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Drivers of Demand for Foreign Currency and Manufacturing Output in Nigeria (1986 to 2024)

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Abstract

This paper examined the relationship between the drivers of foreign currency demand and manufacturing output in Nigeria from 1986 to 2024. The analysis employed the ARDL bounds testing approach to assess cointegration, and ARDL estimation to capture both long-run and short-run impacts. The results showed that import value had a negative and significant impact on manufacturing output, indicating that heavy reliance on imported inputs undermined industrial growth. Oil export revenue had a positive and significant impact, highlighting its role as a key source of foreign exchange for industrial financing. Remittance inflows had a positive but weakly significant effect, suggesting limited but supportive contributions to manufacturing through consumption-led demand. The Bureau de Change exchange rate showed a negative but statistically insignificant long-run effect, implying that exchange rate depreciation pressures were partly mitigated by adaptive strategies within the sector. The error correction term confirmed a moderate speed of adjustment toward equilibrium after shocks. Based on these findings, the study recommended that the Federal Ministry of Industry, Trade and Investment and the Central Bank of Nigeria promote backward integration and local content production to reduce import dependence. It further advised that the Nigerian National Petroleum Company Limited and the Ministry of Petroleum Resources allocate part of oil revenues to a Sovereign Industrial Development Fund for manufacturing infrastructure. Additionally, the Nigerians in Diaspora Commission and the CBN were encouraged to design investment-linked remittance products to channel diaspora funds into industrial ventures. Finally, the CBN was urged to deepen the official forex market to improve currency stability and ensure consistent forex access for manufacturers.

Keywords: *Manufacturing output, Foreign currency demand, Import dependence, Oil export revenue, Remittance inflows*

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Background to the Study

The global demand for foreign currency has become increasingly significant in the contemporary international financial system, playing a pivotal role in shaping economic activities and cross-border transactions. Foreign currency demand, driven by international trade, capital flows, and investment activities, highlights the interconnectedness of global markets. Globally, nations rely on foreign currency for various transactions, such as importing goods and services, repaying external debt, stabilizing exchange rates, and maintaining international reserves. This demand fluctuates based on economic activities, exchange rate policies, and geopolitical factors. For instance, the surge in global trade volumes, which reached $32 trillion in 2022, as reported by the United Nations Conference on Trade and Development (UNCTAD), highlights the importance of foreign currency in facilitating cross-border commerce and sustaining economic growth (Okonkwo & Eze, 2022). Additionally, countries with significant import dependency or external debt obligations, particularly emerging markets, experience pronounced fluctuations in their demand for foreign currency, often leading to pressure on exchange rates and foreign reserves.

In sub-Saharan Africa (SSA), the demand for foreign currency has been driven largely by the region's reliance on imported goods, external borrowing, and remittance inflows. Sub-Saharan Africa imports approximately $250 billion worth of goods annually, with critical sectors like manufacturing, healthcare, and technology dependent on imports of machinery, pharmaceuticals, and equipment (World Bank, 2023). External debt stocks in SSA have also escalated in recent years, rising from $493 billion in 2018 to $702 billion in 2022 (International Monetary Fund [IMF], 2023), further amplifying the demand for foreign currency to meet debt obligations. Meanwhile, remittance inflows, amounting to over $48 billion in 2022 (World Bank, 2023), have emerged as a key source of foreign exchange for several countries in the region. Exchange rates in SSA are often volatile, with Bureau de Change (BDC) exchange rates reflecting pressures from rising demand for foreign currency, as witnessed during the COVID-19 pandemic when several currencies in the region experienced sharp depreciations against the US dollar.

The progress of the Nigerian economy to a large extent depends on the effective and efficient management of the national resources and other macroeconomic variables such as manufacturing output, exchange rate, demand of foreign currencies among others. The demand for foreign currency is intricately linked to its economic structure and trade dynamics. Nigeria's economy is heavily reliant on oil exports, which account for over 80% of foreign exchange earnings. However, the country's import dependency, particularly for refined petroleum products, industrial machinery, and food items, exacerbates the demand for foreign currency. In 2022, Nigeria's import value stood at $54 billion (Central Bank of Nigeria [CBN], 2023), reflecting the country's significant reliance on imports to meet domestic consumption and industrial needs. External debt stocks in Nigeria have also risen sharply, from $25.27 billion in 2018 to $41.69 billion in 2023 (Debt Management Office, 2023), necessitating substantial foreign exchange to service these obligations. The BDC exchange rates, which often differ from official rates, provide a barometer for foreign currency demand, with rates reaching as high as ₦1450 to $1 in 2024, signaling significant pressure on the naira.

Foreign debt service payments, which exceeded $2.4 billion in 2022 (CBN, 2024), further highlight the persistent demand for foreign currency in Nigeria.

