

Import Demand Behaviour in Nigeria from 1983 to 2021

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Research Article

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IMPORT DEMAND BEHAVIOUR IN NIGERIA FROM 1983 TO 2021

ABSTRACT

This paper examines import demand behavior in Nigeria from 1983 to 2021 using Cointegration and Autoregressive Distributed Lag (ARDL) techniques. The study investigates the impact of economic activity, inflation, the real exchange rate, per capita GDP, institutional quality, and domestic crude oil prices on import demand. The study analyzes short-run and long-run relationships, revealing significant links between certain variables and import demand. Notably, import demand is negatively related to the real exchange rate in the short run, while per capita income is negatively related and inflation is positively related. In the long run, a favorable exchange rate positively affects import demand, while inflation has a negative impact. Crude oil prices and institutional quality do not significantly influence import demand. The ARDL model explains 68.40% of the variation in the dependent variable, and policymakers should prioritize exchange rate stability, income-enhancing policies, prudent inflation management, economic diversification, and institutional improvement to promote sustainable growth and reduce Nigeria's import dependence.

Keywords: real exchange rate, per capita income, inflation rate, crude oil prices, institutional quality, economic growth, diversification.

1.1 Introduction

Import demand behaviour is crucial to a country's balance of trade and economic activity, as it represents the goods and services purchased from abroad (Wiedmann et al., 2007). It reflects consumption and investment levels and is vital in trade in intermediate goods and services used in domestic production processes (Miroudot et al., 2009). Factors influencing import demand include economic growth, exchange rates, and government policies (Singhal et al., 2022). Understanding these factors is essential for designing effective economic policies (Okpara, 2011). In Nigeria, imports play a pivotal role due to its heavy reliance on foreign goods, particularly consumer goods and capital equipment (Babayemi et al., 2018). Despite Nigeria's significant crude oil exports, its non-oil trade balance has historically shown deficits, impacting its overall trade dynamics (Ademola et al., 2013). Factors such as exchange rate fluctuations, income levels, and global market conditions influence the country's import demand behaviour (Nteegah et al., 2017). Research on Nigeria's import demand has highlighted drivers such as income levels, exchange rates, and government policies (Oyewumi & Adeyemo, 2020; Adewuyi, 2016). These factors interact in complex ways and can affect import demand asymmetrically, responding differently to economic shocks such as oil price fluctuations (Gharib et al., 2021; Le et al., 2021). Empirical studies suggest that Nigeria's import behaviour shows elasticity to factors such as income, exchange rates, and oil price shocks, with responses often asymmetrical

(Akpan et al., 2015; Englama, 2013). Government policies, including fiscal and monetary measures, also play crucial roles in shaping import demand dynamics (Annicchiarico & Diluiso, 2019; Auray et al., 2020).

This study aims to investigate the elasticity of Nigeria's imports to inflation, income, oil price shocks, and exchange rates, examine whether asymmetries exist in these relationships, and explore the cyclical nature of import behaviour in response to these drivers. Additionally, it seeks to analyse how monetary policy, fiscal policy, and institutional quality moderate the relationship between import behaviour and its drivers in Nigeria.

2.1 LITERATURE REVIEW

Various economic, social, and environmental factors influence import demand behaviour in Nigeria. Understanding these determinants is crucial for policymakers to develop effective policies that promote economic growth, social stability, and sustainable development. A thorough analysis of these determinants is necessary for informed policy formulation and implementation. Over the past four decades, Nigeria's import demand has been shaped by income levels, exchange rates, inflation, government policies, oil revenue mismanagement, economic reforms, a growing middle class, and the COVID-19 pandemic. The exchange rate regime, fluctuating between different systems from 1981 to 2021, and global crude oil prices have been particularly impactful. Government policies, including trade, monetary, and fiscal policies, along with insecurity,

especially in the northern regions, have also significantly influenced import demand. This study aims to provide insights into the various drivers of import demand behaviour in Nigeria and how these drivers interact. Through a rigorous analysis of existing literature, the review contributes to a deeper understanding of import demand behaviour, helping policymakers formulate policies to improve economic growth, reduce import dependency, and promote exports.

2.2 Conceptual Review

Import demand behavior in Nigeria encompasses various factors influencing the volume of imported goods and services, including the inflation rate, income, oil price shocks, exchange rate, monetary and fiscal policies, regulatory quality, and the rule of law (Chugunov et al., 2021; Yildirim & Arifli, 2021; Egwaikhide, 1999). The Central Bank of Nigeria (CBN) notes that imports satisfy the demand for consumer goods, raw materials, machinery, and equipment. Inflation, a critical economic indicator measuring overall price increases over time, is categorized into demand-pull, cost-push, and built-in inflation (Siregar & Majid, 2022). Income, or monetary compensation from various sources, correlates with higher consumption and investment, stimulating economic growth (Brooks, 2018). Oil price shocks, defined as sudden, significant changes in oil prices, impact the global economy, particularly affecting oil-producing countries like Nigeria (Hamilton; Geise & Piłatowska, 2015). The exchange rate, the value of one currency in terms of another, fluctuates based on demand and supply forces (Yunita & Robiyanto, 2018). Monetary policy involves actions by the central bank to manage money supply, value, and cost to achieve macroeconomic goals (Alalade et al., 2020; Nwoko et al., 2016), while fiscal policy involves government regulation through spending and taxation to achieve economic objectives such as resource reallocation and economic growth (Bekheet, 2021; Palley, 2013). The rule of law, which ensures all individuals, including public officials, are bound by the same laws, is crucial for economic growth and social stability (Marryman & Pérez-Perdomo, 2007). Finally, regulatory quality refers to the effectiveness of government regulations in promoting economic growth, protecting consumers, and ensuring fair business practices (Iwanow & Kirkpatrick, 2007; Nistotskaya & Cingolani, 2016).

