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Drivers of Demand for Foreign Currency and Oil-Sector Performance in Nigeria (1986 To 2024)

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Abstract

The study was conducted with the main objective of examining how key drivers of foreign currency demand influenced long-run oil sector output growth in Nigeria. To achieve this, the study employed the autoregressive distributed lag modelling technique, supported by unit root testing, cointegration analysis and error-correction modelling, to establish both long-run and short-run relationships among oil sector output, import value, bureau-de-change exchange rate, oil export revenue and external debt stock. The method enabled the identification of equilibrium adjustments and the stability of the long-run dynamics among the variables. Findings revealed that import value had a positive and significant impact on oil sector output, indicating that imports of machinery, equipment and industrial inputs played a vital role in supporting exploration and production activities. Oil export revenue also exerted a positive and significant long-run effect, underscoring the centrality of export earnings in sustaining investment capacity and operational efficiency in the oil sector. The bureau-de-change exchange rate had a negative but insignificant influence, suggesting that although currency depreciation created broader economic uncertainty, it did not structurally alter long-run oil output because oil transactions were primarily denominated in foreign currency. External debt stock exhibited a positive but insignificant impact, implying that borrowing has not consistently translate into productive investment within the oil sector. Based on these outcomes, the study recommended that the Federal Ministry of Industry, Trade and Investment, the Nigeria Customs Service and the Nigerian Upstream Petroleum Regulatory Commission streamline procedures for importing essential oil sector machinery to reduce bottlenecks and support productivity. It also recommended that the Nigerian National Petroleum Company Limited and the Ministry of Petroleum Resources strengthen revenue management systems and invest strategically in production infrastructure to stabilise export earnings. Furthermore, the Central Bank of Nigeria and the Securities and Exchange Commission were encouraged to enhance transparency within foreign exchange markets to reduce volatility. Lastly, the Debt Management Office and the Ministry of Finance were advised to implement project-linked borrowing practices to ensure that external debt supported infrastructure and operational improvements in the oil sector.

Keywords: *Foreign currency demand, Oil sector output, Import value, Oil export revenue, External debt*

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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 oil sector performance, 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 the oil sector output in Nigeria, but the sector is still struggling. 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 oil sector. This argument could not be justified by the declining capacity utilization and the unimpressive performance of the industrial sector as a whole. Oil, the liquid gold of the world, its 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, oil sector growth has been pivotal in driving economic transformations, as seen in developed economies like the United States, Germany, and Japan, even some Asian countries like, Oman, Bahrain, Saudi Arabia, where industrialization has fueled job creation, innovation, and wealth accumulation. Emerging markets, such as Qatar, Pakistan, and Turkey, have also witnessed rapid transformation of the oil sector, driven by investment in infrastructure, access to global markets, and the adoption of advanced production 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, the oil sector performance has been uneven, hampered by structural challenges, inadequate infrastructure, and a lack of access to critical inputs, and commodity terms of trade. 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 Oil output 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, oil sector 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).

The oil sector's contribution to Nigeria's GDP has significantly declined in recent years, hovering between 4% and 6% as of 2024-2025, down from over 9% pre-2020. While the oil sector remains critical for government revenue and foreign exchange, it now represents a small fraction of the total economic output, with non-oil sectors driving growth. Recently, in Q3 2024, the oil sector contributed 5.57% to the total real GDP, earlier, it was 5.48% in Q3 2023. (CBN, 2024). Nigeria's demand for foreign currency is intrinsically linked to its oil sector: strong oil performance (high prices/production) boosts foreign exchange supply, strengthening the Naira, while oil downturns reduce supply, increasing demand pressure and causing Naira depreciation; however, high import bills and capital flight also drive demand,

leading to volatility that policy reforms attempt to manage for stability, even with positive oil prospects. In essence, when oil performs well, Nigeria earns more dollars, helping meet import demands and stabilize the Naira; when oil falters, forex scarcity worsens, putting severe downward pressure on the Naira as demand outstrips supply, despite policy efforts.

Based on the nature and importance of the relationship between the drivers of foreign currency demand and oil sector performance, this study becomes necessary as oil sector output and capacity utilization in key sectors have experienced significant fluctuations in recent years in Nigeria. Including dependence on oil import from other countries. Therefore, it is in the interest of this paper 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 External debt stock, has impacted the Oil Sector performance 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 and 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, the paper 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.