The managers of the Nigerian economy have made several attempts to promote manufacturing output in Nigeria, but the sector remains grossly underdeveloped. The demand for foreign exchange on the other hand, continues to witness much increase over the years. Scholars have argued that the increase in the demand for foreign currency was for investment into the real sector of the economy, especially the Manufacturing sector. This argument could not be justified by the declining capacity utilization and the unimpressive performance of the industrial sector. The manufacturing output growth, a vital component of economic development, is characterized by the expansion and diversification of industrial activities, increased production capacity, and technological advancement. Globally, manufacturing sector growth has been pivotal in driving economic transformations, as seen in developed economies like the United States, Germany, and Japan, where industrialization has fueled job creation, innovation, and wealth accumulation. Emerging markets, such as China and India, have also witnessed rapid manufacturing industry growth, driven by investment in infrastructure, access to global markets, and the adoption of advanced manufacturing technologies. According to the World Bank (2023), industrial growth contributed to 23% of global GDP in 2022, underscoring its importance in fostering economic stability and resilience.

In the Nigerian context, Manufacturing output has been uneven, hampered by structural challenges, inadequate infrastructure, and a lack of access to critical inputs. Despite contributing approximately 25% to GDP in 2022 (National Bureau of Statistics [NBS], 2023), Nigeria's industrial sector remains underdeveloped, with limited capacity to compete in global markets. The manufacturing sub-sector, a critical driver of industrial growth, has been constrained by high production costs, erratic power supply, and limited access to finance. Additionally, the country's reliance on imported raw materials and machinery has exposed the industrial sector to fluctuations in foreign currency availability and exchange rates. For instance, manufacturers in Nigeria have faced increased costs due to the depreciation of the naira, with some reporting up to 30% increases in production expenses in 2023 (Manufacturers Association of Nigeria [MAN], 2023). These challenges have hindered the growth of industries, limiting their ability to create jobs and drive economic diversification (Bello & Agbaje, 2024).

Based on the nature and importance of the relationship between the drivers of foreign currency demand and industrial growth, this study becomes necessary as Manufacturing output and capacity utilization in key sectors have experienced significant fluctuations in recent years in Nigeria. Therefore, it is in the interest of this study to conduct an analysis of how foreign currency demand—through proxies such as Import value, Bureau de Change (BDC) exchange rates, Oil Export revenue, and Remittance inflows—has impacted Manufacturing Output in Nigeria.

Literature Review

Conceptual Reviews

Demand for foreign currency is a critical concept in international economics and finance, reflecting the need for a country's residents, firms, or government to acquire foreign exchange for various transactions. According to Adegbite & Adetayo (2020), demand for foreign currency is driven by the need to facilitate international trade, including imports of goods and services, debt servicing, capital flight, and foreign investments. These transactions require the exchange of domestic currency for foreign currency, making the demand for foreign exchange integral to an open economy. This need is further influenced by global economic trends, domestic monetary policies, and macroeconomic variables such as inflation, interest rates, and exchange rate regimes.

Gurung and Pant (2021) described the demand for foreign currency as the requirement for foreign exchange to meet international obligations, including payments for imported goods, foreign debt service, and remittances sent abroad. They emphasized that demand for foreign currency is closely tied to the trade and current account balances, as economies with significant trade deficits often experience higher demand for foreign exchange to pay for imported goods. In this context, excessive demand for foreign currency, particularly in economies with limited foreign exchange reserves, can create significant imbalances, leading to exchange rate volatility and potential economic instability.

Obi and Eze (2022) highlighted the role of structural factors in shaping the demand for foreign currency, particularly in developing economies like Nigeria. They argued that foreign currency demand is not only influenced by external trade but also by domestic factors such as production inefficiencies, import dependency, and weak industrialization. For instance, in highly import-dependent economies, industrial sectors rely on foreign exchange for the procurement of machinery, raw materials, and other inputs, leading to persistent demand pressures. Obi and Eze further linked the demand for foreign currency to speculative activities in parallel markets, where volatility and price differentials exacerbate challenges in managing exchange rates and foreign reserves.

Similarly, Adamu and Bala (2019) noted that foreign currency demand is directly linked to external debt obligations and foreign capital inflows. They posited that as countries borrow from external sources, the demand for foreign currency increases to meet debt repayment schedules, including interest payments and principal amortizations. They further stated that fluctuations in global commodity prices, such as crude oil for oil-exporting nations, can significantly influence foreign currency demand, as revenue shortfalls often necessitate higher borrowing or foreign exchange purchases to meet fiscal and trade obligations.

In the context of international trade, demand for foreign currency is also influenced by remittance inflows. Olayemi & Bello (2021), opined that remittances serve as a stabilizing factor, providing foreign exchange liquidity and reducing demand pressures in countries where inflows are substantial. However, in situations where remittance inflows decline or fail to match rising import and debt obligations, demand for foreign currency intensifies, leading to exchange rate volatility and potential inflationary pressures.

Based on the conceptual clarifications provided, this study defines demand for foreign currency as the aggregate need for foreign exchange by an economy's residents, businesses, and government to finance international trade, service external debt, stabilize exchange rates, and meet other obligations. It incorporates factors such as import value, external debt stocks, Bureau de Change (BDC) exchange rates, foreign debt service, oil export revenue, and remittance inflows, all of which interact to shape the dynamics of foreign exchange markets and their impact on industrial growth. This definition provides a comprehensive framework for analysing the variables central to this study.