2.3 Empirical Literature Review

Numerous empirical studies have explored import demand behaviour in various countries, including Nigeria, both domestically and abroad. This literature review briefly summarizes findings from scholars across countries, starting with research from foreign countries and concluding with studies conducted in Nigeria.

2.3.1 Comparative Empirical Analysis of Import Demand Behaviour in Different Countries

In 2004, Ho's study on Macao's import demand function, using aggregate and disaggregate models and the Johansen-Juselius test, revealed cointegration of imports with some determinants, yielding stable error correction when both constant and trend were included. Similarly, Mohammed and Tang (2000) found a long-run relationship between Malaysian real imports and components of final demand expenditure using Johansen multivariate cointegration analysis, indicating inelastic import price and fast adjustment in the error correction model (ECM). Furthermore, Narayan and Narayan (2010) re-estimated import demand elasticities for Mauritius and South Africa using ARDL and BDM techniques, demonstrating significant long-run relationships between import volumes, relative prices, and domestic income, with shocks taking years to correct. In contrast, Khalid and Nourah (2002) found that Saudi Arabia's aggregate import demand was more responsive to changes in income and domestic prices using cointegration analysis and ECM. They recommended the Engle-Granger approach for reliable forecasting. For instance, Sajeewani and Wijeweera (2008) analyzed trade liberalization policies in Bangladesh and found significant negative import price elasticity for India and the United States and positive income elasticity for Malaysia. Huseyin's (2006) study of Turkey's import demand function identified key determinants such as relative import prices and real GNP, showing price elasticities higher than income elasticities. Similarly, Oskooee and Halicioglu (2017) highlighted asymmetric effects of exchange rate changes on Turkey's trade balances using a nonlinear ARDL approach, suggesting policymakers consider these asymmetries. Tang and Nair (2002) used the Unrestricted Error Correction Model-Bounds Test Analysis for Malaysia, showing long-run elasticities of import demand with respect to income and relative prices and informing monetary, fiscal, and exchange rate policy. Dutta and Ahmed's (1999) study on

Bangladesh identified key determinants like real import prices and GDP, emphasizing robust error correction models. Meanwhile, Mugableh (2017) examined Jordan's import demand, finding imports income elastic and price inelastic, underscoring the importance of understanding import demand behavior for effective policy design.

2.3.2 Review of Empirical Literature on Import Demand Behavior in Nigeria

Various empirical studies have examined Nigeria's import demand behavior, providing a comprehensive understanding of the determinants influencing it. Babatunde and Egwaikhide (2010) investigated the determinants of import demand in Nigeria using the Bounds Test Analysis approach. They found evidence of cointegration between imports, income, and relative prices, with long-run elasticities of import demand with respect to income and relative prices of 2.48 and 0.133, respectively. Similarly, Adeleye, Adeteye, and Adewuyi (2016) used regression analysis, co-integration, and error correction modeling techniques to analyze the relationship between international trade and economic growth, highlighting the monocultural nature of Nigeria's economy and recommending diversification. In contrast, Egwaikhide's (1999) study found that short-term variations in foreign exchange earnings, relative prices, and real output significantly affected total imports. Furthermore, Osabuohien and Efobi (2013) found that income levels, exchange rate, and inflation were significant determinants of Nigeria's imports from the United States. Similarly, Olisa and Onodugo (2019) identified income levels, exchange rate, and Chinese exports as significant determinants of Nigeria's imports from China. Oyelami and Alege (2018) examined the impact of trade diversification on macroeconomic performance and concluded that it enhances economic growth and reduces exchange rate volatility. Ademola et al. (2013) found that non-oil exports and trade openness positively impact economic growth, while a depreciating exchange rate negatively impacts GDP. ODULARU (2008) examined the relationship between crude oil consumption, export, and economic performance, recommending private sector involvement to improve economic performance. Similarly, Ifeyinwa et al. (2016) examined the relationship between exchange rate depreciation and trade balance, finding a long-run equilibrium relationship but no significant short-term

effect. Adewuyi (2016) identified aggregate and sectoral incomes as significant determinants of import demand for refined petroleum products. Ayodotun (2016) used panel data analysis to determine that domestic income, foreign exchange reserves, and trade liberalization significantly influence import demand in Sub-Saharan Africa. Chimobi and Ogbonna (2016) highlighted economic growth as the main driver of import demand in Nigeria. Oyejide (2022) examined the effects of trade and exchange rate policies on the agricultural sector and found that protectionism had adverse impacts. Englama et al. (2013) showed that income was the most responsive factor to changes in import demand. Daramola et al. (2007) recommended improving market access, reducing transport costs, and enhancing institutional quality to boost agricultural export potential. Adi et al. (2022) found bidirectional shock and volatility spillover between exchange rate and oil price markets. Similarly, Oyelami and Alege (2021) confirmed that trade diversification positively affects economic growth and reduces exchange rate movements. Nteegah and Mansi (2016) revealed that exchange rate, income, inflation, and trade openness significantly influence import demand. Shuaibu (2017) indicated that trade liberalization positively impacts government revenue but negatively affects household income in the short term. Finally, Ogunniyi et al. (2021) found that COVID-19 decreased import demand for certain goods due to supply chain disruptions but increased demand for medical supplies and food products. Overall, these studies highlight the complex interplay of economic factors influencing Nigeria's import demand behavior and underscore the need for informed policy responses to promote sustainable economic growth.

