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DETERMINANTS OF AGGREGATE IMPORT IN NIGERIA

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Abstract

While productive imports can boost the economy, excessive non-productive imports may negatively impact domestic industries and employment. The objective of this study is to identify the determinants of aggregate imports in Nigeria using an imperfect substitution model. This study analyses annual data for Nigeria that were obtained from 1981 to 2022 from the World Development Indicators and the CBN Statistical Bulletin. Key variables tested include foreign reserves, real effective exchange rate, real GDP per capita, import unit value, export per capita, foreign capital inflows to GDP and tariff rate. Using the autoregressive distributed lag (ARDL) Bounds test, findings reveal that import demand is positively impacted by real GDP per capita and foreign reserves, but not significantly by real effective exchange rates or tariff rates. Furthermore, exports per capita and foreign capital inflows when substituted for foreign reserves all have a positive impact on aggregate import per capita, while import unit value when substituted for real effective exchange rate and tariff rate does not affect real import per capita, all in the long. Based on these conclusions, the study recommends that authorities revise import policies to support local production, adjust foreign reserve holdings, and enhance export-led strategies to manage Nigeria's import demand effectively.

Keywords: Imports, Foreign reserves, Real effective exchange rate, Real GDP per capita, Tariff

Jel Classification Codes: C10, C18, F13, F14

1. Introduction

The dynamics of international trade, particularly imports, play a significant role in shaping the economic landscape of developing nations. A country's ability to expand and flourish economically is often believed to be significantly influenced by its import activities. However, excessive reliance on imports can have unfavourable effects on the domestic economy, especially when such commodities could be more profitably produced locally (Ayodotun & Farabiyi, 2016). While imports are crucial in stimulating economic growth, especially when focused on productive commodities (Nteegah &

Mansi, 2016), they must be carefully managed to prevent adverse effects on the balance of payments and domestic industries. This delicate balance necessitates policies to control and optimize the aggregate volume of imports, making it essential to understand the factors that determine import demand in Nigeria (Adenikinju & Chete, 2002; Egwaikhide, 2010).

Previous research has established various factors affecting import demand, but results have been inconsistent across different periods and methodologies (Oyejide et al., 2013; Omoke, 2012). In light of this, the purpose of this study is to investigate the factors that influence Nigeria's overall imports, with a particular emphasis on important macroeconomic variables including real GDP, exchange rate, the availability of foreign reserves, and tariff rates. The results will add to the body of knowledge already available on import demand in developing nations and might potentially lay the groundwork for future research on the dynamics of Nigeria's international trade, especially in light of the country's growing economic integration.

2.0 Literature review

The imperfect substitute theory, the Keynesian theory, and the Neo-classical theory are the main theories that explain the import demand function. Below is a review of these theories

2.1 Theoretical Review

2.1.1 Imperfect Substitute Theory

The imperfect substitute theory emphasizes the significance of the impact of price and income on import demand using three distinct approaches: Marshallian (1890); Chamberlainian (1933); and Cournot (1838) and Bartholomew (2010). According to Shuaibu and Fatai (2014), the Marshall condition presupposes growing returns at the industry level but steady returns to scale at the business level. To eliminate industry-level monopoly profit, the Chamberlainian strategy posits that the industry is made up of numerous monopolistic enterprises and new firms entering the market with differentiated products.

The Cournot approach presupposes a market structure with few imperfectly competitive companies that consider each other’s production as given (Shuaibu & Fatai, 2014; Bartholomew, 2010) The consumer is assumed to maximize utility subject to a budget restriction in the imperfect substitution theory, which is in line with the traditional demand theory. Stated differently, the import demand function takes into account the importing nation's revenue, the cost of the imported commodity, and the cost of goods produced locally as its arguments (Goldstein & Khan, 1985).

2.1.2 Keynesian theory

The significance of macroeconomic variables in influencing import demand is explained by the Keynesian hypothesis. It makes the assumptions that capital movements are flexible and employment is changeable in order to explain import demand as a function of price and income (Englama et al., 2013). It acknowledges and takes into account the

effects of shifting spending on output on the equilibrium of the balance of payments (Johnson, 1976).

2.1.3 Neo-classical Theory

The Heckscher Ohlin (H-O) framework, which was created based on Ricardo's work (1817), is linked to Neoclassical theory. According to the hypothesis, countries purchase items for which they have the least amount of factor endowment since they differ in terms of production factors (Englama et al., 2013). Stated differently, the idea posits that the cost at which the importing country produces a specific commodity in relation to its trade partner also influences import demand. The impacts of relative import prices on the volume and direction of international commerce are the main focus of comparative advantage (Shuaibu & Fatai, 2014).

