatility, alongside interest and inflation rates, negatively affected long-run manufacturing performance, although imports and gross capital formation supported growth. Similarly, Nwikina et al. (2025), using real exchange rate, external reserves, and trade openness as proxies, found that real exchange rates had a significant negative effect on manufacturing GDP, while reserves and openness supported sectoral performance. Abiola (2025) reinforced these findings with ARDL techniques, showing that exchange rate volatility had only a partial and statistically insignificant effect on manufacturing growth, suggesting that other macroeconomic and policy factors remain decisive in shaping outcomes.

Evidence from other African countries complements these findings. Kamugisha and Assoua (2020) in Uganda showed that while real exchange rates influenced trade balances only in the short run, income levels were a stronger determinant of trade outcomes both in the short and long run. In Nigeria, Ogunleye (2022) established, using ECM and Granger causality tests, that currency depreciation increased output in the long run but constrained it in the short run, while Iboma (2022) similarly found that nominal exchange rate depreciation improved the trade balance only in the long run. Together, these results suggest that the short-run effects of exchange rate depreciation are largely adverse for production and trade, while any potential gains materialize only under favorable long-run structural conditions.

Beyond exchange rates, studies have also examined capacity utilization as a direct determinant of manufacturing performance. Ihenyen et al. (2024) found significant sectoral differences: capacity utilization in food and beverages and oil refining positively influenced manufacturing output, while cement capacity utilization had a negative but significant impact. Okeke et al. (2025) further showed that exchange rates, interest rates, and inflation shaped both growth and utilization outcomes, with high costs suppressing performance. In contrast, bank credit and lower lending rates improved utilization, while human capital and trade openness played minor roles. Ezie et al. (2020) earlier confirmed that exchange rates had significant long-run effects on manufacturing output, while Okunade (2020) found that although capacity utilization was positively linked to output, the effect was statistically insignificant because of chronic underutilization across industries.

Recent studies have also emphasized the institutional, infrastructural, and policy-related factors behind persistent underutilization in Nigeria. Omhonria and Needon (2022), through firm-level surveys, demonstrated that capacity improvement strongly enhanced organizational performance, particularly in goal attainment and efficiency. Alugbuo (2023) identified electricity supply as a significant short-run determinant of manufacturing utilization, while labor force dynamics and lending interest rates had mixed but important effects across time horizons. Chegwe et al. (2025) added another dimension by showing that inflation, though harmful in perception, did not significantly affect returns on manufacturing investment over the last decade. Collectively, these studies reveal that Nigeria's manufacturing capacity utilization is not only constrained by volatile exchange rates but also by institutional inefficiencies, weak infrastructure, and inconsistent macroeconomic conditions, underscoring the multi-dimensional determinants of industrial performance.

Most empirical studies on capacity utilization in Nigeria have focused on macroeconomic variables such as exchange rate volatility, inflation, interest rate, energy cost, infrastructure, and foreign direct investment as determinants (Akinlo, 2021; Uchenna & Okonkwo, 2020). While these factors are important, little attention has been given to international price competitiveness indicators like the Purchasing Power Parity (PPP) conversion factor and Price Level Ratio, which capture the relative cost of goods and services across countries and their effect on domestic productive capacity. In fact, existing literature in Nigeria has not adequately examined how international price disparities and exchange-adjusted purchasing power conditions influence the ability of the manufacturing sector to fully utilize its installed capacity. Therefore, this study fills the gap by introducing PPP conversion factor and price level ratio as explanatory variables for capacity utilization in Nigeria's manufacturing sector, offering a more globally integrated perspective to the discourse. This provides fresh insights that extend beyond traditional domestic determinants and highlights how international price dynamics shape local industrial performance.