2.4 Gap in the Literature

The literature on import demand in Nigeria has made significant contributions in identifying determinants. However, a gap remains in empirical analysis of the interactive role of macroeconomic policies and institutional frameworks. This study aims to fill this gap by examining how fiscal and monetary policies, as well as institutional quality, moderate the elasticity of import demand with respect to inflation, the exchange rate, income, and oil price shocks, during the period 1981 to 2021. This study's findings will help policymakers understand the factors driving import demand in

Nigeria and formulate effective policies to promote economic growth and development.

Previous studies have suggested that Nigeria's import response to exchange rates is asymmetric. Therefore, further empirical analysis could examine this phenomenon. Such research would improve understanding of the asymmetric relationship between import demand and the exchange rate in Nigeria. Overall, this study and future research will provide valuable insights for policymakers, researchers, and other stakeholders interested in promoting economic development in Nigeria.

3.0 THEORETICAL FRAMEWORK AND METHODOLOGY

3.1 Theoretical Framework

The theoretical framework explaining import demand encompasses two major theories: the Consumer theory of demand and the Marshall-Lerner condition. These theories highlight how income, prices, and exchange rates influence trade patterns (Hong, 1999). Trade patterns can affect import demand behavior. Nigeria is heavily dependent on imports for many goods, including food and manufactured goods. Several factors influence the country's trade patterns, including government policies, exchange rates, and economic conditions.

Consumer theory of demand is a fundamental concept in economics that explains how consumers choose what goods and services to purchase, influenced by factors such as price, income, tastes and preferences, and the availability of substitutes (Lentnek, Harwitz, & Narula, 2023). This theory also applies to durable goods, which are expected to last for more than one year (Miller, 2023). Demand systems can estimate consumer demand for multiple goods simultaneously, while market models study how demand and quality expectations adjust in a buyer-dominated market (Nelson, 2023; Stauffer & Weisbuch, 2003). Key assumptions underpinning consumer behavior include rationality, where consumers aim to maximize satisfaction or utility from purchases; well-defined preferences, which allow consumers to rank goods and services; and budget constraints that require trade-offs to maximize utility. The theory also incorporates diminishing marginal utility, where additional consumption of a good provides decreasing satisfaction, and the substitution effect,

where consumers opt for cheaper alternatives when prices rise. The income effect also plays a role, as price increases reduce purchasing power and affect consumption of other goods and services. Together, these assumptions explain consumer choices and reactions to price and income changes. The Marshall-Lerner condition, an economic concept highlighted by Singh et al. (2022), relates to the trade balance's responsiveness to exchange rate changes, stating that a currency depreciation will improve the trade balance if the sum of the price elasticities of exports and imports is greater than one. This condition, proposed by Alfred Marshall and Abba Lerner in the early 20th century, is crucial in analyzing the effectiveness of exchange rate policies in promoting trade and economic growth.

3.4 Methodology

Chapter three studied and reviewed various methods. However, for this study, the method adopted is the Autoregressive Distributed Lag (ARDL).

3.4.1 Autoregressive Distributed Lag (ARDL)

Autoregressive Distributed Lag (ARDL) models are a type of regression model that allows for the inclusion of both lagged values of the dependent variable and lagged values of the independent variables. This makes ARDL models well-suited for studying dynamic relationships between variables, as they can capture both the short-run and long-run effects of shocks to the system.

Pesaran, Shin, and Smith (2001) first developed ARDL models. They are a general class of models used to study cointegrated relationships between variables. Cointegration occurs when two or more variables trend together, even though they may be individually non-stationary. ARDL models have several advantages over other cointegration methods. First, they are relatively easy to estimate, even with small sample sizes. Second, they are robust to heteroskedasticity and autocorrelation. Third, they can be used to study both short-run and long-run relationships between variables.

Once an ARDL model is estimated, it can be used to study the dynamic relationships between variables. For example, the model can determine the speed of adjustment to the long-run equilibrium after a shock to the system.

They are a powerful tool for studying dynamic relationships between variables, and they are becoming increasingly popular among researchers.

The data used for this study are mainly secondary data sourced from the World Bank Development Indicators, 2019 edition, and the Central Bank of Nigeria (CBN) Statistical Bulletin, 2019 edition. The dataset comprises annual data on the variables over a thirty-nine-year period from 1980 to 2018.

3.5 Data Sources and Specification of Model

3.5.1 Data Source

3.5.2 Model Specification

The ARDL model is a hybrid model that combines the autoregressive distributed lag (ADL) model and the error correction model (ECM). The ADL model captures the model's short-run dynamics, while the ECM captures the long-run relationship between the variables. The model is estimated using ordinary least squares (OLS). The ADF and PP unit root tests assess the variables' stationarity. The Johansen cointegration test tests for the existence of a long-run relationship between the variables.