Import value is a critical economic concept that refers to the monetary worth of goods and services brought into a country from abroad. It is an essential indicator in understanding a nation's trade dynamics, foreign exchange demand, and economic dependence on external economies. According to Krugman and Obstfeld (2020), import value represents the total cost of imported goods, inclusive of the value of the product itself and other associated costs such as transportation, insurance, and tariffs. It serves as a crucial indicator of a country's integration into the global economy, reflecting its demand for foreign goods and services that may not be readily available domestically. This measure is vital for economic planning and analysis, as it has implications for foreign currency demand, trade balances, and the overall health of the economy.

BDC (Bureau de Change) exchange rates are an integral component of foreign exchange markets, particularly in developing economies where parallel exchange markets play a significant role. The term "BDC exchange rate" refers to the rate at which foreign currencies are bought and sold by Bureau de Change operators. These operators are licensed or informal currency dealers who provide currency exchange services outside formal banking systems. BDC exchange rates often differ significantly from official rates set by central banks, making them an indicator of market-driven supply and demand for foreign currency. According to Eze and Uzochukwu (2020), BDC exchange rates are shaped by the interaction of economic forces, such as currency scarcity, inflation, speculative activities, and the overall macroeconomic environment of a country.

Oil export revenue refers to the income a country generates from the sale of crude oil and refined petroleum products to foreign markets. It is a critical component of national income, particularly for oil-exporting nations, as it significantly influences foreign exchange earnings, government revenue, and overall economic performance. According to the International Energy Agency (IEA, 2022), oil export revenue is calculated as the volume of oil exports multiplied by international oil prices, less production, transportation, and marketing costs. This revenue is often denominated in foreign currencies, such as the US dollar, making it a vital source of foreign exchange reserves for oil-dependent economies.

External debt stocks are a critical economic concept that refers to the total outstanding debt that a country owes to external creditors, including governments, international financial institutions, and private lenders. This includes all loans, bonds, and other financial instruments that must be repaid in foreign currency or another external denomination. According to the World Bank (2022), external debt stocks represent the total obligations of a country to non-residents, providing a snapshot of a nation's financial liabilities and its degree of integration into the global financial system. External debt stocks are an essential indicator of a country's financial health, reflecting its borrowing practices, ability to attract foreign investment, and reliance on external financing to meet developmental or economic needs. Another perspective on external debt stocks focuses on their relationship with foreign exchange reserves and fiscal sustainability. Reinhart and Rogoff (2019) argue that high external debt levels, especially when denominated in foreign currencies, pose risks to a country's economic stability, as they require significant foreign exchange to meet repayment obligations. This creates a direct link between external debt stocks and foreign currency demand, as countries with substantial debt obligations must allocate foreign reserves for debt servicing, often at the expense of other economic priorities. For instance, Nigeria's external debt stocks rose from $25.27 billion in 2018 to $41.69 billion in 2023 (Debt Management Office, 2023), with debt servicing costs reaching $2.4 billion in 2022. This increasing burden has placed significant pressure on Nigeria's foreign reserves and exchange rate stability, demonstrating the critical interplay between external debt and foreign exchange dynamics.

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 means 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 highlightd 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.

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 highlighted 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.

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).

Toure and Diallo (2021) examined the impact of external debt and exchange rate fluctuations on industrial growth in Senegal from 1990 to 2020. Using an autoregressive distributed lag (ARDL) model, the study found that external debt negatively affected industrial growth, as high debt service obligations constrained the availability of foreign exchange for industrial development. Exchange rate fluctuations further exacerbated these challenges by increasing the cost of importing machinery and raw materials. The study concluded that improved debt management strategies and currency stabilization policies were essential for fostering industrial growth in Senegal. While the study provided valuable insights, it failed to include remittance inflows, which are a significant source of foreign exchange in Senegal, or oil export revenue, which could have provided a broader perspective on foreign exchange dynamics.

Chen and Wang (2021) investigated how external debt and exchange rate volatility influenced industrial growth in China from 1990 to 2020. The study employed an autoregressive distributed lag (ARDL) model to assess the short- and long-term impacts of rising foreign debt obligations and exchange rate instability. The findings indicated that external debt had a negative long-term impact on industrial growth due to the increasing burden of debt servicing, which strained foreign currency reserves. Additionally, exchange rate volatility further reduced industrial performance by raising uncertainty for export-oriented industries and increasing the cost of importing raw materials. While the study provided key insights into China's reliance on external borrowing and currency management, it excluded remittance inflows as a stabilizing factor and lacked sectoral analysis, which could have captured differential impacts across industries such as manufacturing and high-tech sectors.