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:

$$AMCUR = F\ (PPP, PLR) \qquad \text{[Equation (1)]}$$

$$AMCUR_{it} = \beta_0 + \beta_1 PPP_{it} + \beta_2\ PLR_{it} + c_{it} + \varepsilon_{it} \qquad \text{[Equation (2)]}$$

Introducing the control variables, we have:

$AMCUR_{it} = \beta_0 + \beta_1 PPP_{it} + \beta_2 PLR_{it} + \beta_3 LINTR_{it} + c_{it} + \varepsilon_{it}$ [Equation (3)]

Where;

AMCUR: Average Manufacturing Capacity Utilization Rate

PPP: Purchasing Power Parity Conversion Factor

PLR: Price Level Ratio

LINTR: Lending Interest Rate

β_0 is the constant term or intercept for firm *i* in the year t. β_1, β_2, and β_3, are linear regression coefficients to be estimated. c_{it} is the non-observable individual effect while ε_{it} is the disturbance or error term for firm *i* in the year t.

Building equations (3) into an ARDL model, we have:

$$\Delta AMCUR = a_0 \sum + \sum_{i=1}^{m} \propto {}_2^i \log(PPP)_{t-1} + \sum_{i=1}^{m} \propto {}_3^i \log(PLR)_{t-1} + \sum_{i=1}^{m} \propto {}_4^i \log(LINTR)_{t-1} \quad \text{[Equation (4)]}$$

Once a long-run association is established between the variables in equation (4) the study proceeded to examine the long-run effect and the short-run dynamics using the unrestricted Error Correction Model (ECM) approach.

$$\Delta AMCUR = \alpha_0 + \alpha_1 \Delta AMCUR_{(t-i)} + \alpha_2 \Delta(PPP)_{(t-i)} + \alpha_3 \Delta(PLR)_{(t-i)} + \alpha_4 \Delta(LINTR)_{(t-i)} + \delta ECT_{(-1)} + \mu_t \quad \text{[Equation (5)]}$$

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 purchasing power parity (PPP) conversion factor and price level ratio (PLR) on manufacturing sector capacity utilization in Nigeria in equation (5) 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