The model is specified as follows:

$$IDB = f(EXR, INC, INF, INQ, OILP) \quad (1)$$

Given the peculiar objective of this study, which aims to investigate the factors that influence import demand behaviour in Nigeria, the model in Equation 1 is modified as:

$$IDB_t = \alpha_0 + \beta_1 EXR_t + \beta_2 INC_t + \beta_3 INF_t + \beta_4 INQ_t + \beta_5 OILP_t + \mu_t \quad (2)$$

where:

IDB = Import Demand Behaviour (dependent variable)

EXR = Exchange Rate

INC = GDP Per Capita (Income)

INF = Inflation

INQ = Institutional Quality

OILP = Oil Price

μ_t = error term

α_0 = Intercept parameter of the model

$\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 = Slope coefficients of the model

Equation 1 is the long-run impact of import determinants on Nigeria's import demand behaviour. However, the long run cannot be achieved without the immediate or short-run possibilities. In fact, not all policies reach the long run, as some die out in the short run, especially once they have achieved their aim. Therefore, to understand import demand behaviour in Nigeria, this study tests for a long-run relationship among the variables. This is done using the ARDL Bound Test developed by Pesaran et al. (2001), and specified below as;

$$\begin{aligned}\Delta IDB_t = & \gamma + \sum_{i=1}^p a \Delta IDB_{t-k} + \sum_{j=0}^q b \Delta EXR_{t-k} + \sum_{j=0}^z x \Delta INC_{t-k} + \sum_{j=0}^N d \Delta INF_{t-k} + \sum_{j=0}^i d \Delta INQ_{t-k} \\ & + \sum_{j=0}^o d \Delta OILP_{t-k} + \beta_0 IDB_{t-1} + \beta_1 EXR_{t-1} + \beta_2 INC_{t-1} + \beta_3 INF_{t-1} + \beta_4 INQ_{t-1} \\ & + \beta_5 OILP_{t-1} + \mu_t\end{aligned}$$

Equation (3)

Equation 3 (ARDL) empirical results are used to analyze the effects of the independent variables on the dependent variable. The coefficients $\Phi, \Psi, \pi, \alpha, \beta$, and ϕ are normalized by ρ , and it is computed as follows to give the long-run estimates of public debt, as in Equation (2);

$$-\frac{\gamma}{\rho} = \beta_0, -\frac{\Phi}{\rho} = \beta_1, -\frac{\Psi}{\rho} = \beta_2, -\frac{\pi}{\rho} = \beta_3, -\frac{\alpha}{\rho} = \beta_4, -\frac{\beta}{\rho} = \beta_5$$

To capture the speed of adjustment through which economic growth returns to equilibrium from previous deviation caused by public debt, the error correction term (ECT) is introduced to Eqn 2, and it is given as;

$$\begin{aligned}\Delta IDB_t = & \lambda \varrho_{t-1} + \sum_{i=1}^p a \Delta IDB_{t-k} + \sum_{j=0}^q b \Delta EXR_{t-k} + \sum_{j=0}^z x \Delta INC_{t-k} + \sum_{j=0}^N d \Delta INF_{t-k} \\ & + \sum_{j=0}^R f \Delta INQ_{t-k} + \sum_{j=0}^M g \Delta OILP_{t-k} + \mu_t\end{aligned}\quad (4)$$

Due to the interactive nature of import demand with its determinants, the error correction model is modified as follows:

$$\begin{aligned}\Delta IDB_t = & \lambda \varrho_{t-1} + \sum_{i=1}^p a \Delta IDB_{t-k} + \sum_{j=0}^q b \Delta EXR_{t-k} + \sum_{j=0}^z x \Delta INC_{t-k} \\ & + \sum_{j=0}^N d \Delta INF_{t-k} + \sum_{j=0}^M g \Delta INQ_{t-k} + \sum_{j=0}^N i \Delta OILP_{t-k} + \mu_t\end{aligned}$$

(5)

ϱ_{t-1} is the lagged error correction coefficient, which contains long-run information derived from the long-run co-integrating relationship. It is calculated as;

$$\varrho_{t-1} = IDB_{t-1} - \widehat{\beta}_0 - \widehat{\beta}_1 EXR_{t-1} - \widehat{\beta}_2 INC_{t-1} - \widehat{\beta}_3 INF_{t-1} - \widehat{\beta}_4 INQ_{t-1} - \widehat{\beta}_5 OILP_{t-1}$$

Note that $\widehat{\beta}_0 = -\frac{\gamma}{\rho}$, $\widehat{\beta}_1 = -\frac{\Phi}{\rho}$, $\widehat{\beta}_2 = -\frac{\Psi}{\rho}$, $\widehat{\beta}_3 = -\frac{\pi}{\rho}$, $\widehat{\beta}_4 = -\frac{\alpha}{\rho}$ and $\widehat{\beta}_5 = -\frac{\beta}{\rho}$

The results are discussed in the context of the theoretical literature on the determinants of Import Demand Behaviour.