Ali and Hossain (2021) conducted a study examining the relationship between external debt service, exchange rate volatility, and industrial growth in Southeast Asia, focusing on Malaysia, Thailand, and Indonesia from 1990 to 2020. Using a panel autoregressive distributed lag (ARDL) model, the study revealed that external debt service negatively influenced industrial growth, as rising debt repayment obligations reduced foreign exchange reserves and increased currency depreciation. Exchange rate volatility further exacerbated this effect, particularly for industries reliant on imported raw materials and capital goods. The study found that countries with higher foreign reserves and export diversification were better able to mitigate these negative effects. However, the exclusion of remittance inflows, which are significant in many Southeast Asian economies, limited the scope of the analysis.

Furthermore, the reliance on aggregate industrial output data prevented a detailed examination of sector-specific impacts, such as differences between manufacturing and resource-based industries.

Adebayo and Lawal (2021) explored the effects of external debt and exchange rate volatility on industrial growth in West Africa, focusing on five Economic Community of West African States (ECOWAS) countries, Nigeria, Ghana, Côte d'Ivoire, Senegal, and Sierra Leone, between 1990 and 2020. Using a panel ARDL model, the authors examined both short- and long-term relationships among the variables. Their findings revealed that external debt negatively influenced industrial growth due to high foreign debt service obligations, which drained foreign exchange reserves. Additionally, exchange rate volatility compounded the negative impact by increasing the cost of importing capital goods and raw materials essential for industrial production. However, the study did not include oil export revenue or remittance inflows, which are critical sources of foreign exchange in the region. Furthermore, the authors used aggregate industrial output data, which may have masked the differentiated effects on various subsectors, such as manufacturing or agriculture-related industries.

Methodology

This study made use of secondary data from 1986 to 2024. Data on Import value, Bureau De Change (BDC), Oil export revenue, and External Debt Stock were extracted from Central Bank of Nigeria statistical bulletin (2012, 2022,2023), while the one of 2024 was extrapolated. 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, External Debt Sock to provide a more comprehensive analysis of how foreign currency demand influences the growth of Oil Sector Performance in Nigeria.

The empirical model for this study can be represented as:

$$OSPt = f(IMV_t, BDC_t, OER_t, EDSt) \quad (2)$$

The functional specification of the model can be expressed as:

$$OSPt = \alpha_0 + \alpha_1 IMV_t + \alpha_2 BDC_t + \alpha_3 OER_t + \alpha_4 EDSt + \upsilon_t \quad (3)$$

Where;
OSP_t the Oil Sector Performance captured by the Output
IMV refers to Import Value
BDC signifies the BDC exchange rates
OER signifies the Oil Export Revenue
EDS signifies the External Debt Stock
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 Oil Sector Performance. This is because higher import dependency typically drains foreign exchange reserves and reduces resources available for domestic investment in the sector. 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 and other equipment needed, which hampers Oil Sector Performance.

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

Similarly, **External debt stocks** are also anticipated to negatively ($\alpha_2 < 0$) affect Oil Sector Performance. Rising debt levels often lead to higher debt servicing obligations, which crowd out funds needed for industrial development, especially the oil Sector, and increase foreign currency demand, pressuring exchange rates. Mundell-Fleming also noted that changes in interests' rates and exchange rates can affect a country's debt servicing costs, impacting its external debt stock.

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:

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

Results and Discussion

Descriptive Statistics

Descriptive statistics provide a preliminary quantitative summary of the distributional properties of variables used in empirical analysis. They offer insights into central tendency, dispersion, and the shape of the data, thereby helping to understand trends, variability, and potential departures from normality before undertaking inferential estimation. In the context of the discussion thus far on drivers of demand for foreign currency and oil sector performance in Nigeria, the summary statistics in Table 1 shed light on the historical behavior of Oil Sector Output growth (OSP), Import Value (IMV), Bureau de Change exchange rate (BDC), Oil Export Revenue (OER), and External Debt Stock (EDS) over the study period.