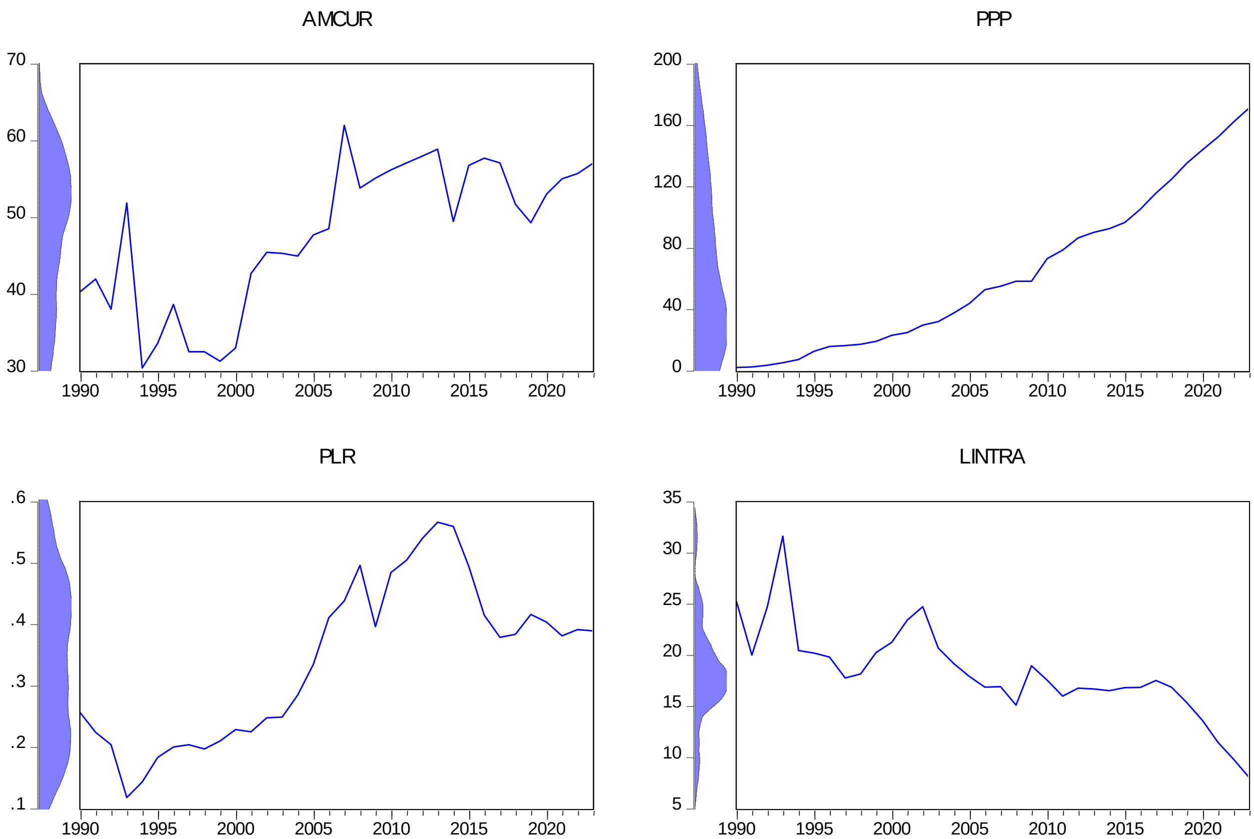

Figure 1: Graphical Representation of Variable Trends (1990-2023)

Source: Eviews 10.0 Statistical Software, 2025

Figure 1 above shows the time trends of the variables from 1990 to around 2023. The trend analysis reveals that the relationship between AMCUR and the selected variables is mixed. Purchasing Power Parity (PPP) rose sharply over the years, but AMCUR did not follow proportionately, suggesting only a weak and inconsistent positive association, as rising PPP did not guarantee higher manufacturing utilization. The Price Level Ratio (PLR), on the other hand, shows a more direct influence, with improvements in PLR generally coinciding with higher AMCUR up to the mid-2010s, although the relationship weakened afterwards when PLR declined while AMCUR remained relatively stable. Lending Interest Rate (LINTR) displays the clearest pattern, with high rates in the 1990s associated with low AMCUR and declining rates from the 2000s onward supporting higher utilization levels. Overall, the evidence points to a weak link between AMCUR and PPP, a moderately positive link with PLR, and a strong negative link with lending interest rates

Table 4.2.1: Descriptive Statistic for the Variables Under Study

Variable	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability	Observations
AMCUR	47.75435	9.514814	-0.471934	1.924511	2.900715	0.234486	34
PPP	63.32094	51.61351	0.592304	2.141996	3.030915	0.219708	34
PLR	0.340861	0.129711	0.095955	1.812326	2.050483	0.358710	34
LINTR	18.35608	4.466760	0.403898	4.490233	4.070548	0.130645	34

Source: Eviews 10.0 Statistical Software, 2025

Table 4.2.1 presents the descriptive statistics for the variables under study based on 34 observations. The average manufacturing capacity utilization rate (AMCUR) is 47.75% with a standard deviation of 9.51, indicating moderate variability in utilization across the period. Purchasing Power Parity (PPP) has a mean of 63.32 with a relatively high standard deviation of 51.61, showing substantial fluctuations in parity levels over time. The Price Level Ratio (PLR) records a mean value of 0.34 with a standard deviation of 0.13, reflecting lower relative domestic price levels compared to international standards, with limited variation. The lending interest rate (LINTR) averages 18.36% and displays moderate variation with a standard deviation of 4.47.

In terms of distributional properties, AMCUR and PLR show slight negative and near-zero skewness respectively, suggesting relative symmetry, while PPP and LINTR exhibit mild positive skewness, indicating longer right tails. The kurtosis values show that AMCUR, PPP, and PLR are platykurtic (flatter than normal distribution), whereas LINTR is leptokurtic, suggesting heavier tails and greater concentration around the mean. The Jarque-Bera test statistics and their corresponding probabilities (all above 0.05) indicate that the null hypothesis of normality cannot be rejected for any of the variables. This suggests that the data series are approximately normally distributed, thereby validating the use of parametric techniques for subsequent regression analysis.