4.1 EMPIRICAL RESULTS AND INTERPRETATION

4.2 Descriptive Analysis

This section describes the data for all variables used throughout the study, with particular reference to the mean, maximum, minimum, and standard deviation of each of the six variables, as presented in Table 4.2.1 (raw data).

Table 4.2.1: Descriptive Statistics

	IDB	EXR	INC	INF	INQ	OILP
Mean	13.27007	106.0293	1312.619	16.49407	-0.973194	45.34808
Median	12.99895	114.8990	903.4494	10.22849	-0.971850	28.88967
Maximum	22.81126	358.8108	3200.953	75.40165	-0.681769	114.1267
Minimum	3.029761	0.724410	270.0275	0.686099	-1.292818	12.82358
Std. Dev.	5.356317	100.6198	886.7908	14.67360	0.155512	31.42694
Skewness	-0.097979	0.835023	0.522934	2.109788	-0.059316	0.918290
Kurtosis	2.422420	2.926005	1.845186	8.203027	2.325083	2.614536
Jarque-Bera	0.604497	4.424674	3.944581	72.92402	0.763078	5.722619
Probability	0.739154	0.109445	0.139138	0.000000	0.682810	0.057194
Sum	517.5327	4029.114	51192.16	643.2688	-37.95457	1768.575
Sum Sq. Dev.	1090.225	374600.8	29883120	8181.950	0.918989	37530.79
Observations	39	38	39	39	39	39

Source: Author's Computation Using EViews 10

The descriptive analysis of data from 1981 to 2021 provides insights into six variables. 'IDB' averages 13.27007, while 'EXR' averages 106.0293. 'INC' reflects an average income level of 1312.619, and 'INF' has an average inflation rate of 16.49407. The average 'INQ' is -0.973194, and 'OILP' averages 45.34808. 'IDB' ranges from 3.029761 to 22.81126, 'EXR' from 0.724410 to 358.8108, 'INC' from 270.0275 to 3200.953, and 'INF' from 0.686099 to 75.40165. 'INQ' ranges from -1.292818 to -0.681769, and 'OILP' from 12.82358 to 114.1267. The standard deviation for 'IDB' is 5.356317, indicating moderate variability, whereas 'EXR' shows a higher standard deviation of 100.6198, reflecting significant fluctuation. 'INC' has a substantial standard deviation of 886.7908, 'INF' shows 14.67360, 'INQ' 0.155512, and 'OILP' 31.42694, indicating varying degrees of variability. Skewness measures reveal that 'IDB' is slightly left-skewed (-0.097979) and 'EXR' is right-skewed (0.835023). Kurtosis values are highest for 'INQ' (2.325083) and 'OILP' (2.614536). The Jarque-Bera test results suggest that 'IDB' (0.604497) and 'INQ' (0.763078) are approximately normal, with associated probabilities indicating a higher likelihood of a normal distribution, such as 0.739154 for 'IDB'.

4.3 Unit Root Test

Table 4.3.1: Stationarity Test Using Augmented Dickey-Fuller (ADF) and Phillips-Perron Unit Root Test

Variables	Levels		First Difference		Order of Integration
	ADF	PP	ADF	PP	
IDB	-2.4971	-2.3006	-7.8160***	-8.0394***	I(1)

EXR	-2.8092*	-4.2741***	-----	-----	I(0)
INC	-0.4493	-0.7062	-5.0307***	-5.0178***	I(1)
INF	-4.0432***	-4.0714***	-----	-----	I(0)
OIP	-1.1217	-1.0380	-5.0336***	-5.9640***	I(1)
INQ	-2.7680*	-2.6735*	-----	-----	I(0)

Source: Author's Computation Using EViews 10

Note: *, **, and *** denote 10%, 5%, and 1% levels of significance, respectively.

The unit root test results in Table 4.3.1 provide insights into the stationarity properties of the variables. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were used to avoid spurious regression; a unit root test was carried out to ensure that all variables are mean-reverting, i.e., stationary. The order of integration specifies the number of differences required to achieve stationarity.

Table 4.3.1 reveals that exchange rate (EXR), inflation (INF), and institutional quality (INQ) are stationary at level. While import demand (IDB), income (INC), and oil price (OIP) are stationary in first differences. In first differences, the calculated statistics reject the null hypothesis of a unit root at the 1%, 5%, and 10% significance levels, respectively. The first-difference results from the Augmented Dickey-Fuller and Phillips-Perron tests confirm that all variables are stationary of order of integration I(1). Based on this result, ARDL is appropriate because some variables are non-stationary at level. Therefore, we use ARDL because the variables have mixed orders of integration.

4.4 Co-integration analysis

We examined the long-run relationship amongst the variables in the model by conducting the ARDL bounds test proposed by Pesaran *et al.* (2001). Pesaran *et al.* (2001) document the critical values for the bounds test, which are based on assumptions about whether the variables in the model are I(0) or I(1). This test has long been used to determine whether short- and long-run relationships exist among variables.