Table 1: Summary Statistics

	OSP	IMV	BDC	OER	EDS
Mean	4864.296	7408405.	185.2015	3023.300	3.26E+09
Maximum	14635.22	38170224	1419.870	8878.970	1.04E+10
Minimum	5.540000	5983.600	2.020000	8.110000	5.99E+08
Std. Dev.	4958.948	9716022.	267.8396	2638.602	2.77E+09
Skewness	0.555276	1.605343	3.078311	0.353841	1.241371
Kurtosis	1.746425	4.889260	13.66771	1.947900	3.264926
Jarque-Bera	4.557759	22.55145	246.5192	2.612557	10.13056
Probability	0.102399	0.000013	0.000000	0.270826	0.006312
Observations	39	39	39	39	39

Source: Researcher's Computation Using EViews-12 (2026)

The descriptive characteristics of oil sector output growth (OSP) show a mean value of ₦4,864.30 billion, with a wide range stretching from a minimum of ₦5.54 billion to a maximum of ₦14,635.22 billion. This wide spread is confirmed by its high standard deviation of ₦4,958.95 billion, indicating considerable volatility in oil-sector performance over the decades. This aligns with the earlier discussion that Nigeria's oil output has been subject to fluctuations arising from global price shocks, domestic production challenges and structural investment patterns. The slightly positive skewness value of 0.56 suggests that the distribution is tilted to the right, meaning periods of unusually high output are more common than extremely low output. With a kurtosis of 1.75, the distribution is flatter than a normal distribution, which is consistent with the presence of long-term gradual shifts instead of abrupt spikes. The Jarque-Bera probability of 0.10 implies that OSP does not significantly deviate from normality at the 10 percent threshold, reinforcing the view that although oil output is volatile, its distribution remains statistically stable over time.

Import value (IMV) exhibits a very high mean of ₦7,408,405 million, reflecting Nigeria's large and growing dependence on foreign goods, as noted in earlier discussions. Its maximum value of about ₦38.17 trillion is markedly higher than the minimum of ₦5.98 billion recorded in the late 1980s, illustrating a dramatic expansion in import intensity. The high standard deviation of ₦9.72 trillion confirms that import values have grown rapidly but unevenly, consistent with periods of economic booms, sharp currency depreciations and structural import dependence. The skewness of 1.61 indicates a strong rightward tilt, showing that extremely high import expenditures occur more frequently than extremely low ones. With kurtosis at 4.89, IMV has a sharply peaked distribution, pointing to clustered periods of exceptionally high import spending. The Jarque-Bera statistic is significant at the 1 percent level, confirming that IMV departs from normality, which mirrors the structural nature of Nigeria's long-term import expansion and the macroeconomic pressures driving foreign-currency demand.

The bureau de change exchange rate (BDC) reveals striking statistical behaviour. With a mean of ₦185.20 per dollar but a maximum of ₦1,419.87 and minimum of only ₦2.02, the data show the magnitude of naira depreciation across the years. The high standard deviation of 267.84 emphasises extremely high volatility, reflecting frequent shifts in exchange-rate regimes, speculative pressures, forex shortages and macroeconomic policy changes. A skewness value of 3.08 indicates a very pronounced right skew, meaning extreme depreciations dominate the distribution. Kurtosis of 13.67 suggests a heavy-tailed, highly leptokurtic distribution characterized by severe and recurrent outliers. The near-zero probability of the Jarque-Bera statistic indicates that BDC exchange rates do not approximate a normal distribution. This aligns with the narrative that the parallel market is sensitive to shocks, with exchange rates reacting sharply to changes in oil revenues, policy interventions and market expectations.

Oil export revenue (OER) shows a mean of USD 3,023.30 million, a maximum of USD 8,878.97 million and a minimum of USD 8.11 million. This highlights dramatic variability over time, driven largely by global oil price cycles, output levels and external demand for crude oil. The standard deviation of USD 2,638.60 million confirms this significant fluctuation. The skewness measure of 0.35 indicates slight rightward asymmetry, suggesting that high revenue episodes are somewhat more common than extremely low ones. With kurtosis at 1.95, OER has a distribution slightly flatter than the normal distribution, which reflects Nigeria's recurring episodes of both high and low oil revenue periods rather than extreme outliers. The Jarque-Bera probability of 0.27 suggests that OER does not significantly deviate from normality, consistent with the cyclical but not excessively erratic nature of global oil markets.