Theoretical Underpinning

The Mundell-Fleming model, a cornerstone in international macroeconomics, serves as an appropriate theoretical framework for analysing the impact of foreign currency demand on Manufacturing Output in Nigeria. This model extends the Keynesian IS-LM framework to an open economy, examining the interplay between exchange rates, capital flows, and macroeconomic variables under fixed and flexible exchange rate regimes. Its relevance to this study lies in its ability to explain how external factors, such as import value, external debt stocks, Bureau de Change (BDC) exchange rates, foreign debt service, oil export revenue, and remittance inflows, interact with domestic economic activities like industrial growth in the context of an open economy like Nigeria's.

The mathematical specification of the Mundell-Fleming model is captured through three key equations: the goods market equilibrium (IS curve), the money market equilibrium (LM curve), and the balance of payments equilibrium (BP curve). In its simplest form, the model is expressed as:

IS Curve: $Y = C(Y-T) + I(r) + G + NX(e)$ (1)

Where Y is output, C is consumption, T is taxes, I is investment, G is government expenditure, NX is net exports, and e is the exchange rate.

LM Curve: $M / P = L(Y, i)$ (2)

Where; M is the money supply, P is the price level, L is liquidity demand, Y is output, and i is the interest rate.

BP Curve: $BP = NX(e) + CF(i - i^*)$ (3)

Where; BP represents the balance of payments, CF is capital flows, i is the domestic interest rate, and i^* is the foreign interest rate.

In the context of this study, the Mundell-Fleming model provides a theoretical lens to understand how demand for foreign currency, reflected through variables like import value, external debt stocks, BDC exchange rates, foreign debt service, oil export revenue, and remittance inflows—affects industrial growth. Import value is a major component of net

exports (NX) in the IS curve, and increasing import dependency typically reduces net exports, exerting downward pressure on output (Y), including industrial growth. Similarly, external debt stocks and foreign debt service influence capital flows (CF) in the BP equation, affecting foreign exchange availability and, consequently, exchange rates (e). Volatile exchange rates, such as those observed in Nigeria's parallel markets, can disrupt industrial growth by increasing the cost of imported raw materials and machinery required for production.

Empirical Review

Empirical studies on the relationship between foreign currency demand and Manufacturing output growth have been conducted globally, offering insights into the dynamics of economic variables such as import value, external debt, exchange rates, oil revenue, and remittance inflows. These studies reveal varying outcomes depending on the economic context, research design, and variables used. By analysing specific examples, it is possible to identify key patterns and methodological gaps in the literature.

Njoroge (2024) examined oil dependence and industrial vulnerability in 10 African economies from 1990 to 2021, employing dynamic panel estimations using the system GMM approach. The findings revealed that heavy oil dependence increased industrial vulnerability, particularly through exposure to global oil price fluctuations that disrupt forex supply for industrial imports. The study highlighted that diversification of foreign exchange sources is critical to mitigating this vulnerability. While the methodology effectively handled endogeneity concerns, the focus on macroeconomic vulnerability indicators limited the exploration of firm-level adaptive strategies that could buffer manufacturing against oil revenue shocks.

Onuorah (2024) investigated the impact of capital goods imports on manufacturing growth in 18 developing economies over the period 1995 to 2020. Using panel ARDL estimation, the study found that capital goods imports had a positive and significant effect on manufacturing output, as they facilitated technological upgrading and production efficiency. This result underscored the importance of strategic importation policies that prioritize productivity-enhancing inputs. However, the study did not sufficiently consider the foreign exchange constraints that may limit sustained access to such imports, especially in economies with volatile export earnings. The absence of sectoral disaggregation in manufacturing data also made it challenging to identify which subsectors benefited most from capital goods imports.

Abebe and Worku (2023) examined the role of remittance flows in driving industrial development across 22 African economies between 1995 and 2020. Using panel fixed-effects regression complemented by system GMM estimation to address endogeneity concerns, they found that remittance inflows had a positive but modest effect on industrial value-added, with the impact being stronger in countries with better financial sector development. The study highlighted that remittances contribute indirectly to industrial growth through increased consumption demand and improved access to finance for small-scale enterprises. However, the analysis largely emphasized aggregate industrial value-added without adequately disaggregating between manufacturing and other industrial subsectors, which could have

provided more nuanced insights into sector-specific effects. Additionally, the heavy reliance on secondary data without integrating qualitative measures limits the depth of understanding regarding how remittance recipients actually channel funds into productive investment.

Adusei and Gyamfi (2023) investigated the relationship between import dependence and industrial growth in 34 developing economies spanning 1990 to 2019. Applying dynamic panel estimators, including the system GMM method, they reported that higher import dependence was associated with slower industrial growth, especially in economies with persistent trade deficits. They argued that reliance on imports for industrial inputs constrained domestic value chains and weakened competitiveness. While the methodological approach effectively accounted for dynamic feedback and endogeneity, the study tended to generalize findings across diverse economies without fully controlling for structural differences in industrial capacity and technological readiness. This makes it difficult to directly apply their results to individual country contexts such as Nigeria, where import patterns are heavily skewed toward intermediate goods rather than finished consumer products.