Table 4.4.1: ARDL Bounds Test for Cointegration

Null hypothesis: no co-integration exists		
Test Statistic	Value	K
F-statistic	5.696	5
Critical Value Bounds		
Significance	I (0) Bound	I (1) Bound
10%	2.4730	3.8930
5%	3.0210	4.6570
1%	4.3740	6.5290

P-VALUE	0.0020	0.0200
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Source: Authors' Computation Using EViews 10

The Autoregressive Distributed Lag (ARDL) Bounds Test for Cointegration provides valuable insights into long-term relationships among the variables under examination. Cointegration indicates a stable and equilibrium relationship between non-stationary variables (2014-2023). The null hypothesis states that the variables are not cointegrated. With a test statistic value of 5.696 and an F-statistic of 5.696 ($K = 3$), the critical value bounds at different significance levels are 2.4730 ($I(0)$) and 3.8930 ($I(1)$) for 10%, 3.0210 ($I(0)$) and 4.6570 ($I(1)$) for 5%, and 4.3740 ($I(0)$) and 6.5290 ($I(1)$) for 1%. The p-values, 0.0020 at 10% and 0.0200 at 5%, suggest strong evidence to reject the null hypothesis of no cointegration. The significant F-statistic and low p-values indicate a long-term relationship among the variables, implying they move together in the long run and maintain a stable equilibrium. This co-movement is valuable for understanding economic dynamics and policy implications. The ARDL approach is particularly suitable for non-stationary time series data, as it accommodates both stationary and non-stationary variables and applies to various economic scenarios. By employing the ARDL Bounds Test, we assess statistical significance by comparing the test statistic with critical value bounds to determine whether a long-term relationship exists. Thus, the ARDL Bounds Test is a rigorous and comprehensive method for examining cointegration, providing valuable insights into the variables' dynamics and enhancing the understanding of economic phenomena.

4.5 Interpretation of Model Results

Table 4.5.1: ARDL (1,2,2,2,1,1) regression

Variable	Coefficient	Std. err.	t-value	P-value	95% Conf. Interval	
SHORT RUN ESTIMATES						
LEXR	-0.5215	0.2035	-2.56	0.018	-0.9435	-0.0994
LEXR(-1)	-0.4574	0.1847	-2.48	0.021	-0.8404	-0.0743
LINC	-0.2134	0.3418	-0.62	0.539	-0.9223	0.4954
LINC(-1)	0.4694	0.2603	1.8	0.085	-0.0705	1.0093
LINF	0.256	0.1083	2.36	0.027	0.0315	0.4805
LINF(-1)	0.1441	0.0723	1.99	0.059	-0.0058	0.2941
LOIP	0.2984	0.2582	1.16	0.26	-0.2372	0.8339
INQ	-0.4694	0.1967	-2.39	0.026	-0.8773	-0.0615
C	2.6787	0.7348	3.65	0.001	1.155	4.2025
ECT(-1)	-0.6985	0.165	-4.23	0	-1.0408	-0.3563
LONG RUN ESTIMATES						
LEXR	0.1669	0.0667	2.5	0.02	0.0286	0.3051
LINC _s	-0.7639	0.3919	-1.95	0.064	-1.5766	0.0489
LINF	-0.5202	0.1999	-2.6	0.016	-0.9347	-0.1056
LOIP	0.2485	0.3768	0.66	0.516	-0.5329	1.0299
INQ	0.4649	0.3696	1.26	0.222	-0.3016	1.2314
Sample: 1985 thru 2021					Number of OBS = 37	
R-squared = 0.6840					Adj R-squared = 0.4829	
Log likelihood = 42.706093					Root MSE = 0.0989	

***, **, and * indicates the statistical level of significance at 1%, 5% and 10% level of significance respectively.

Source: Authors' Computation Using STATA

First, the R-squared value of 0.6840 indicates that the model explains 68.40% of the variation in the dependent variable. This is a relatively good fit.

The log-likelihood value of 42.706093 indicates that the model fits the data well. A higher log-likelihood value indicates a better model fit. The root mean square error (RMSE) value of 0.0989 indicates that the model is relatively accurate. A lower RMSE value indicates a more accurate model. The Autoregressive

Distributed Lag (ARDL) model results shed light on the short-run and long-run determinants of import demand behavior in Nigeria from 1983 to 2021.

4.5.1 Short-run Estimates

Table 5.6.1 presents the ARDL estimation results. The error correction model assesses the short-run impact of import demand behavior on imports in Nigeria. The error correction term coefficient of -0.6985 indicates that approximately 69.85% of deviations from long-run equilibrium are corrected in the short run, with statistical significance at the 1% level. A decrease in import demand behavior (LIDB) leads to a 0.6985% increase in imports ($p < 0.001$), showing a negative relationship between import demand behavior and import levels. The real exchange rate (LEXR) coefficient of -0.5215% signifies that a 1% increase in LEXR results in a 0.5215% decrease in imports, statistically significant at the 5% level ($t\text{-value} = -2.56$, $p = 0.018$). Similarly, the lagged LEXR (-1) coefficient of -0.4574% reveals that a 1-unit increase in the previous year's LEXR corresponds to a 0.4574% decrease in imports ($p = 0.021$). For per capita income (LINC), the current value coefficient of -0.2134% is not statistically significant ($p = 0.539$), while the lagged LINC (-1) coefficient of 0.4694% suggests a potential positive relationship, significant at the 10% level ($p = 0.085$). The inflation rate (LINF) coefficient of 0.256% indicates that a 1% increase in LINF leads to a 0.256% increase in imports ($p = 0.027$). In comparison, the lagged LINF coefficient of 0.1441% suggests a positive association but is not significant at the 5% level ($p = 0.059$). The crude oil price (LOIP) coefficient of 0.2984% is not significant ($p = 0.26$), and the INQ coefficient of -0.4694% implies that a 1% increase in INQ results in a 0.4694% decrease in imports, significant at the 5% level ($p = 0.026$). Overall, significant coefficients (LEXR, LEXR (-1), LINF, LINC (-1), and INQ) highlight meaningful short-run dynamics. In contrast, non-significant coefficients (LINC and LOIP) indicate weaker associations, providing insights for economic analysis and policymaking.