External debt stock (EDS) presents a mean of ₦3.26 trillion, with a maximum of ₦10.42 trillion and a minimum of ₦0.60 trillion. The large standard deviation of ₦2.77 trillion indicates rapid changes over time, consistent with shifts in Nigeria's external borrowing policy, exchange-rate conversion effects and debt restructuring episodes. The skewness value of 1.24 reveals moderate rightward skewness, indicating that extremely high debt levels have become more common in recent years. Kurtosis of 3.26 suggests a distribution slightly more peaked than a normal distribution, implying some clustering around the mean but also occasional

high-debt episodes. The Jarque-Bera probability of 0.006 indicates a statistically significant deviation from normality, which aligns with the non-linear and policy-driven nature of Nigeria's borrowing patterns.

Unit Root Test

Unit root tests are employed to determine the stationarity properties of time series data. Stationarity implies that the statistical properties of a variable, such as its mean and variance, remain constant over time. Establishing the order of integration of variables is essential in time series analysis because non-stationary variables can produce spurious regression results if not properly transformed. The Augmented Dickey–Fuller test, which incorporates both an intercept and a deterministic trend in this case, was used to examine the presence of a unit root in each of the variables associated with drivers of foreign currency demand and oil sector performance.

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)
OSP	-3.623891	-3.236994**	I(0)
OER	-6.218324	-4.226815*	I(1)
EDS	-6.407319	-4.226815*	I(1)

Note: The tests include intercept with trend; *, ** and *** significant at 1 and 10 percent.
Source: Researcher's Computation Using EViews-12 (2026**)**

Oil Sector Output growth (OSP) was found to be stationary at level, that is, integrated of order zero, I(0). The ADF test statistic of -3.623891 is more negative than the critical value of -3.236994 at the indicated significance level, leading to the rejection of the null hypothesis of a unit root at level. This implies that OSP does not require differencing to achieve stationarity and that its mean reverting properties are stable over time. The Bureau de Change exchange rate (BDC) was found to be stationary after first differencing, indicating integration of order one, I(1). The reported ADF statistic of -3.232800 is more negative than the critical value of -3.215267 at the 10 percent significance level, confirming stationarity at first difference. This outcome implies that the level series of BDC contains a unit root and follows a stochastic trend, which is consistent with the long-term depreciation pattern and structural shifts observed in the descriptive statistics. Import Value (IMPV) is also integrated of order one, I(1), becoming stationary after first differencing. The ADF test statistic of -4.410088 is more negative than the critical value of -4.226815 at the 1 percent significance level, indicating strong evidence against the null hypothesis of a unit root at first difference.

Oil Export Revenue (OER) was similarly found to be stationary at first difference, I(1). The ADF statistic of -6.218324 exceeds in absolute terms the 1 percent critical value of -4.226815, providing strong evidence of stationarity after differencing. the short run but do not permanently alter its growth path once the series is transformed. External Debt Stock (EDS) also exhibits integration of order one, I(1). The ADF test statistic of -6.407319 is more

negative than the 1 percent critical value of -4.226815, confirming stationarity after first differencing.

Cointegration Test

Cointegration analysis provides a framework for examining whether a set of non-stationary variables share a stable long-run relationship despite short-run fluctuations. When variables are integrated of different orders, such as a combination of I(0) and I(1) processes, the Bounds testing approach becomes particularly appropriate because it allows for testing cointegration without requiring all variables to be integrated at the same level. The central idea behind cointegration is that although individual variables may drift over time due to macroeconomic shocks or structural trends, they may still move together in the long run in a manner consistent with economic theory. Thus, a significant Bound test result provides evidence of a meaningful long-run equilibrium relationship among the variables.

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	5.410305	10%	2.20	3.09
k	4	5%	2.56	3.49
		1%	3.29	4.37

Source: Researcher's Computation Using EViews-12 (2026)

In the present analysis, the F-statistic from the ARDL Bounds test is 5.410305. To determine whether a long-run relationship exists at the 5 percent significance level, this value is compared with the corresponding lower and upper critical bounds. At 5 percent, the critical values for the lower bound (I(0)) and upper bound (I(1)) are 2.56 and 3.49 respectively. Because the computed F-statistic of 5.41 is greater than the upper bound critical value of 3.49, the null hypothesis of no level relationship is rejected at the 5 percent significance level. This implies that oil sector output growth and the selected drivers of foreign-currency demand form a cointegrated system, indicating the presence of a long-run equilibrium relationship.