2.2 Empirical Review

Hay and Mashkoor (2010) looked at the factors influencing imports into Bangladesh using the ARDL model and the rolling window regression technique. The long-term relationship between imports, national income, and relative price elasticities was demonstrated by the ARDL model's results, which indicated that while relative price elasticity was negative, income elasticity was positive. The rolling window regression analysis's findings showed that relative price elasticities ranged from 0.13 to 0.51 and long-run income elasticities were between 0.81 and 0.96.

The Republic of Cote d'Ivoire's import demand function was estimated by Case and Fair (2010). Using annual data for the years 1970–2007, the study used the co-integration technique and limits testing strategy to assess the long-term link between imports, relative import prices, final consumption spending, investment expenditure, and export expenditure. When import, final consumption expenditure, and relative prices are the dependent variables in the import demand function, there is additional evidence of a co-integration relationship between the variables. To promote economic growth, the report advised the nation's policymakers to keep a careful eye on shifts in the relative prices of goods and services.

Harvey and Sedegah (2011) investigated the import's composition, dynamics, and stability in Ghana by using the ARDL method. The findings showed that trade liberalization, foreign exchange reserves, and domestic income were important short- and long-term factors. According to the report, economic policies should be developed to raise per capita income at the macroeconomic level and lower poverty by distributing income fairly.

Cakmak et al. (2016) used quarterly data from 2003Q1 – 2014Q4 to determine the major drivers of imports in the Turkish economy using the VAR technique. Research has shown that a 1% increase in the real exchange rate corresponds to a 0.29% increase in imports, a 1% increase in exports results in a 0.86% increase in imports, and a 1% increase in the real exchange rate corresponds to a 3.14% increase in imports.

Nteegah and Nelson (2016) used the Ordinary Least Square (OLS) and co-integrated/error correction technique to study the determinants impacting import demand

in Nigeria from 1980 to 2014. The findings showed that while the degree of openness, gross capital formation, and external debt have positive effects on total import demand, changes in domestic prices and the exchange rate had a negative impact on Nigeria's total import demand.

Ogbonna (2016) calculated Nigeria's aggregate import demand function for the years 1980–2010. The co-integration strategy was used. The short-term coefficients between the explained and the explanatory variables were measured for short-term causal relationships, whereas the error correction term in the estimated VEC model was assessed for long-run causal relationships. The outcome suggested that import demand and real exchange rates, the world price index, and Nigerian disposable income had an underlying long-run stationary steady-state relationship. Over time, real exchange rates, the world price index, and disposable income all significantly influence Nigeria's import demand, with the causal relationship extending from the explanatory factors to imports. The real exchange rate, interest rate, world price index, and disposable income are all explanatory variables that do not substantially contribute to Nigeria's import demand.

Adeniyi (2018) performed a time series analysis of Nigeria's import demand for the period 1990 – 2016 using the Autoregressive Distributed Lag (ARDL) and discovered that, primarily due to the nation's limited local manufacturing capability, demand for imported commodities increases as the economy expands. Similarly, Akpan and Atan (2017) examined the relationship between income and imports in Nigeria for the period 1981 – 2015, using the Cointegration and Error Correction Model (ECM) and came to the conclusion that higher income levels raise the demand for foreign consumer goods and capital.

Adewuyi (2020) looked at how Nigeria's import demand was affected by exchange rates between 2001 and 2018. Using the autoregressive distributed lag (ARDL) Bounds test cointegration method, the study discovered that higher inflation rates reduce customers' purchasing power, which in turn lowers demand for imported goods. It did this by incorporating interest rate and inflation variables into the regression model. The results also showed that higher interest rates make borrowing more expensive, which can discourage investment in industries that depend on imports and hence reduce demand for imports.

Bahmani-Oskooee and Saha (2020) examined the effect of the exchange rate on India's bilateral exports to and imports from the 14 largest trading partners using the autoregressive distributed lag (ARDL) Bounds test. The study found short-run asymmetric effects that transform into long-run asymmetric effects in about half of the sample. The increase has positive and significant effects on India's exports to China but the decrease in real rupee-yuan has no effects. The increase in rupee-dollar has positive long-run effects on both the exports to and imports from the US but the decrease is inconsequential.

Oloso and Ogbuji (2021) employed a system-GMM dynamic panel analysis to investigate the relationship between exchange rate policy and economic growth in a sample of 40 Sub-Saharan African countries from 1970 to 2010. The findings suggest that exchange rate policy has a significant effect on economic growth, with appropriate exchange rate management contributing to higher growth rates.

Nora and Ubong (2021) employed the autoregressive distributed lag (ARDL) approach, the Bounds test for co-integration, and the error correction mechanism to trace the effect of exchange rate on import volume in Nigeria. The study covered the period 1981 to 2019 and revealed, that in the short-run dynamics, though the exchange rate has no significant effect on import volume, its one-period lag has a significant effect, Also, the import price index has the desired a priori sign (negative), but it has no significant effect on the import volume in the Nigerian economy.