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)
PPP	4.9967	-2.9540	_	_	I(0)
PLR	-1.0054	-2.9540	4.8733	-2.9571	I(I)
LINTR	-1.6827	-2.9540	6.9974	-2.9571	I(I)

Source: Eviews 10.0 Statistical Software, 2025

Table 4.2.2 presents the Augmented Dickey-Fuller (ADF) unit root test results for the variables under study. The results indicate that AMCUR, PLR, and LINTR are non-stationary at levels since their ADF statistics (–1.9251, –1.0054, and –1.6827 respectively) are greater than the 5% critical value of –2.9540. However, after first differencing, their ADF statistics (8.7309, 4.8733, and 6.9974) exceed the 5% critical value of –2.9571 in absolute terms, confirming stationarity at first difference. This means these variables are integrated of order one, I(1). In contrast, PPP is stationary at level, as its ADF statistic of 4.9967 lies beyond the 5% critical threshold of –2.9540, implying it is integrated of order zero, I(0). The mix of I(0) and I(1) variables indicates that the dataset is suitable for econometric techniques such as the Autoregressive Distributed Lag (ARDL) model, which can accommodate variables of different integration orders provided none is integrated of order two or higher. This justifies the choice of methods applied in the subsequent regression analysis.

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	3	5%	2.27	3.28

Source: Eviews 10.0 Statistical Software, 2025

The F-Bounds test result in Table 4.2.3 shows that the calculated F-statistic (5.6206) is greater than the upper bound critical values (I(1)) at all conventional significance levels (10 percent = 2.94, 5 percent = 3.28). The null hypothesis for this test states that there is no long-run relationship among the variables. Since the F-statistic exceeds the upper bounds, we reject the null hypothesis. This means there is strong statistical evidence that a long-run or cointegrated relationship exists among the variables in the model. With three explanatory variables (k = 3), the test confirms that despite possible differences in the order of integration (some variables are I(0), others I(1)), they are related in the long term. This justifies the use of an ARDL model that includes both long-run and short-run dynamics in the 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		
PPP	-0.324194	0.146197	-2.217513	0.0372
PLR	68.56237	26.22477	2.614413	0.0152
LINTR	0.644279	0.465657	1.383595	0.1804
C	30.47141	376.2221	0.080993	0.9362
		Short Run Results		
D(PPP)	0.589419	0.166480	3.540475	0.0018
D(PLR)	-38.01278	20.62742	-1.842828	0.0789
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 test results in Table 4.2.4 show both long-run and short-run dynamics of the relationship between AMCUR and the explanatory variables. In the long run, PPP has a negative and statistically significant effect on AMCUR (coefficient = –0.324, p = 0.0372), suggesting that higher purchasing power parity weakens manufacturing capacity utilization, possibly due to loss of competitiveness from relative price distortions. On the other hand, PLR has a strong positive and significant effect (coefficient = 68.56, p = 0.0152), indicating that improvements in relative domestic price levels support higher capacity utilization in the manufacturing sector. Lending interest rate (LINTR) has a positive but statistically insignificant effect (coefficient = 0.644, p = 0.1804), implying that interest rate fluctuations do not have a strong long-term impact on manufacturing utilization within the study period.

In the short run, PPP exerts a significant positive effect (coefficient = 0.589, p = 0.0018), meaning immediate increases in purchasing power improve manufacturing utilization, even though the long-run effect is negative. Conversely, PLR shows a negative but weakly significant short-run effect (coefficient = –38.01, p = 0.0789), suggesting short-term price adjustments may temporarily constrain utilization. The error correction term (ECT) is negative and highly significant (–0.8899, p = 0.0000), confirming a strong speed of adjustment of about 89% towards long-run equilibrium each year when shocks occur. The model's overall fit is robust, with R^2 = 0.69 and Adjusted R^2 = 0.66, while the F-statistic (13.99, p = 0.0000) confirms joint significance of the explanatory variables. The Durbin-Watson statistic (2.07) indicates no autocorrelation, strengthening the reliability of the estimates.

Diagnostic Tests

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 4.3.1: 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 test in Table 4.3.1 shows no evidence of serial correlation. The F-statistic (0.3333, p = 0.7205) and the Obs*R-squared (1.0644, p = 0.5873) are both not significant. This means the model's residuals are not serially correlated.

Table 4.3.2: 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 Breusch-Pagan-Godfrey test results in Table 4.3.2 shows no evidence of heteroskedasticity. The F-statistic (0.5517, p = 0.8345) and the Obs*R-squared (6.6160, p = 0.7611) are not statistically significant. This means the error terms have constant variance, and the model does not suffer from heteroskedasticity.