Model Estimation and Results Evaluation

The results have shown that a long-run cointegrating relationship exists between the drivers of foreign-currency demand and oil-sector performance in Nigeria. In light of this, the study proceeds to estimate both the error-correction representation and the long-run ARDL model. The ARDL-ECM framework illustrates how short-run adjustments converge toward the established long-run equilibrium. Following a general-to-specific modelling strategy, the study derives a parsimonious and policy-relevant short-run dynamic specification, which is presented in the subsequent results.

Table 4: ARDL-ECM and Long Run Estimates
Dependent Variable: D(OSP)

Error correction estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OSP(-1))	0.7843	0.1722	4.5546	0.0011
D(OSP(-2))	1.2849	0.2622	4.9005	0.0006
D(OSP(-3))	0.6905	0.2886	2.3923	0.0378
D(IMV)	-0.0006	0.0001	-5.8079	0.0002
D(IMV(-1))	-0.0014	0.0002	-5.9606	0.0001
D(IMV(-2))	-0.0007	0.0002	-4.0226	0.0024
D(IMV(-3))	-0.0004	0.0001	-3.3883	0.0069
D(BDC)	-10.5563	2.2982	-4.5932	0.0010
D(BDC(-1))	15.3816	2.0636	7.4538	0.0000
D(BDC(-2))	22.4906	5.7660	3.9005	0.0030
D(BDC(-3))	20.9904	5.2332	4.0110	0.0025
D(OER)	1.3144	0.1189	11.0588	0.0000
D(OER(-1))	-0.6109	0.1778	-3.4360	0.0064
D(OER(-2))	-1.0970	0.2354	-4.6607	0.0009
D(OER(-3))	-0.6689	0.2521	-2.6535	0.0242
D(EDS)	2.3255	-0.7909	-2.9405	0.0148
D(EDS(-1))	1.2654	-0.2180	-5.8049	0.0002
D(EDS(-2))	2.3660	-0.3464	-6.8299	0.0000
D(EDS(-3))	1.2658	-0.1531	-8.2702	0.0000
CointEq(-1)*	-0.0780	0.0112	-6.9780	0.0000
Long-run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
IMV	0.0009	0.0002	3.7793	0.0036
BDC	-12.8712	11.1681	-1.1525	0.2759
OER	0.6663	0.1956	3.4061	0.0067
EDS	1.2356	0.9225	1.3393	0.2101
C	-1188.6320	948.2243	-1.2535	0.2385
Reliability Estimates				
R-squared	0.9748			
Adjusted R-squared	0.9429			
Durbin-Watson stat	1.8800			

Source: Researcher's Computation Using EViews-12 (2026)

The coefficient of the error-correction term, CointEq(–1), is –0.078, and it is highly significant with a probability value of 0.0000. This negative and statistically significant coefficient confirms that deviations from the long-run equilibrium are corrected over time, reinforcing the earlier conclusion that a stable cointegrating relationship exists between drivers of foreign-currency demand and oil-sector performance in Nigeria. The magnitude of –0.078 suggests that approximately 7.8 percent of any short-run disequilibrium is adjusted each period toward the long-run equilibrium path. Import Value (IMV) has a positive and statistically significant

long run coefficient of 0.0009 with a t statistic of 3.7793 and probability value of 0.0036, indicating significance at the 1 percent level. This suggests that, in the long run, a one billion naira increase in import value is associated with an increase of approximately 0.0009 billion naira in oil sector output growth, holding other factors constant.

The Bureau de Change exchange rate (BDC) shows a negative coefficient of -12.8712, with a t statistic of -1.1525 and a probability value of 0.2759. Although the negative sign suggests that higher naira depreciation in the parallel market, measured in naira per dollar, is associated with lower oil sector output growth in the long run, the relationship is not statistically significant at conventional levels.

Oil Export Revenue (OER) exhibits a positive and statistically significant coefficient of 0.6663, with a t statistic of 3.4061 and a probability value of 0.0067, indicating significance at the 1 percent level. Since OER is measured in million dollars and OSP in billion naira, the coefficient implies that a one million dollar increase in oil export revenue is associated with an increase of approximately 0.6663 billion naira in oil sector output growth in the long run, ceteris paribus. This substantial and significant relationship highlights the central role of export earnings in sustaining investment, maintenance, and expansion within the oil industry.