4.5.2 Long-run Estimates

The Long-run Autoregressive Distributed Lag (ARDL) model examines relationships among variables and can be interpreted from an academic perspective with an economic focus. Regarding specific variables, the real exchange rate (LEXR) demonstrates a significant positive relationship with import demand behavior. An appreciation of the exchange rate increases import demand behavior by 0.1669% ($p = 0.02$), which is significant at 5%. This indicates that a more favorable exchange rate encourages higher imports in the long run. Conversely, inflation (INF) exhibits a significant negative relationship with import demand behavior. A one-percentage-point increase in inflation reduces import demand behavior by 0.5202 ($p = 0.016$), which is significant at 5%. Higher inflation rates may reduce consumers' purchasing power, limiting their ability to afford imported goods and influencing import demand behavior in the long run. The coefficient for per capita GDP (LINC) is statistically significant in the long run at 10%, indicating a negative relationship with import demand behavior. A 1 percentage-point increase in income (per capita GDP) decreases import demand behavior by 0.7639% ($p = 0.064$), indicating that higher income reduces long-run import demand. Furthermore, neither oil prices (LOIP) nor institutional quality (INQ) demonstrates a statistically significant relationship with import demand behavior in the long run. These results suggest that changes in oil prices and institutional quality do not have immediate effects on import demand behavior in Nigeria within the study period.

4.6 Results of Post-estimation Tests

4.6.1 From the table

Diagnostic Test	F-stat	p-value
Heteroskedasticity Test:	0.84	0.3604
ARCH		

Breusch-Godfrey Serial Correlation LM Test:	7.1470	0.1283
Jarque-Bera Normality Test	2.6	0.2721

Source: Authors' Computation Using EViews 10

This section evaluates the diagnostic tests conducted on the model to assess its robustness and validity. The post-estimation tests, detailed in Table 4.6.1, provide key insights into the model's reliability. The ARCH test for heteroskedasticity yields an F-statistic of 0.84 with a p-value of 0.3604, indicating no significant heteroskedasticity and confirming that the model's assumption of constant error variance holds. The Breusch-Godfrey Serial Correlation LM Test yields a test statistic of 7.1470 and a p-value of 0.1283, suggesting no significant serial correlation and implying that the residuals are not systematically related over time. Finally, the Jarque-Bera Normality Test, with a statistic of 2.6 and a p-value of 0.2721, indicates that while there is some deviation from perfect normality, it is not significant enough to undermine the model's validity. Collectively, these tests support the model's robustness, confirming the reliability of the estimated coefficients and their statistical significance. The results affirm that the model meets the criteria for being a Best Linear Unbiased Estimator (BLUE), making it suitable for policy prescriptions and decision-making.

5.0 SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

This paper examines the impact of determinants on import demand in Nigeria from 1983 to 2021 using theoretical and empirical methods, including cointegration and ARDL techniques. The model's R-squared of 0.6840 indicates a strong fit, explaining 68.40% of the variation in import demand. The short-run analysis identifies significant negative relationships between import demand behavior (LIDB) and imports, with the real exchange rate (LEXR) and its lagged value (LEXR (-1)) both showing decreases in imports as LEXR increases, aligning with Deborah, Odejimi, and Hillary (2020). Conversely, in the long run, LEXR exhibits a positive relationship with import demand, indicating that a favorable exchange rate encourages higher imports. Per capita income (LINC) shows a short-run negative effect on import demand, but the lagged LINC exhibits a potential positive relationship. However, in the long run, LINC significantly decreases import demand, as higher income levels reduce import needs, consistent with Ohiomu and Abraham (2017). The inflation rate (LINF) positively impacts import demand in the short run but negatively affects it in the long run, reflecting reduced purchasing power with higher inflation. The variable INQ also negatively affects import demand in the short run. However, neither oil prices (LOIP) nor institutional quality (INQ) shows significant impacts in either

the short or long run. Post-estimation tests confirm the ARDL model's robustness, showing no heteroskedasticity, serial correlation, or significant deviations from normality, reinforcing the model's reliability. Overall, the findings offer valuable insights into the dynamics of import demand in Nigeria, highlighting the nuanced roles of exchange rates, inflation, and income, while suggesting limited immediate influence from oil prices and institutional quality.