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.

Hypothesis One

H_0: Purchasing power parity (PPP) conversion factor does not have a significant effect on average manufacturing capacity utilization rate.

H_1: PPP conversion factor has a significant effect on average manufacturing capacity utilization rate.

Presentation of Test Result

From Table 4.2.2, the coefficient of PPP is –0.324194, the t-statistic is –2.218, and the p-value is 0.0372.

Decision: Since the |t-stat| = 2.218 > 2.0 and p-value = 0.0372 < 0.05, we reject the null hypothesis and accept the alternate. The PPP conversion factor has a statistically significant negative effect on manufacturing capacity utilization. This implies that a rise in PPP (which reflects relative inflation differences between Nigeria and the U.S.) may be associated with a decline in utilization capacity in manufacturing.

Hypothesis Two

H_0: Price level ratio (PLR) have no significant effect on average manufacturing capacity utilization rate.

H_1: PLR has a significant effect on average manufacturing capacity utilization rate.

Presentation of Test Result

From Table 4.2.2, the coefficient of PLR is 68.56237, the t-statistic is 2.614, and the p-value is 0.0152.

Decision: Since the |t-stat| = 2.614 > 2.0 and p-value = 0.0152 < 0.05, we reject the null hypothesis and accept the alternate. The price level ratio has a statistically significant and positive effect on average manufacturing capacity utilization. This suggests that improvements in relative price competitiveness (as measured by PLR) support better capacity utilization in Nigeria's manufacturing sector.

DISCUSSION OF FINDINGS

Effect of Purchasing Power Parity Conversion Factor on Average Manufacturing Capacity Utilization Rate

The negative and significant effect of the Purchasing Power Parity (PPP) conversion factor on manufacturing capacity utilization (AMCUR) in the long run suggests that as the relative price of goods in Nigeria becomes higher compared to its trading partners, manufacturing activity reduces. This can be explained by the fact that a higher PPP conversion factor indicates rising prices domestically compared to international markets, which is often caused by local inflation or currency depreciation. In a country like Nigeria, where many manufacturing firms rely heavily on imported raw materials, components, and machinery, higher PPP values signal higher import costs. As the cost of imported inputs rises, production becomes more expensive, leading to reduced profitability and discouragement of expansion. When manufacturing becomes more costly due to unfavorable international price comparisons, producers may either cut down operations or shift to less resource-intensive production, which lowers capacity utilization. Thus, in the long term, persistent increases in relative prices compared to trading partners result in declining competitiveness of Nigerian manufacturers, causing under-utilization of installed production capacity.

Empirical studies support this interpretation. For instance, Ogunleye (2022) found that currency depreciation (which affects PPP) had a positive effect on domestic output in the long run but a negative one in the short run. This suggests that while firms eventually adjust to relative price changes, the initial impact is usually disruptive. In support of this, Iboma (2022) showed that currency devaluation improves the trade balance only in the long run, indicating that changes in PPP take time to produce benefits and are initially harmful. Also, Kamugisha and Assoua (2020), in their study of Uganda, confirmed that real exchange rates (which closely relate to PPP) had short-run effects on trade balances but not in the long run, highlighting that PPP-related dynamics affect external competitiveness in complex ways. In the Nigerian context, Okeke et al. (2025) found that high exchange rates and interest rates – both influenced by PPP – significantly hinder manufacturing growth. This supports the view that increasing cost structures caused by unfavorable PPP movements reduce output and discourage optimal use of capacity. It also means that unless price disparities between Nigeria and its trading partners are managed, manufacturers will continue to operate below capacity due to cost pressures.