The long-run estimate for external debt stock showed a positive but statistically insignificant effect on oil sector output growth, with a coefficient of 1.2356, a standard error of 0.9225, a t-statistic of 1.3393 and a probability value of 0.2101. The positive coefficient indicates that increases in external debt had the potential to support oil sector performance, possibly through improved fiscal capacity or investment-related spending. However, the insignificance suggests that external debt did not consistently translate into productive financing for the oil sector. The R-squared value of 0.9748 indicates that approximately 97.48 percent of the variation in oil-sector output growth is explained by the included drivers of foreign-currency demand and the model's dynamics. The adjusted R-squared, which accounts for model complexity, is also very high at 0.9429. This value demonstrates that even after adjusting for the number of explanatory variables, the model retains strong explanatory power, confirming that the relationship is not artificially inflated by overfitting. This reinforces the adequacy of the model specification and shows that the key drivers of foreign-currency demand meaningfully capture the structural forces influencing oil-sector output growth. Such a high adjusted R-squared is consistent with the strong cointegration relationship identified earlier, reflecting the long-run co-movement among the variables. The Durbin–Watson statistic of 1.88 is close to the ideal value of 2, suggesting that the residuals do not suffer from serious autocorrelation. This is an important reliability indicator because serial correlation in the residuals can distort coefficient estimates and invalidate inference.

Discussion of Findings

Findings from the study showed that import value had a positive and significant impact on oil-sector output growth in Nigeria. This significant outcome suggests that Nigeria's oil industry relies heavily on imported machinery, technological components, engineering tools and specialised industrial inputs to support exploration, refining and transportation activities. The

dependence on imported capital goods means that increases in import expenditure create opportunities for technological upgrading and operational enhancement within the oil sector. This corresponds with the conclusions of Onuorah (2024), who found that capital goods imports serve as a catalyst for industrial production efficiency in developing economies by enabling technological diffusion. It also aligns with the insights of Mensah and Twumasi (2022), who reported that oil revenues often ease foreign-exchange constraints, enabling greater access to imported industrial equipment that bolsters sectoral productivity. Conversely, however, the result stands in contrast with Adusei and Gyamfi (2023) and Akinlo and Lawal (2022), who observed that high import dependence tends to weaken industrial performance by constraining domestic value chains. The difference may reflect the specialised nature of Nigeria's oil sector, where imports serve as essential production inputs rather than substitutes for local goods. Thus, the positive and significant effect found in this study highlights the critical role of strategic importation in sustaining oil-sector output in an economy heavily reliant on foreign industrial inputs.

The study further revealed that the bureau-de-change (BDC) exchange rate had a negative but insignificant influence on oil-sector performance. Although the negative sign implies that currency depreciation could raise operational costs and create instability in the broader foreign-exchange environment, the insignificance indicates that informal-market exchange rate volatility does not structurally determine long-run oil output. This is unsurprising given that oil transactions are denominated in US dollars, providing a natural hedge against domestic currency fluctuations. This outcome echoes the reasoning in Toure and Diallo (2021) and Chen and Wang (2021), who found that exchange-rate instability affects industrial sectors primarily through the rising cost of imported inputs. However, in Nigeria's oil sector, where earnings are dollar-denominated, the pass-through effect is far weaker than in general industry. The finding is also consistent with the observation by Mlambo and Sibanda (2023) that resource-rich economies with strong foreign-exchange inflows tend to maintain production stability despite exchange-rate pressures. Therefore, even though the BDC market reflects macroeconomic stress, it does not exert a persistent long-run influence on oil-sector output growth.

A third major finding demonstrated that oil export revenue had a positive and significant relationship with oil-sector output growth. This shows that sustained revenue inflows strengthen the sector's capacity to finance exploration, maintain production infrastructures and sustain investment in new technologies. In Nigeria's case, higher export earnings not only provide government revenue but also enhance the availability of foreign exchange needed for industry-specific imports. This outcome strongly aligns with Mensah and Twumasi (2022), who found that oil revenues ease foreign-exchange bottlenecks and improve industrial performance in resource-rich African economies. It is also consistent with Njoroge (2024), who reported that economies highly dependent on oil receipts often experience heightened vulnerability when oil revenues fall, indicating that stable revenue streams are essential for industrial continuity. The significant long-run effect found in this study therefore reinforces the view that oil-sector growth in Nigeria is closely anchored to robust export receipts, which stabilize investment flows and support critical operational activities.