Bahmani-Oskooee and Arinze (2022) explored the symmetric and asymmetric effects of exchange rates on trade flows between U.S. and African countries. The results confirmed the long-run asymmetric effect of exchange rate swings of U.S. exports to 15 countries and U.S. imports from 12, as well as revealed a significant asymmetric short-run effect of exchange rate fluctuation on U.S. exports to and imports from 20 of the countries.

3.0 Methodology

3.1 Theoretical Framework

The study's theoretical underpinnings can be found in the imperfect substitute model. The imperfect substitute model developed by Goldstein and Khan (1985) offers a framework for understanding the complexity of global trade by taking into account the unique characteristics of exchanged products.

The model posits that not all traded goods are perfect substitutes. This implies that changes in exchange rates will have varying effects on different categories of imports, depending on factors such as product differentiation, quality, and brand identity. Central to the model is the concept of elasticities of substitution, which measures the responsiveness of the quantity demanded of one good to a change in the price of another. The imperfect substitution theory highlights the significance of price and income effects on import demand by utilizing three different approaches: Marshallian, Chamberlainian, and Cournot (Bartholomew, 2010).

Import prices are regarded as exogenously given by the model, which claims that imported items are inadequate replacements for native goods and that supply elasticities are unlimited. As such, the theory's explanatory variables include relative prices and income, with the actual effective exchange rate acting as a stand-in for the import price index because it is difficult to produce an import price index for every import category. Thus, the import demand function for such a country can be expressed as in the equation below:

$$IMPi = f(RGDPPC, REER) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$

Real GDP per capita (RGDPPC) and real effective exchange rate (REER) are proposed as key explanatory variables in the above-mentioned theoretical framework. Price is thought to have a negative impact on the quantity of imports, whereas income is thought to have a favourable impact on imports. An upward movement of the real exchange rate is expected to have a positive (as opposed to negative) effect on imports because the real effective exchange rate is a proxy for the price that importers must deal with and it is

defined or measured in this study in a way that indicates appreciation of the local currency, or naira.

3.2 Model Specification

This study uses the imperfect substitute model developed by Goldstein and Khan (1985), which Bobic (2009) and others have empirically applied. Equation 3.1, which was previously mentioned in Section 3.1, has been updated to serve as the mathematical equation for estimation in this study. Equation 3.1 is modified by log-linearising it and adding two additional explanatory variables, TR and FRPC, respectively, also, the equation will be split into three where IUV and EXP will be used as a substitute for REER and FR respectively in equation 3.3 and FCI will replace FR in equation 3.4. The model's econometric form is given as follows once the intercept, error, and time subscripts t, are introduced:

$$LogIMPt = \alpha + \beta 1 logRGDPPCt + \beta 2 logREERt + \beta 3 logFRPCt + \beta 4 logTRt + ut \dots\dots\dots\dots\dots\dots\dots (3.2)$$

$$LogIMPt = \alpha + \beta 1 logRGDPPCt + \beta 2 logIUVt + \beta 3 logEXPt + \beta 4 logTRt + vt \dots\dots\dots\dots\dots (3.3)$$

$$LogIMPt = \alpha + \beta 1 logRGDPPCt + \beta 2 logREERt + \beta 3 logFCIt + \beta 4 logTRt + \mho t \dots\dots\dots\dots\dots (3.4)$$

where:

IMP = aggregate import

RGDPPC = real GDP per capita;

REER stands for real effective exchange rate, and a rise in this rate indicates a true appreciation of the naira;

FRPC = foreign reserves per capita measured in US dollar and expressed as a percentage of import;

IUV = Import unit value

EXP = export price measured in US dollar and expressed as a percentage of import;

FCI = foreign capital inflows as a percentage of GDP;

TRi is the tariff rate on the import of category i merchandise;

t = time dimension;

β = intercept;

Log = natural logarithm; and

u, v, and ℧ = stochastic or error terms.

The estimated parameters of the model are made to be elasticities by formulating it in logarithmic or log form. Because it takes into account the potential for non-linear

interactions between the dependent and independent variables, log transformation is acceptable. Additionally, it lessens the likelihood of heteroskedasticity and changes highly skewed variables into a more normal distribution. This occurs as a result of the scale for measuring the variables being compressed. A suitable method for converting highly skewed variables into more normal ones is log transformation. Lastly, because it compresses the scale used to measure the variables, it lessens the likelihood that heteroskedasticity would arise.