Interestingly, the short-run effect of PPP was found to be positive and significant, suggesting that temporary improvements in price competitiveness can stimulate quick gains in manufacturing activity. For instance, when the naira strengthens slightly or when inflation stabilizes temporarily, manufacturers may experience brief relief from high costs, allowing for a short-term rise in capacity use. This aligns with Uche and Nwamiri (2021), who found an asymmetric effect of exchange rate on productivity, where depreciation worsened productivity in the short term, indicating that initial reactions to price changes often lead to unstable outcomes. The short-run positive PPP effect may reflect producers' ability to take advantage of momentary improvements in input affordability or export competitiveness before the longer-term negative impacts of inflation and currency pressure set in. However, for these short-term benefits to translate into sustainable capacity utilization, supportive policies are needed. These include stable pricing systems, local sourcing of inputs, reduced dependence on imports, and macroeconomic stability. Without such support, the long-term negative effect of unfavorable PPP on manufacturing capacity utilization may continue to dominate, limiting Nigeria's industrial growth potential. Therefore, this study's finding confirms the need to maintain a balance between domestic price stability and international competitiveness to enable the manufacturing sector to grow and fully utilize its production potential.

4.4.2 Effect of Price Level Ratio on Average Manufacturing Capacity Utilization Rate

The Price Level Ratio (PLR), which measures the ratio of domestic prices to international prices adjusted by purchasing power parity, is an important determinant of manufacturing capacity utilization. A strong and positive long-run effect of PLR on manufacturing capacity utilization (AMCUR) suggests that when domestic prices become more aligned with or even lower than international prices, local manufacturing becomes more competitive. This means that Nigerian-produced goods are relatively cheaper or fairly priced compared to imported alternatives, increasing demand for locally manufactured products both at home and in foreign markets. The improved demand encourages firms to expand their operations and utilize idle capacity. A favorable PLR also implies that the domestic economy is achieving price efficiency and reducing distortions often caused by inflation, subsidies, or currency volatility. When domestic prices are not excessively high relative to global benchmarks, it signals a more stable and predictable macroeconomic environment, which fosters investment in machinery, technology, and workforce, all of which enhance production capacity.

This relationship is supported by several empirical studies. For example, Okunade (2020), using ARDL models for Nigeria from 1981 to 2016, found that capacity utilization has a positive relationship with output, although it was statistically insignificant due to chronic underutilization in Nigeria's manufacturing sector. This finding indirectly underscores the importance of factors like price stability and competitive pricing, which could improve utilization. Similarly, Omhonria and Needon (2022) in a cross-sectional study of firms in Rivers State showed that improvements in production capacity are strongly linked with better operational efficiency and goal attainment. These operational improvements are more likely when pricing conditions, such as those reflected by a favorable PLR, support planning and cost management.

Additionally, Alugbuo (2023) found that while electricity consumption positively influenced capacity utilization, lending interest rates and labor force dynamics also played crucial roles, especially in the short run. A favorable PLR may lower production costs and ease inflationary pressures, which in turn makes interest rates more manageable for manufacturers. When inflation is stable, businesses can better plan, price, and finance their production, leading to more optimal utilization of their capacity. Supporting this, Chegwe et al. (2025) showed that inflation, although statistically insignificant for investment returns, still plays a role in shaping investor expectations. A stable PLR helps avoid erratic price changes that scare investors away from capital-intensive sectors like manufacturing.

Furthermore, Ezie et al. (2020) noted that exchange rate changes significantly impact manufacturing output, which can be interpreted through the lens of price competitiveness. When exchange rates and inflation are well managed, it reflects in the PLR, making domestic goods more competitive. The result is improved manufacturing performance, as firms are able to export more or compete with imports. Even Okeke et al. (2025) found that high inflation and interest rates negatively affect capacity utilization, while improved bank credit access and a more stable macroeconomic environment (reflected through a stable PLR) support expansion.