Akinlo and Lawal (2022) explored the effects of industrial policy and import dependence on manufacturing performance in 26 sub-Saharan African countries over the period 1985 to 2018. Employing a panel cointegration framework and pooled mean group estimation, they found that industrial policies promoting local content and import substitution were positively associated with manufacturing growth, while high import dependence negatively affected manufacturing performance in the long run. The results underscored the importance of coordinated policy frameworks that reduce dependency on foreign inputs while strengthening domestic supply chains. Nonetheless, the study treated industrial policy as a broad construct, without differentiating between sector-targeted interventions and broader macroeconomic reforms, which may obscure the specific mechanisms through which policy influences manufacturing output. The data constraints for some countries also mean that the findings may underrepresent economies with weaker statistical reporting systems.

Amankwah (2024) analysed the effect of remittance inflows on manufacturing growth in five emerging Asian economies between 1990 and 2022. Using panel ARDL and error correction modeling, the study revealed that remittances had a significant and positive long-run impact on manufacturing output, largely through financing small and medium-sized enterprises and facilitating technology adoption. The findings emphasized the role of remittances as a stable source of foreign exchange that supports industrial investment. However, the study's focus on emerging Asian economies—many of which have more developed manufacturing bases and stronger institutional frameworks than African countries—limits the direct comparability of results to less industrially advanced regions. Additionally, while the analysis effectively captured long-run dynamics, it paid less attention to short-run volatility in remittance flows that may disrupt manufacturing planning and investment cycles.

Chisadza and Bittencourt (2022) investigated the role of remittances in promoting economic growth and industrial development across 37 African countries from 1980 to 2018. Using system GMM estimators to address endogeneity and dynamic panel data characteristics, they

found that remittances positively influenced economic growth, with indirect spillovers to industrial development through improved investment capacity and consumption demand. The effect was stronger in countries with deeper financial systems. However, the study primarily focused on aggregate industrial development rather than specifically examining manufacturing subsectors, making it difficult to assess sector-specific productivity effects. Additionally, the analysis relied heavily on macro-level data without incorporating microeconomic perspectives on how remittances are allocated between consumption and production.

Mensah and Twumasi (2022) assessed the relationship between oil revenues and industrial performance in 12 resource-rich African economies between 1995 and 2019. Employing panel fixed-effects and Driscoll-Kraay standard errors to control for cross-sectional dependence, they reported that oil revenues positively affected industrial performance, particularly by easing foreign exchange constraints that limit access to imported machinery and inputs. They cautioned, however, that dependence on oil revenues could expose industrial sectors to external shocks. While the empirical strategy addressed potential heteroskedasticity and autocorrelation, the analysis gave limited attention to the institutional and governance factors that can mediate the transformation of oil revenues into sustainable industrial capacity.

Mlambo and Sibanda (2023) explored how resource rents and foreign exchange availability influence manufacturing growth in 21 developing countries from 1990 to 2020. Using a panel vector error correction model (VECM), they found that resource rents enhanced manufacturing growth when accompanied by strong forex reserves, as these reduced input import costs and supported industrial investment. The study offered important insights into the forex–manufacturing linkage in resource-rich contexts. However, its emphasis on aggregated manufacturing data across diverse countries may overlook structural and policy differences that influence how resource rents translate into manufacturing productivity gains. Moreover, the study did not fully examine the volatility risks associated with resource rent dependence (Mlambo & Sibanda, 2023).

Methodology

This study made use of secondary data from 1986 to 2024. Data on Import value, Bureau De Change (BDC), Oil export revenue, and Remittances were extracted from Central Bank of Nigeria statistical bulletin (2012, 2022,2023), while the one of 2024 was extrapolated. The data was also logged to bring them to same base. E-Views software was employed for the running of the data.

Model Specification

The paper drew insights from and extended the methodological framework of Yilmaz and Kaplan (2021), who investigated the relationship between foreign currency demand and manufacturing sector performance in Turkey. Their model examined the dynamic interactions between foreign exchange market pressure, remittance inflows, and import value indices as key determinants of industrial growth, and its captured as:

$$MNFO = \beta_0 + \beta_1 FEXR_t + \beta_2 REM_t + \beta_3 IMV_t + u_t \quad (1)$$

Where;
MNFO = Manufacturing outputs
FEXR= Foreign exchange rates
REM = Remittance inflows
IMV = Import value index
$\beta_1 - \beta_3$ are the coefficients of foreign currency demand?
μ_t is the error term.

Building upon their approach, this study incorporates additional variables relevant to the Nigerian context, including Bureau De Change exchange rates, and oil export revenue, to provide a more comprehensive analysis of how foreign currency demand influences the growth of Manufacturing output Nigeria.