5.2 Recommendation

The ARDL model analysis of import demand in Nigeria offers key insights to guide economic policy and decision-making to manage import demand effectively (Englama et al., 2013; Madichie et al., 2020). The analysis reveals that the real exchange rate (LEXR) significantly affects import demand, with appreciation reducing imports in the short run and increasing them in the long run. Policymakers should aim for exchange rate stability to balance import demand without harming trade competitiveness. Per capita income (LINC) negatively impacts import demand, with significant long-run effects suggesting that income-enhancing policies could reduce imports, though impacts on domestic industries and employment need consideration. Inflation rate (LINF) shows a positive short-run effect but a negative long-run impact on import demand, highlighting the need for prudent monetary policies to manage inflation and safeguard consumer purchasing power. Although oil prices (LOIP) and

institutional quality (INQ) have no significant short- or long-run effect on import demand, efforts to diversify the economy and improve institutional quality remain important. Policymakers should adopt a coordinated approach to align monetary, fiscal, exchange rate, and trade policies, incorporate long-term planning into economic strategies, and regularly monitor and evaluate policy impacts to promote sustainable economic growth and effective import demand management in Nigeria.

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APPENDIX

Figure 1: Institutional Quality

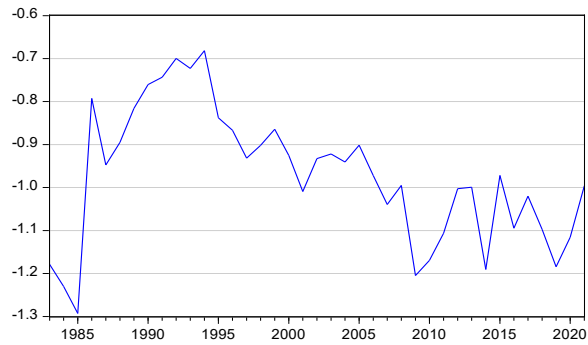


Figure 2: Import

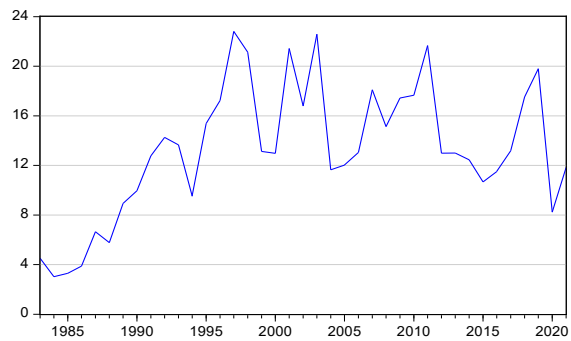


Figure 3: Exchange Rate

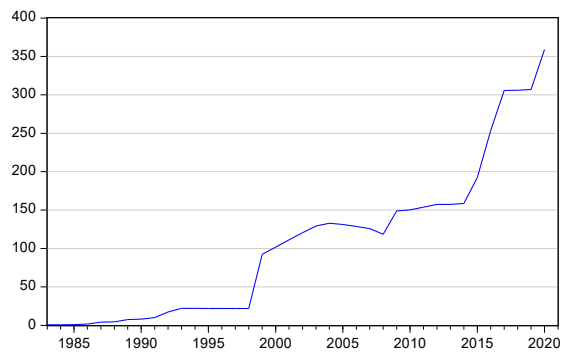


Figure 4: Income (GDP per capita)

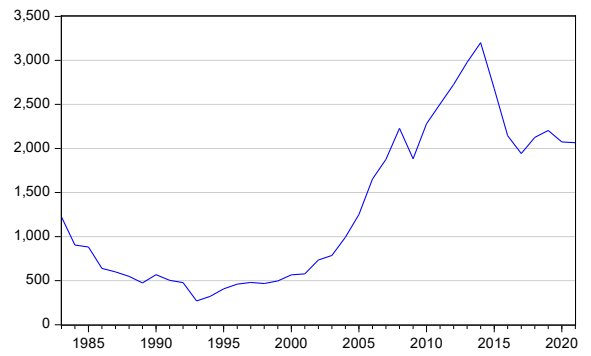


Figure 5: Inflation

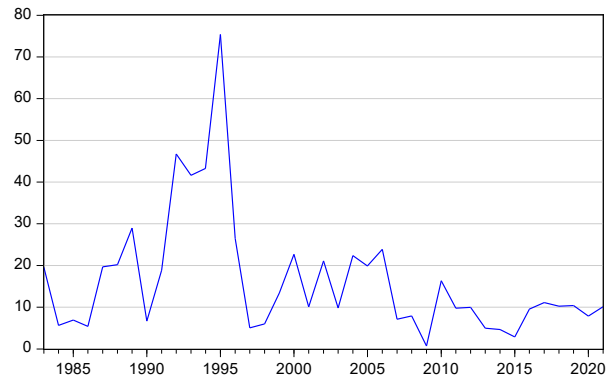


Figure 6: Institutional Quality (Government Effectiveness)

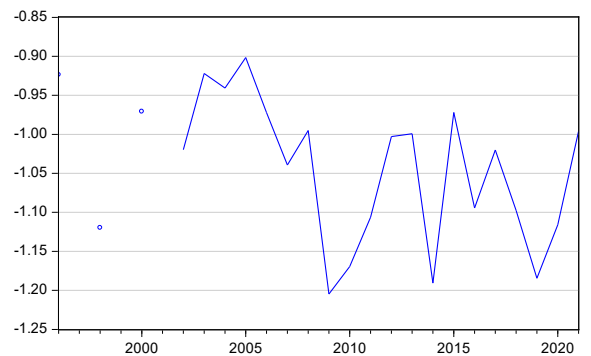


Figure 7: Oil Price