Finally, findings showed that external debt stock exerted a positive but insignificant influence on oil-sector output growth. Although the positive coefficient suggests that external borrowing may create fiscal room that indirectly supports oil-sector operations, for example through improved infrastructure or macroeconomic stabilization, the insignificance implies that external debt has not consistently translated into sector-specific investment capable of driving long-run output expansion. This aligns with findings from Toure and Diallo (2021), Chen and Wang (2021), Ali and Hossain (2021) and Adebayo and Lawal (2021), all of whom concluded that external debt typically constrains industrial growth because heavy debt-service obligations drain foreign exchange, reducing the resources available for productive investment. The insignificance found in this study thus reflects a broader pattern observed across developing economies where external debt is not strategically tied to productive sector financing. It also highlights a key structural issue: Nigeria's external borrowing has often been directed toward consumption expenditure and budget support rather than reinvestment into oil-sector operations. Hence, while external debt may create short-term liquidity, it does not function as a stable long-run driver of oil-sector output.

Conclusion and Recommendations

The study set out to examine how key drivers of foreign-currency demand influence oil-sector output growth in Nigeria, and the findings collectively demonstrate that the external sector plays a central role in shaping long-run oil performance. The significant contribution of import value highlights the sector's dependence on foreign-sourced machinery and technical inputs, indicating that the structure of oil production is deeply integrated with global supply networks. The strong positive effect of oil export revenue highlights the importance of stable external earnings in sustaining investment cycles, foreign-exchange availability and production capacity. Meanwhile, the insignificant influence of exchange-rate pressures and external debt suggests that, although they shape the broader macroeconomic environment, they do not exert consistent long-run effects on oil-sector output. In conclusion, the results emphasise that Nigeria's oil-sector growth trajectory is largely anchored in patterns of trade and export revenue generation, reflecting both the opportunities and vulnerabilities inherent in its external-sector dependence.

Based on the findings, the following suggestions were made:

i. Strengthening oil-sector performance in light of the study's findings requires targeted institutional actions that address the specific dynamics revealed. Since import value showed a significant positive effect on long-run oil-sector output, the Federal Ministry of Industry, Trade and Investment, in collaboration with the Nigeria Customs Service and the Nigerian Upstream Petroleum Regulatory Commission (NUPRC), should streamline import procedures for critical oil-sector machinery and technical equipment. This includes reducing bottlenecks at ports, improving customs clearance efficiency and ensuring that forex allocations via the Central Bank of Nigeria (CBN) prioritise imports that directly support upstream and midstream operations. Such measures would reinforce the technological and infrastructural inputs necessary for sustained oil-sector productivity.
ii. Given the significant influence of oil export revenue, institutions such as the Nigerian

National Petroleum Company Limited (NNPCL), the Ministry of Petroleum Resources and the CBN should strengthen mechanisms that stabilise and optimise export earnings. This could involve improving metering accuracy, reducing leakages, expanding investment in production maintenance and ensuring transparent revenue management systems. By boosting the reliability of export receipts, these institutions would enhance the sector's capacity to finance essential exploration and production activities, thereby sustaining output growth. Strengthening fiscal frameworks through the Federal Ministry of Finance can also ensure that revenue inflows are channeled strategically to support sectoral reinvestment.

iii. For the bureau-de-change exchange rate, which showed an insignificant but negative impact, the CBN and the Securities and Exchange Commission (SEC) should intensify efforts to unify and regulate foreign-exchange markets to reduce speculative pressures and improve transparency. Although the oil sector is largely insulated from parallel-market volatility, reducing distortions in the forex system would minimise operational uncertainty and promote a more stable macroeconomic environment, indirectly supporting investment decisions within the oil industry.

iv. Lastly, the insignificant impact of external debt indicates that borrowing has not been efficiently channelled toward productive oil-sector development. The Debt Management Office (DMO), together with the Ministry of Finance and Budget Office of the Federation, should improve debt allocation frameworks to ensure that externally sourced funds are invested in infrastructure and sector-supportive projects rather than recurrent expenditure. Clear project-linked borrowing tied to refinery rehabilitation, pipeline maintenance or exploration technology would enhance the capacity of external borrowing to contribute meaningfully to long-run oil-sector output.

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