The empirical model for this study can be represented as:

$$MNFOt = f(IMV_t, BDC_t, OER_t, REM_t) \quad (2)$$

The functional specification of the model can be expressed as:

$$\text{MNFO}t = \alpha_0 + \alpha_1 IMV_t + \alpha_2 BDC_t + \alpha_3 OER_t + \alpha_4 REM_t + \upsilon_t \quad (3)$$

Where:
MNFO is the Manufacturing Output growth
IMV refers to Import Value
BDC signifies the BDC exchange rates
OER signifies the Oil Export Revenue
REM signifies the Remittance inflows
α_0 is the autonomous parameter.
$\alpha_1, \alpha_2, \alpha_3, \alpha_4$, are the coefficients of the respective drivers of foreign currency demand variables?
υ_t is the error term.

***A Priori* Expectations**

Based on *a priori* expectations, **import value** is expected to have a negative ($\alpha_1 < 0$) relationship with Manufacturing output growth. This is because higher import dependency typically drains foreign exchange reserves and reduces resources available for domestic industrial investment. Mundell-Flemings model however noted that this could also be the reverse where as domestic income increases, imports also increase, which can lead to a decline in net export and aggregate demand.

For **BDC exchange rates**, a negative coefficient ($\alpha_2 < 0$) is expected. Exchange rate volatility in the parallel market increases uncertainty and raises the cost of imported raw materials and machinery, which hampers Manufacturing Output growth.

The **oil export revenue** is expected to exhibit a positive ($\alpha_3 > 0$) relationship with manufacturing output growth. Higher oil earnings provide foreign exchange liquidity, stabilizing exchange rates and supporting the importation of industrial inputs and infrastructure development.

Similarly, **remittance inflows** are expected to positively ($\alpha_4 > 0$) affect manufacturing output growth. By increasing foreign exchange availability, remittances help stabilize exchange rates and finance industrial production through lower import costs and increased investment potential. Mundell-Fleming view this from remittance interactions with human capital and domestic investment dynamics.

ARDL Model Specification

According to Pesaran et al. (2001), Pesaran and Pesaran (1997), an autoregressive distributed lag model is considered as an appropriate technique for this study because findings from unit root test indicated that the orders of integration of the variables are. I(1) and I(0). As thus, ARDL model could be specified as follows:

$$\Delta MNFO_t = \beta_0 + \sum_{i=1}^{n} \beta_1 \Delta IMV_{t-1} + \sum_{i=0}^{n} \beta_2 \Delta BDC_{t-1} \sum_{i=0}^{n} \beta_3 \Delta OER_{t-1} + \sum_{i=0}^{n} \beta_4 \Delta REM_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots (4)$$

Results and Discussion

Descriptive Statistics

Descriptive statistics provide a concise summary of the main features of a dataset, offering insight into the central tendency, dispersion, and distributional properties of the variables under study. They help researchers understand the general pattern of the data before moving into more advanced econometric analysis.

Table 1: Summary Statistics

	MNFO	IMPV	BDC	OER	REM
Mean	47.17692	7408405.	185.2016	3023.299	1.04E+10
Maximum	61.00000	38170224	1419.870	8878.970	2.43E+10
Minimum	29.29000	5983.600	2.020000	8.107300	2424527.
Std. Dev.	9.538786	9716022.	267.8396	2638.602	9.85E+09
Skewness	-0.48434	1.605343	3.078311	0.353841	0.017927
Kurtosis	1.764137	4.889260	13.66771	1.947901	1.104561
Jarque-Bera	4.006732	22.55145	246.5191	2.612554	5.840211
Probability	0.134881	0.000013	0.000000	0.270826	0.053928
Observations	39	39	39	39	39

Source: Researcher's Computation Using EViews-12 (2025)

For manufacturing output (MNFO) from Table 1, the mean value of 47.18 billion naira suggests that, on average, Nigeria's manufacturing sector maintained a moderate level of

output over the study period. The range between the maximum of 61.00 billion naira and minimum of 29.29 billion naira reflects both periods of growth and significant stagnation, as seen during times of macroeconomic instability and foreign exchange shortages. The relatively low standard deviation (9.54) indicates that output changes were not extremely volatile. The negative skewness value (-0.48) implies that slightly more observations were concentrated at the higher end of the output scale, while the kurtosis value (1.76) shows a flatter distribution than the normal curve. The Jarque-Bera probability (0.13) exceeds the 5 percent significance level, suggesting that manufacturing output is approximately normally distributed.

Import value (IMPV) displays a much higher degree of variability, with an average of ₦7.41 trillion, a maximum of ₦38.17 trillion, and a minimum of just ₦5,983.6 million, reflecting Nigeria's growing dependence on imports over the years. The very large standard deviation (₦9.72 trillion) points to substantial fluctuations, likely linked to periods of currency depreciation, oil price shocks, and changes in import policy. The high positive skewness (1.61) suggests that the distribution is heavily right-tailed, driven by extreme high import values in recent years. The kurtosis value of 4.89 indicates a more peaked distribution than normal, with fatter tails, implying that extreme import values occur more often than in a normal distribution. The Jarque-Bera test (p-value = 0.000013) rejects the null hypothesis of normality, showing that import values are not normally distributed, which is consistent with the erratic nature of Nigeria's import demand.