3.3 Data and Sources of Data

The analysis makes use of annual time series data spanning major economic factors pertinent to Nigeria's import behavior, from 1981 to 2022. The CBN Statistical Bulletin (2022) provided data on real imports, real GDP, real effective exchange rate, tariff rate, and real export per capita. World Development Indicators (2022) provided data on foreign reserves per capita and real foreign capital inflows relative to GDP. The value of foreign goods and services imported by Nigerian citizens is represented by Real Imports per Capita (RIMPC), which is normalized by population size and adjusted for inflation using the GDP implicit price deflator (base year 2000 = 100). Real GDP per Capita (RGDPPC) measures the average income per person in Nigeria, calculated by dividing total national income by the population and adjusted to constant prices using the GDP deflator (base year 2000 = 100). Additionally, after accounting for variations in price levels, the Real Effective Exchange Rate (REER) shows how much Nigeria's currency is worth in relation to the currencies of its trading partners. A rise in REER signifies a real appreciation of the Naira.

Furthermore, Foreign Reserves per Capita (FRPC) are calculated by dividing Nigeria's nominal foreign reserves (in USD) by the population and adjusting for inflation using the US GDP implicit deflator (base year 2000 = 100). This variable indicates the reserves available for addressing the balance of payments imbalances. Tariff Rate (TR) measures the government-imposed taxes on imported goods, expressed as a percentage of the import value. Higher tariffs typically increase the cost of imports. Real Exports per Capita (EXPPC) represent the value of goods and services exported from Nigeria, adjusted for inflation and normalized by population size. Real Foreign Capital Inflows relative to GDP (FCIPC) represent the value of foreign direct investment, portfolio investments, and other capital inflows into Nigeria, adjusted for inflation using the US GDP implicit deflator (base year 2000 = 100). The World Bank's World Development Indicators (2022) is the source of this information which is a secondary source of data.

4.0 Result and Discussion

4.1 Pre-estimation Analysis

4.1.1 Descriptive Statistics

Table 1 shows the result of descriptive analysis. The variable acronyms and their descriptions, mean, maximum (max), minimum (min), and standard deviation (std. Dev) values are all listed in columns of the table.

Table 1 Descriptive Statistics

Var.	Description	Mean	Max.	Min.	Std Dev.
RIMPPC	Total imports per capita, at 2021 constant value of Naira (thousand)	3.214	5.891	0.889	2.891
REER	Real effective exchange rate index (2000=100), with an upward movement representing appreciation of Naira in real terms	147.379	536.911	49.776	115.783
IUV	Import unit value	154.28	408	94.62	87.29
FRPC	Foreign reserves per capita (real)	118.598	5.79	0.18	103.587
EXPPC	Real export per capita, at 2021 constant value of US$	4.529	8.785	0.024	2.356
FCIPC	Gross foreign capital inflows, % of GDP	1.475	5.79	0.18	1.235
RGDPPC	Real GDP per capita, at 2021 constant value of Naira (thousand)	1.896	2.679	1.408	4.612
TR	Tariff rate, tariff revenue as a percentage of merchandise imports	18.645	36.02	5.25	8.210

Source: Author's Computation, 2024

Var stands for variable, Max for maximum, Min for minimum, and Std. Dev. for standard deviation. There are 41 observations total for each variable.

Measured in thousands of 2021 constant value of Naira, real import per capita (RIMPPC) had a mean value of 3.214, a maximum and minimum of 5.891 and 0.889, respectively, and a standard deviation of 2.891. For the real effective exchange rate (REER) index (2000=100), the standard deviation was 115.783, the mean was 147.379, the maximum was 536.911, and the minimum was 49.776. Additionally, the import unit value (IUV) had a mean value of 154.28, a maximum and minimum of 408 and 94.62, respectively, and a standard deviation of 87.29. In terms of foreign reserves per capita (FRPC), the standard deviation was 103.587, the smallest value was 0.18, the maximum value was 5.79, and the mean was 118.598. Furthermore, the average export receipt per capita (EXPPC) in US dollars constant with 2021 was 4.529; the highest value was 8.785, the lowest was 0.024, and the standard deviation was 2.356. Regarding foreign capital inflows relative to GDP (FCIPC), the standard deviation was 1.235, the maximum value was 5.79, the minimum was 0.18, and the mean was 1.475 as a percentage of GDP. In a similar vein, the real GDP per capita (RGDPPC) mean, expressed in thousands of constant Naira for 2021, was 1.896, with a maximum of 2.679, a low of 1.408, and a standard deviation of 4.612. When expressed as a percentage of merchandise imports, the tariff rate mean value was 18.645, its maximum value was 36.02, its minimum value was 5.25, and its standard deviation was 8.210.