CONCLUSION AND RECOMMENDATIONS

The rapid depreciation of the naira in foreign exchange markets impacts various economic activities, including importation, exportation, and local market prices. Currency depreciation increases the cost of raw materials, leading to higher goods prices and reduced demand, which adversely affects manufacturing firms' ability to maximize productive capacity. This study examined the interaction between naira depreciation, purchasing power parity (PPP) conversion factor, price level ratio (PLR), and manufacturing sector capacity utilization in Nigeria from 1990 to 2023. Using the Autoregressive Distributed Lag (ARDL) analysis, the PPP conversion factor was found to have a significant negative effect, indicating that rising domestic prices relative to foreign prices reduce manufacturing competitiveness due to higher input costs. The PLR showed a significant positive effect, suggesting that higher relative price levels enhance capacity utilization. However, this finding is counterintuitive, as a higher PLR (PPP divided by market exchange rate) implies that Nigerian goods are relatively more expensive, which should reduce demand and competitiveness, particularly in an import-dependent economy. Possible explanations include multicollinearity between PPP and PLR (as PLR is derived from PPP), nominal output growth masking real declines, or data artifacts from base year choices in PLR calculations. Further robustness checks, such as using real effective exchange rates or alternative price indices, are recommended to validate this result. The control variable, lending interest rate (LINTR), was insignificant in the long run, suggesting limited impact on capacity utilization over the study period. The analysis confirmed a stable long-run equilibrium, though the adjustment speed is unusually rapid for annual data, potentially indicating overfitting or small-sample bias with only 34 observations.

The negative long-run effect of PPP on manufacturing capacity utilization underscores the need to address rising import costs and ensure macroeconomic stability. The government should implement policies to reduce inflation and stabilize the naira's real value relative to other currencies. Promoting local production of currently imported goods, such as petrochemicals, steel, and machine parts, can reduce dependence on foreign inputs and enhance cost-efficiency. Manufacturers should also be supported with access to foreign exchange at stable rates for essential inputs, alongside backward integration strategies to minimize long-term import reliance.

The positive impact of PLR on capacity utilization, while statistically significant, requires cautious interpretation due to its theoretical inconsistency. Efforts to improve the competitiveness of Nigerian-made goods should focus on maintaining price stability through sound fiscal and monetary policies. Reducing production costs via improved infrastructure (e.g., electricity, transport, water supply) is critical. Tax incentives and affordable credit access should be provided to manufacturers to encourage investment and expansion. Enhancing the ease of doing business in Nigeria will attract investors to the manufacturing sector, boost local production, and enable domestic firms to compete with imports. A predictable pricing environment will stabilize consumer demand, supporting better capacity planning.

This study builds on limited literature examining the effect of naira depreciation on the average capacity utilization of manufacturing firms in Nigeria, following Ezie, Sulaiman, and Abdelrasaq (2020). Unlike previous studies focusing on labor force, credit constraints, or electricity consumption, this study specifically investigates the roles of PPP conversion factor and PLR. The findings confirm that PPP has a significant negative effect, while PLR's positive effect, though statistically significant, is puzzling and warrants further investigation. These results provide novel insights into the macroeconomic determinants of manufacturing performance in Nigeria, but future studies should address PLR's counterintuitive effect and test model robustness with alternative specifications or larger datasets.

Acknowledgments

This study was funded from the Institution Based Research (IBR) grant awarded to me by the Nigeria Tertiary Education Trust Fund (TETFUND) at the Enugu State College of Education, Aguobu-Iwollo, Nigeria. I express my profound gratitude to TETFund for their generous funding and unwavering commitment to advancing academic research and innovation. Their support has been instrumental in the successful completion of this study.

REFERENCES

Abiola, M. O. (2025). Impact of exchange rate volatility on the manufacturing sector growth performance in Nigeria. *International Journal of Arts and Social Sciences, 13*(1), 1–9.

Alugbuo, J. C. (2023). Determinants of capacity utilization in the Nigeria manufacturing sector. *UBS Journal of Business and Economic Policy, 1*(2).

Chegwe, O., Ayewumi, F. E., & Ehiedu, V. C. (2025). Impact of inflation on manufacturing sector's investment returns. *International Journal of Academic Accounting, Finance & Management Research, 9*(2), 28–35.

Deaton, A., & Heston, A. (2010). Understanding PPPs and PPP-based national accounts. *American Economic Journal: Macroeconomics, 2*(4), 1–35.

Ezie, O., Sulaiman, A., & Abdelrasaq, N. (2020). Effect of exchange rates on manufacturing sector growth in Nigeria: 1986–2014. *FUW-International Journal of Management and Social Sciences, 1*(2&3), 1–15.

Iboma, G. E. (2022). Analysis of the effects of currency devaluation on the trade balance and economic growth in Nigeria. *Multidisciplinary Journal of Research Development, 31*(1), 1–10.