The Bureau de Change exchange rate (BDC) exhibits high volatility, with an average rate of ₦185.20 per dollar, a maximum of ₦1,419.87, and a minimum of just ₦2.02 in 1986. The high standard deviation (267.84) underlines the significant instability in the naira's value over the study period, particularly during episodes of currency crises and structural adjustment reforms. The strong positive skewness (3.08) indicates that most exchange rates were clustered at lower levels, but extreme depreciation episodes created a long right tail. The kurtosis value of 13.67 is exceptionally high, indicating a leptokurtic distribution with extreme outliers. The Jarque-Bera p-value of 0.0000 confirms strong deviation from normality, reflecting the historical shocks that have shaped Nigeria's exchange rate environment.

Oil export revenue (OER) has an average of $3,023.30 million, with a maximum of $8,878.97 million and a minimum of $8.11 million. This wide range underscores the high dependence of Nigeria's foreign exchange earnings on oil price movements and production levels. The standard deviation (2,638.60) is large relative to the mean, indicating substantial volatility. The slight positive skewness (0.35) means the distribution is moderately right-tailed, while the kurtosis value (1.95) indicates a slightly flatter distribution than normal. The Jarque-Bera statistic (p-value = 0.27) suggests no significant departure from normality, which may be due to the cyclical nature of oil prices balancing over time. Remittance inflows (REM) average about $10.4 billion, with a maximum of $24.31 billion and a minimum of about $2.42 billion. The standard deviation ($9.85 billion) indicates notable variability, influenced by global economic conditions, migration trends, and exchange rate policies affecting diaspora remittances. The skewness value (0.018) is close to zero, indicating near symmetry in the

distribution, while the kurtosis value (1.10) is less than 3, showing a flatter-than-normal distribution. The Jarque-Bera p-value (0.054) is slightly above the 5 percent level, suggesting marginal normality in remittance data.

Unit Root Test

A unit root test is a statistical procedure used to determine whether a time series is stationary or non-stationary. The Augmented Dickey-Fuller (ADF) test is a commonly applied method for checking stationarity, where the null hypothesis assumes the presence of a unit root and rejection of the null indicates that the series is stationary.

Table 2: Summary of Unit Root Test Results

Variable	ADF Test Statistics	Critical ADF Test Statistics	Order of Integration
BDC	-3.232800	-3.215267***	I(1)
IMPV	-4.410088	-4.226815*	I(1)
MNFO	-4.218127	-3.536601**	I(1)
OER	-6.218324	-4.226815*	I(1)
REM	-3.631404	-3.533083**	I(0)

Note: The tests include intercept with trend; * and *** significant at 1 and 10 percent.
Source: Researcher's Computation Using EViews-12 (2025)

In this study, the Bureau de Change exchange rate (BDC) became stationary at first difference with an ADF test statistic of -3.232800, which is lower than the 10 percent critical value of -3.215267. Import value (IMPV) was also found to be stationary at first difference, with an ADF statistic of -4.410088 compared to the 1 percent critical value of -4.226815. This suggests that while import values have trended upward significantly due to Nigeria's structural Manufacturing output (MNFO) similarly achieved stationarity at first difference, with an ADF value of -4.218127 exceeding the 5 percent significance threshold of -3.536601. Oil export revenue (OER) was found to be stationary at first difference, recording an ADF statistic of -6.218324, well below the 1 percent critical value of -4.226815. Remittance inflows (REM) stand out as the only variable that was stationary at level, with an ADF statistic of -3.631404 against the 5 percent critical value of -3.533083.

Cointegration Test

Cointegration analysis examines whether a group of non-stationary variables share a long-run equilibrium relationship despite their short-run fluctuations. In the context of time series data, even if individual variables trend over time, cointegration implies that a specific linear combination of these variables is stationary, suggesting that they move together in the long term.

Table 3: Bound Test-Co-integration Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.293444	10%	2.20	3.09
k	4	5%	2.56	3.49
		1%	3.29	4.37

Source: Researcher's Computation Using EViews-12 (2025)

The results of the bounds test in Table 3 show an F-statistic value of 4.293444, which is higher than the 5% upper bound critical value of 3.49. Since the computed F-statistic exceeds the upper bound at the 5% significance level, we reject the null hypothesis of no levels relationship. This confirms that the variables in the model are cointegrated, implying the existence of a long-run equilibrium relationship between manufacturing output and the proxies for foreign currency demand, import value, Bureau de Change exchange rate, oil export revenue, and remittance inflows.

Model Estimation and Results Evaluation

The study has confirmed the existence of a cointegrating relationship between manufacturing output and the demand for foreign currency in Nigeria. Consequently, the analysis proceeds to estimate both the error correction model and the long-run equations. The ARDL-ECM results provide insights into how the short-run adjustments in the ARDL framework converge towards the long-run equilibrium. A general-to-specific modelling strategy is employed to obtain a well-specified and parsimonious short-run dynamic model, as presented in Table 4.