4.1.2 Correlation Analysis

Every set of variables' pairwise correlation coefficients are displayed in Table 2, along with the corresponding p-values, beneath the correlation coefficients. The correlation coefficients' p-values, which are the values enclosed in parenthesis, show how statistically significant the correlation coefficient is for each pair of variables. In this study, a correlation between two variables is considered to exist if the correlation coefficient's p-value is less than 5%. That is, the study specified cut-off significance level

is 5%, and if the p-value is higher than the selected 5% crucial value, no association is considered to exist.

Table 4.2: Correlation Table

Correlation Probability	RIMPPC	CGIMPPC	COGIMPPC	SIMPPC	REER	IUV	FRPC	EXPPC	FCIPC	RGDPPC	TR
RIMPPC	1.000 ----										
CGIMPPC	0.809 (0.000)	1.000 ----									
COGIMPPC	0.883 (0.000)	0.857 (0.000)	1.000 ----								
SIMPPC	1.000 (0.000)	0.809 (0.000)	0.883 (0.000)	1.000 ----							
REER	-0.247 (0.119)	0.079 (0.624)	-0.095 (0.554)	-0.247 (0.119)	1.000 ----						
IUV	0.519 (0.000)	0.204 (0.202)	0.407 (0.008)	0.519 (0.000)	-0.106 (0.508)	1.000 ----					
FRPC	0.834 (0.000)	0.687 (0.000)	0.716 (0.000)	0.833 (0.000)	-0.333 (0.033)	0.297 (0.059)	1.000 ----				
EXPPC	0.093 (0.563)	-0.025 (0.875)	-0.017 (0.914)	0.093 (0.563)	-0.557 (0.000)	-0.309 (0.049)	0.249 (0.116)	1.000 ----			
FCIPC	-0.091 (0.573)	-0.147 (0.359)	-0.154 (0.337)	-0.091 (0.573)	-0.456 (0.003)	-0.321 (0.041)	0.023 (0.885)	0.387 (0.012)	1.000 ----		
RGDPPC	0.883 (0.000)	0.684 (0.000)	0.879 (0.000)	0.883 (0.000)	-0.301 (0.056)	0.571 (0.000)	0.790 (0.000)	-0.031 (0.846)	-0.166 (0.299)	1.000 ------	
TR	-0.361 (0.020)	-0.264 (0.096)	-0.371 (0.017)	-0.361 (0.020)	0.163 (0.309)	-0.192 (0.229)	-0.391 (0.011)	0.060 (0.707)	-0.118 (0.464)	-0.407 (0.008)	1.000 -----

Source: Author's computation, 2024

Beginning with Table 2's first column, it is shown that real imports per capita (RIMPPC) have a positive correlation with IUV, FRPC, EXPPC, and RGDPPC and a negative connection with REER and FCIPC, based on the correlation coefficients' adopted crucial statistical significance at the 5% level. Going on to the second row and column, it can be seen that REER has no positive correlation with any of the variables, FRPC, EXPPC, and FCIPC have negative correlations with it, while RIMPPC, IUV, RGDPPC, and TR have no correlations with it. Regarding the third column and row import unit value is correlated positively with RIMPPC and RGDPPC, negatively with EXPPC and FCIPC, and uncorrelated with REER, FRPC, and TR.

Regarding the fourth column and fourth row, there exists a positive correlation between foreign reserves per capita and RIMPPC and RGDPPC, a negative correlation with REER and TR, and no correlation with IUV, EXPPC, and FCIPC. Export per capita is reportedly positively connected with FCIPC, negatively correlated with REER and IUV, and uncorrelated with RIMPPC, FRPC, RGDPPC, and TR in the fifth column and fifth row. As a proportion of GDP, foreign capital inflows are connected positively with EXPPC, negatively with REER and IUV, and uncorrelated with RIMPPC, FRPC, RGDPPC, and TR in the sixth column and sixth row. Similarly, real GDP per capita, or GDPPC, is linked positively with IUV and FRPC, negatively with TR, and uncorrelated with REER, EXPPC, and FCIPC in the seventh column and seventh row. The tariff rate as a percentage of item imports is finally shown to be uncorrelated with REER, IUV, EXPPC, and FCIPC, negatively correlated with RIMPPC, FRPC, and RGDPPC, and not favourably linked with any of the other variables (see the eighth row).

4.1.3 Results of Unit Root Tests

Because their p-values at the level form are less than 0.05 significance value, the results in Table 3 demonstrate that only FCIPC and LTR are stationary at the level. Conversely, LRIMPPC, LREER, LIUVPC, LFRPC, LEXPC, and LRGDPPC are only stationary at the first difference and not at level.