Ihenyen, C. J., Ogwu, F. E., & Abraham, T. K. (2024). Manufacturing capacity utilization and growth of manufacturing industry in Nigeria. *International Peer-Reviewed Journal, 8*(4).

Kamugisha, G., & Assoua, J. E. (2020). Effects of a devaluation on trade balance in Uganda: An ARDL cointegration approach. *International Journal of Economics and Finance, 12*(7).

Kang, J. W. (2016). International trade and exchange rate. *ADB Economics Working Paper Series, 498*.

Kang, S. M., & Kim, M. H. (2015). Short-run cost minimization and capacity utilization of regional public hospitals in South Korea. *Modern Economy, 6*(1), 21–29.

Khan, Z., Ali, A., & Ali, S. (2016). Impact of devaluation on the balance of trade: A case study of Pakistan economy. *Asian Journal of Economic Modelling, 4*(2), 90–94.

Klenton, W., & Murry, C. (2022). Capacity utilization rate. *Investopedia.* https://www.investopedia.com/terms/c/capacityutilizationrate.asp

Nelson, R. A. (2019). On the measurement of capacity utilization. *The Journal of Industrial Economics, 37*(3), 273–286.

Nwikina, C. G., Wadi, E. O., Wilson, K. G., & Edi, M. F. (2025). Exchange rate and performance of manufacturing industry. *Global Academics Journal of Economics and Business, 7*(1), 28–39.

OECD. (2022). *Purchasing power parities (PPPs)*. Organisation for Economic Co-operation and Development.

Ogunleye, A. G. (2022). How far does currency depreciation affect domestic output in Nigeria? *BERJAYA Journal of Services and Management, 18*(1), 1–10.

Okeke, C. C., Ugwunna, O. T., Akamobi, O. G., & Ejefobihi, U. F. (2025). Macroeconomic variables and manufacturing sector growth in Nigeria. *Journal of Policy and Development Studies, 18*(2), 21–32.

Okunade, S. O. (2020). Effect of capacity utilisation on manufacturing firms' production in Nigeria. *Global Journal of Management and Business Research: Economics and Commerce, 18*(1), 1–15.

Omhonria, O. D., & Needorn, R. S. (2022). Production capacity improvement and organizational performance of manufacturing firms in Rivers State, Nigeria. *International Journal of Advanced Academic Research, 8*(1), 13–29.

Oniyide, F. V., & Ogunjinmi, O. O. (2021). Effect of manufacturing capacity utilization on economic growth: An empirical evidence of Nigeria. *International Journal of Research and Scientific Innovation, 8*(5), 39–48.

Onwuka, E. C. (2022). Exchange rate volatility and the performance of manufacturing sector in Nigeria: An econometric analysis. *Research Square, 2*(2).

Osigwe, A. C., & Obi, B. (2015). Does capacity utilization rate affect imports of raw materials in Nigeria? *International Journal of Economics and Financial Issues, 5*(2), 489–492.

Ravallion, M. (2012). Poor, or just feeling poor? On using subjective data in measuring poverty. *Policy Research Working Paper 5968*, World Bank.

Rhamouni, M. (2021). Determinants of capacity utilization by firms in developing countries: Evidence from Tunisia. *International Journal of Learning, Innovation, and Development, 13*(3), 212–245.

Singh, M., Rathi, R., & Garza-Reyes, J. A. (2021). Analysis and prioritization of lean six sigma enablers with environmental facets using the best worst method: A case of Indian MSMEs. *Journal of Cleaner Production, 279*(1), 56–78.

Sulaiman, C., Bala, U., & Yusuf, H. (2020). Exchange rate volatility and economic growth in Nigeria: An empirical investigation. *Asian Journal of Economic Modelling, 8*(2), 65–73.

Uche, E., & Nwamiri, S. I. (2021). Dynamic effects of exchange rate movements on productivity levels: New evidence from Nigeria based on NARDL. *Journal of Development Policy and Practice, 1*(2).

World Bank (2022). Metadata Glossary - Price level ratio. Retrieved from *https://databank.worldbank.org/metadataglossary/world-development-indicators/series/PA.NUS.PPPC.RF*