Table 4: ARDL-ECM and Long Run Estimates
Dependent Variable: IMPV

Error correction estimates				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(IMPV)	9.87E-07	3.67E-07	2.6891	0.0145
D(IMPV(-1))	-3.32E-07	4.58E-07	-0.7248	0.4774
D(IMPV(-2))	1.02E-06	4.47E-07	2.2720	0.0349
D(BDC)	0.011619	0.007323	1.5867	0.1291
D(BDC(-1))	-0.02049	0.01176	-1.7423	0.0976
D(BDC(-2))	0.088047	0.022387	3.9329	0.0009
D(OER)	7.96E-05	0.000433	0.1837	0.8562
D(OER(-1))	-0.00163	0.000708	-2.3078	0.0324
D(OER(-2))	-0.00144	0.000578	-2.4972	0.0219
D(OER(-3))	-0.00066	0.000459	-1.4390	0.1664
CointEq(-1)*	-0.30429	0.072986	-4.1692	0.0005
Long-run Estimates				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
IMPV	-3.37E-06	1.29E-06	-2.6109	0.0172
BDC	-0.131011	0.090469	-1.4481	0.1639
OER	0.011344	0.004376	2.5921	0.0179
REM	2.07E-09	1.12E-09	1.8415	0.0812
C	32.1126	3.398081	9.4502	0.0000
Reliability Estimates				
R-squared	0.6564			
Adjusted R-squared	0.5132			
Durbin-Watson stat	1.9358			

Source: Researcher's Computation Using EViews-12 (2025)

The coefficient of the error correction term, CointEq(-1), is -0.30429 and statistically significant at the 1% level (p = 0.0005). In the ARDL framework, this negative and significant coefficient confirms the existence of a stable long-run relationship between manufacturing output and the foreign currency demand variables, as already established in the cointegration results. The magnitude of the coefficient indicates the speed of adjustment toward long-run equilibrium after a short-term shock. Specifically, about 30.43% of any deviation from the long-run equilibrium in one period is corrected in the next period.

The coefficient for Import Value (IMPV) is -3.37E-06 and statistically significant at the 5% level (p = 0.0172). This negative relationship implies that in the long run, higher import values are associated with a decline in manufacturing output. Oil export revenue has a positive coefficient (0.011344) and is statistically significant at the 5 percent level (p = 0.0179), suggesting that higher oil earnings boost manufacturing output in the long term. The Bureau de Change exchange rate shows a negative coefficient (-0.131011) but is statistically insignificant (p = 0.1639). While the negative sign is consistent with the expectation that exchange rate depreciation erodes manufacturing competitiveness by increasing the cost of imported inputs, the lack of statistical significance suggests that, in the long run, other factors such as oil revenues and structural production constraints may outweigh the direct effect of exchange rate fluctuations.

Remittance inflows have a positive coefficient (2.07E-09) but are only marginally significant at the 10 percent level (p = 0.0812). This implies that remittances may have a supportive but limited long-run effect on manufacturing output, likely through boosting household income and demand for locally produced goods. However, since remittances are predominantly used for consumption rather than industrial investment, their impact on manufacturing is not as strong as that of oil revenues. The reliability estimates provide an indication of how well the ARDL model fits the data and whether its results can be considered robust for inference. The R-squared value of 0.6564 means that approximately 65.64% of the variation in Nigeria's manufacturing output is explained by the included explanatory variables, import value, BDC exchange rate, oil export revenue, and remittance inflows, in the long-run and short-run framework. This suggests a reasonably strong explanatory power, particularly for economic time series data, where a multitude of external factors (policy shifts, global market changes, infrastructural challenges) can influence the dependent variable.

The adjusted R-squared value of 0.5132, which accounts for the number of predictors in the model, indicates that after adjusting for potential overfitting, about 51.32% of the variation in manufacturing output is still explained by the model. This is a solid indication that the selected variables remain relevant drivers of manufacturing performance, consistent with earlier discussions on their economic significance. The Durbin-Watson statistic of 1.9358 is close to the ideal value of 2, suggesting that there is no serious autocorrelation problem in the residuals. This is important because autocorrelation can bias statistical inference, leading to unreliable coefficient estimates. The absence of serial correlation reinforces the validity of the model's parameter estimates and strengthens the credibility of the earlier interpretations of both the long-run and short-run dynamics.

Discussion of Findings

Findings from the study showed that import value had a negative and significant impact on manufacturing output in Nigeria. This negative relationship suggests that the manufacturing sector's performance has been undermined by the country's heavy dependence on imported raw materials, machinery, and intermediate goods, which exposes it to foreign exchange constraints and rising import costs during naira depreciation. The implication is that the more Nigeria relies on imports for industrial inputs, the less competitive its manufacturing sector becomes, as production costs escalate and profit margins shrink. This result is consistent with the argument of Akinlo and Lawal (2022), who found that excessive import dependence weakens domestic industrial capacity in sub-Saharan African economies by reducing incentives for local sourcing of inputs. Similarly, Adusei and Gyamfi (2023) reported that high import bills in developing countries often crowd out domestic production and lead to reduced manufacturing output, as scarce foreign exchange resources are diverted away from capital formation. However, the outcome of this study differs from the findings of Onuorah (2024), who argued that in some contexts, imports can enhance manufacturing when they consist primarily of productivity-enhancing capital goods, thereby raising industrial output over time.