Table 3: ADF Unit Root Test Results

Variable Acronyms	Whether level or first difference	t-statistic	p-value	Order of integration
LRIMPPC	At level	-1.6294	0.4583	I(1)
	At first difference	-29389	0.0000	
LREER	At level	-2.1181	0.2389	I(1)
	At first difference	-4.3489	0.0014	
LIUV	At level	-1.7578	0.3884	I(1)
	At first difference	-3.9292	0.0000	
LFRPC	At level	-1.0798	0.7138	I(1)
	At first difference	-5.4635	0.0001	
LEXPC	At level	-2.6709	0.0880	I(1)
	At first difference	-8.4159	0.0000	
FCIPC	At level	-3.8715	0.0050	I(0)
	At first difference	-	-	
LRGDPPC	At level	-0.6859	0.8386	I(1)
	At first difference	-3.8712	0.0050	
LTR	At level	-3.5266	0.0084	I(0)
	At first difference	-	-	

Source: Author's computation, 2024

This is because, when first differenced, all of their p-values are less than 0.05, but at level, they all exceed that threshold. Since some variables in each model have unit roots in their level form, estimating the equations using the OLS approach is likely to yield erroneous results.

4.2 Estimation Results

4.2.1 Results of Cointegration Bound Test

As shown in Table 4 for the ARDL Bound test result, the dependent variable is RIMPPC, with 3 variants of its equations that are labelled (a), (b) and (c), depending on the combination of the independent variables that are made to feature in each variant.

Table 4: ARDL Bounds Test Results

The equations in Table 4 below are all variants of equations 3.2, 3.3 and 3.4 of Chapter 3.

Models	F.stat.	Upper and lower Bounds at 5% significant Level	Remarks
a) $LRIMPPC_t = \alpha + \beta_1 LRGDP_t + \beta_2 LREER_t + \beta_3 LFR_t + \beta_4 LTR_t + \mu_t$	7.587	$I_0 = 2.893$, $I_1 = 4.000$	Co-integrated
b) $LRIMPPC_t = \alpha + \beta_1 LRGDP_t + \beta_2 LIUV_t + \beta_3 LEXP_t + \beta_4 LTR_t + v_t$	5.924	$I_0 = 2.893$, $I_1 = 4.000$	Co-integrated
c) $LRIMPPC_t = \alpha + \beta_1 LRGDP_t + \beta_2 LREER_t + \beta_3 LFCI_t + \beta_4 LTR_t + \mu_t$	5.945	$I_0 = 2.893$, $I_1 = 4.000$	Co-integrated

Source: Author's Computation, 2024.

Explanatory Note: The acronyms used in the table have the following meanings: The variables are expressed in logarithms: β = intercept, t = time dimension, μ = error term, TR = tariff rate, RGDPPC = real GDP per capita, REER = real effective exchange rate, IUV = import unit value, FRPC = foreign reserves, EXPPC = export receipt per capita, FCIPC = foreign capital inflows per capita, and the prefix "L" indicates that the variables are logarithmically expressed. If the F-statistic is more than the upper bound critical value (I1) at the 5% significance level, the model is considered cointegrated; if the F-statistic is less than the lower bound critical value (I0) at the 5% significance level, the model is considered not cointegrated. If the F-statistic lies between the lower and higher bounds, the test is not conclusive.

Table 4 illustrates that, at the 5% significance level, the estimated F-statistic for every model surpasses its critical value, or upper bound I1, which is 4.000. According to the previously mentioned choice rule, this suggests that the variables included in all three models have co-integration. Consequently, each dependent variable and its regressors have a long-term relationship, making the long-run estimates relevant**.**

4.2.2 Results of the ARDL Analysis

For the three models (Models 1a, 1b, and 1c), the ARDL long-run estimates are shown. The coefficients, t-statistics, and p-values are presented, accordingly, for each model estimate. A coefficient or parameter is considered statistically significant in this study, and as a result, the related explanatory variable is only determined to have an impact on the dependent variable if the p-value does not exceed the 5% significant level.

Table 5: Long-run ARDL Estimates of the Import Functions

Variables	**Model 1a featuring LFRPC**	**Model 1b featuring LEXPPC**	**Model 1c featuring LFCIPC**
	Coeff. (t-stat.) [P–value]	**Coeff. (t-stat.) [P–value]**	**Coeff. (t-stat.) [P–value]**
LRGDPPC	0.175 (2.266) [0.039]	0.130 (2.554) [0.018]	0.317 (4.528) [0.000]
LREER	-0.158 (-2.047) [0.059]	-	-0.236 (-0.132) [0.896]
LFRPC	0.314 (3.185) [0.006]	-	-
LTR	-0.334 (-1.413) [0.179]	-0.269 (-1.067) [0.297]	-0.166 (-0.425) [0.067]
FCIPC	-	-	0.109 (2.532) [0.023]
LEXPPC	-	0.112 (2.299) [0.031]	-
LIUV	-	0.233 (1.775) [0.089]	-
ECT_{t-1}	-0.774 [0.000]	-0.842 [0.000]	-1.454 [0.000]
R^2	0.973 [0.000]	0.935 [0.000]	0.952 [0.000]
F-statistic	23.138 [0.000]	22.844 [0.000]	12.859 [0.000]
VIF test statistic for multicorrelation	(3.902)	[2.171]	(5.84)
Breusc-Godfrey LM Test statistic for Autocorrelation	0.145 [0.865]	1.515 [0.243]	0.271 [0.767]
Breusch-Pagan-Godfrey Test statistic for Heteroscedasticity	1.577 [0.191]	1.769 [0.111]	2.356 [0.051]
Jarque-Bera Test Statistics for Normality	0.381 [0.826]	2.715 [0.257]	0.104 [0.948]
Ramsey Reset for Model	12.175 [0.004]	2.984 [0.098}	0.21 [0.654]

Sources: Author's computation, 2024

Explanatory Notes: The acronyms for the explanatory variables utilized in the study have the following meanings: Real GDP per capita is represented by RGDPPC, real effective exchange rate by REER, foreign reserve per capita by FRPC, tariff rate by TR, foreign capital inflows per capita by FCIPC, export per capita by EXPPC, and import unit value by IUV. There are a total of 41 observations for each variable. Furthermore, "t-stat" denotes "t-statistic," "coeff" denotes "coefficient," and "p-value" denotes "probability value."Within the parenthesis, the test statistic is provided in the "( )" form, but the probability value, or p-value, is indicated by the number in the "[ ]" form.

If the p-value of a coefficient's test statistic is less than the 5% critical value, the coefficient is deemed statistically significant. The test statistic and corresponding p-value for each of the following five variables—multicollinearity, autocorrelation, heteroscedasticity, normality, and Ramsey Reset—are recorded in the corresponding rows.

Table 5 presents the R^2 values for models 1a, 1b, and 1c, which are 97.3%, 93.5%, and 95.2%, respectively. This suggests that the model's explanatory variable fluctuations account for 97.3%, 93.5%, and 95.2% of the variations in import demand. Additionally, the Table's result demonstrates that the R^2 value's F-statistics are statistically significant at 5%. As a result, this suggests that each model has a high level of overall fitness and strong explanatory power.

Asteriou and Stephen (2016) found that the results of the Variance Inflation Factor (VIF) test, which was used to identify multicollinearity problems, also show that the average values of the VIF statistic obtained are not above the value of 5, which is generally considered to be a cutoff above which multicollinearity may be a problem.

Similar to this, the results of the Breusch-Pagan/Cook-Weisberg test show that the model does not have a heteroscedasticity issue because all of the p-values exceed the study's chosen 5% cutoff point, and the Breusch-Godfrey LM autocorrelation test similarly shows that there is no autocorrelation in the model because the p-values are not statistically significant at the study's chosen 5% cutoff. Ultimately, the residuals are normally distributed since all of the p-values are greater than the study's chosen 5% cutoff point, according to the results of the normality in the distribution of residuals test, which was used to assess whether the residual distribution was normal or non-normal.

After assessing the results of the diagnostic tests, the performance of each particular variable contained in the model is now examined below.

The table's conclusion reveals that the RGDPPC, REER, FRPC, and TR coefficients in Model 1a are, respectively, 0.175, -0.158, 0.314, and -0.334, with corresponding p-values of 0.039, 0.059, 0.006, and 0.179. The coefficients of REER and TR are not statistically significant, indicating that they have no effect on imports, whereas only RGDPPC and FRPC are positive and statistically significant, suggesting that they have a positive effect on imports.

Additionally, the results demonstrated that the RGDPPC, TR, EXPPC, and IUV coefficients in Model 1b are 0.130, -0.269, 0.112, and 0.233, respectively, with corresponding p-values of 0.018, 0.297, 0.031, and 0.089. This indicates that the IUV, RGDPPC, and EXPPC coefficients are all positive and statistically significant, although the IUV coefficient is not; similarly, the negative TR coefficient is also not statistically significant. This indicates that RGDPPC has a favorable impact on import while IUV and TR have no effect at all. Lastly, Model 1c's RGDPPC, REER, TR, and FCIPC coefficients are 0.317, -0.236, -0.166, and 0.109, respectively, with corresponding p-values of 0.000, 0.896, 0.067, and 0.023. This suggests that whereas the coefficients of REER and TR are not statistically significant and are negative, those of RGDPPC and FCIPC are, suggesting that RGDPPC and FCIPC have a positive impact on import while REER and TR have no effect.