The study also revealed that oil export revenue had a positive and significant impact on manufacturing output in Nigeria. This finding underscores the role of oil earnings as a primary source of foreign exchange to finance the importation of industrial machinery, spare parts, and raw materials essential for manufacturing. In periods of high oil revenue, forex availability improves, easing production constraints for manufacturers. This is in line with the findings of Mensah and Twumasi (2022), who observed that in oil-exporting African countries, resource revenues play a vital role in financing industrial production by mitigating forex shortages. Likewise, Mlambo and Sibanda (2023) found that commodity-driven forex inflows help sustain manufacturing supply chains in resource-rich economies. However, this dependence also makes manufacturing vulnerable to oil market volatility, as highlighted by Njoroge (2024), who warned that over-reliance on oil revenues for industrial growth creates long-term structural instability.

Furthermore, remittance inflows had a positive but weakly significant impact on manufacturing output in Nigeria. This suggests that while remittances contribute to manufacturing indirectly through increased household consumption and investment demand, their influence is not as strong as other forex sources. The finding agrees with Chisadza and Bittencourt (2022), who found that remittances stimulate domestic demand, which in turn can encourage local manufacturing, although the effect depends on the share of remittances invested rather than consumed. Similarly, Abebe and Worku (2023) highlighted that remittance inflows in African economies tend to be channeled more toward consumption than industrial investment, thereby limiting their direct impact on manufacturing capacity. However, the result contrasts with the findings of Amankwah (2024), who argued that in certain Asian economies, remittances have significantly boosted manufacturing through targeted investment in small and medium-scale industrial enterprises.

Conclusion and Recommendations

The analysis of the relationship between the drivers of foreign currency demand and manufacturing output in Nigeria reveals a mixed economic structure in which external trade dynamics, exchange rate movements, and foreign exchange inflows collectively shape industrial performance. The findings demonstrate that import value exerts a negative and significant long-run impact on manufacturing, reflecting the structural vulnerability of an import-dependent industrial base. This reinforces the earlier observation that reliance on foreign inputs exposes manufacturers to foreign exchange shortages and exchange rate volatility, ultimately raising production costs and limiting competitiveness. Conversely, oil export revenues remain a critical positive driver of manufacturing output, serving as the dominant source of foreign exchange for financing industrial imports and investments. However, this dependence on a single commodity creates long-term risks, as fluctuations in global oil prices can disrupt forex supply chains. Remittance inflows, though less statistically robust, also contribute positively by stimulating domestic demand and indirectly supporting local manufacturing. The exchange rate, while economically important, showed a weaker long-run statistical effect, possibly due to adaptive strategies by manufacturers in managing currency volatility.

The following recommendations were suggested for the paper:

i. To address the negative long-run impact of high import value on manufacturing output, policies must focus on reducing Nigeria's dependence on foreign industrial inputs. The Federal Ministry of Industry, Trade and Investment, in collaboration with the Nigerian Export Promotion Council (NEPC), should strengthen local content requirements and incentivize domestic production of raw materials and machinery components. The Central Bank of Nigeria (CBN) should expand targeted intervention funds, such as the Real Sector Support Facility, to finance backward integration projects, while the Bank of Industry (BOI) should provide low-interest loans for manufacturers investing in local supply chain development. This will ease forex pressures and lower production costs.
ii. Given the positive effect of oil export revenues on manufacturing output, the Nigerian National Petroleum Company Limited (NNPCL) and the Ministry of Petroleum Resources should channel part of oil earnings into a Sovereign Industrial Development Fund, managed jointly with the Ministry of Finance. This dedicated fund could be used to finance industrial infrastructure, technological upgrades, and the acquisition of energy-efficient machinery. By ring-fencing a portion of oil revenue for industrial use, the volatility of forex supply to manufacturers can be reduced.
iii. For remittance inflows, the CBN, in partnership with the Ministry of Foreign Affairs and the Nigerians in Diaspora Commission (NiDCOM), should design diaspora bonds and investment-linked remittance channels that encourage recipients to direct a portion of funds into manufacturing-related ventures. Creating formal mechanisms for channeling remittances into industrial SMEs will transform this forex source from largely consumption-oriented spending to production-enhancing investment.
iv. While the Bureau de Change exchange rate showed weaker long-run statistical significance, exchange rate stability remains vital for predictable manufacturing

planning. The CBN should deepen the official forex market through transparent supply allocation, gradually reducing dependence on the parallel market. Coordination with the Debt Management Office (DMO) to maintain sustainable external borrowing levels will also help preserve currency stability, ensuring manufacturers have reliable access to affordable foreign currency for essential imports.

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