In conclusion, all three models showed that real GDP per capita had a positive and statistically significant effect on imports, suggesting that it influences import demand positively. Models 1a and 1c, which included the real effective exchange rate, both had negative coefficients but were not statistically significant at the 5% level. Only model 1a,

which included foreign reserves per capita, demonstrated a statistically significant and favourable effect. The tariff rate was not statistically significant in any of the three models, yet it continuously displayed negative coefficients. The overwhelming of research indicates that tariff rates have a negative impact on import demand. Only in model 1b, the import unit value have a positive coefficient but was not statistically significant. In terms of robustness and definitiveness, the recently added variables Real Export per capita (EXPPC) and Foreign Capital Inflows (FCIPC) perform better than Foreign Reserves per capita. Models 1b and 1c show that both FCIPC and EXPPC have statistically significant and favourable effects on imports. This implies that, as opposed to static foreign reserves, which might not accurately reflect ongoing economic activity, export revenues and capital inflows are more trustworthy and up-to-date measures of a nation's import capacity. The strong performance of these variables makes them superior substitutes in explaining import demand. There are 3 models estimated in this study to accommodate all the models employed. IUV is made to replace REER in model 1b where a negative effect on import demand is expected. Also, EXP replaces FR in model 1b while FCI is a substitute for in model 1c where a positive effect is expected on import demand in Nigeria.

Based on the above methodology, the highlights of the findings in the long are as follows:

a) The coefficients of real GDP per capita are positive and statistically significant in 3 models.
b) The findings show that the 2 coefficients of the real effective exchange rate in models 1a and 1c are negative and insignificant.
c) The coefficient of foreign reserves per capita is positive and statistically significant in model 1a.
d) The 3 coefficients of tariff rate (TR) in the 3 models for total imports per capita are negative but statistically insignificant.
e) Foreign capital inflows in relation to the GDP coefficient are positive in model 1c and statistically significant.
f) The coefficient of export per capita in model 1b is positive and statistically significant.
g) The coefficient of import unit value in model 1b is positive but statistically insignificant.

5. Conclusion and Recommendations

The purpose of these studies is to provide a foundation for policy designed to encourage specific import categories (such as consumer goods and capital goods) and discourage excessive importation. Nevertheless, there aren't many of these studies, especially in Nigeria, and when there are, their conclusions are sometimes inconsistent with one another and have certain methodological flaws. Thus, the goal of this research is to close these information gaps. As a result, the study's particular goals are to scientifically look at what influences Nigeria's total imports.

The study employs the imperfect substitute theory as the theoretical foundation around which the models in the study were constructed in order to accomplish the aforementioned goal. Three model estimations in all were presented in the study, with

alternative variants of the models being stated and estimated for real imports per capita. Furthermore, real GDP per capita, real effective exchange rate, foreign reserves per capita, export receipt per capita, foreign capital inflows per capita, import unit per capita, and tariff rate were the seven explanatory variables that were included in the models. Based on the outcomes of the co-integration test carried out using the ARDL Bounds test and the unit root test carried out through the ADF method, all of the models, which were found to be cointegrated, were estimated using the ARDL estimating technique. Appropriate diagnostic tests were also carried out to ascertain whether multicollinearity, heteroscedasticity, autocorrelation, and normality existed in the distribution of the regression residuals in order to verify the accuracy of the estimations that were supplied. The World Bank's World Development Indicators and the Central Bank of Nigeria's Statistical Bulletin provided the annual statistics for the 1980–2022 period that were used in the research.

Overall, the study's findings indicate that the three models' Real GDP per capita coefficients are statistically significant and positive, suggesting that RGDPPC has a highly favourable impact on per capita imports. Additionally, the results demonstrated that the two real effective exchange rate coefficients in the model for total import per capita are statistically insignificant but negative, indicating that the rate has no bearing on import per capita. There is a strong positive correlation between foreign reserves per capita and imports per capita, as seen by the positive and statistically significant coefficient. The three models' tariff rate coefficients are all negative and statistically insignificant, indicating that the tariff has no impact on imports per person. The statistical significance of the positive correlation between the GDP coefficient and foreign capital inflow suggests a favourable impact on per capita imports. Additionally, there is a positive and statistically significant export per capita coefficient. This suggests that imports per capita will increase. Lastly, there is no influence on import per capita due to the positive but statistically insignificant coefficient of import unit value at 5%.

The recommendations listed below are based on the findings mentioned above:
a) Policymakers need to embark on expenditure-reducing policies so as to reduce the income level and, hence, aggregate demand and therefore lower the demand for imports in Nigeria.
b) Policymakers need to continuously assess the country's foreign reserve holdings on the basis of the projected or anticipated volume of imports that the economy needs.
c) Policies aimed at boosting exports should be pursued, as export earnings enable greater import capacity. This could include enhancing trade agreements, improving export infrastructure etc.
d) Policymakers should review and possibly reform tariff structures to better target non-productive imports rather than imposing general tariffs. Instead, policies such as targeted subsidies or tax relief for key sectors could be more effective in promoting local industries and reducing dependency on imports.

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