

THE EFFECT OF REAL EFFECTIVE EXCHANGE RATE ON IMPORTS AND EXPORTS IN NIGERIA

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Abstract

This paper explores how the macroeconomic variables affect the trade balance in Nigeria between the year 1991 and 2023. The study incorporates the ex post facto research design and uses the Autoregressive Distributed Lag (ARDL) bounds testing model to analyse both short-term and long-term dynamics based on Secondary data obtained from Central Bank of Nigeria and the World Bank Development Indicators. Empirical evidence suggests that there is the long-run equilibrium relationship between trade balance and the choice of macroeconomic variables. In particular, effective exchange rate has a negative impact on trade balance, which implies that currency appreciation deteriorates the external trade position of Nigeria whereas gross domestic product has a positive and significant effect on trade balance due to the increase in production and export capacity. Money supply, inflation and the interest rate were also noted to be statistically insignificant in the long run. In the short-run, dynamics show that there are weak direct impacts of these variables on the balance of trade. The paper suggests policies to stabilize exchange rates, boost economic growth, and also to help the export-oriented sectors in enhancing trade balance in Nigeria. The macroeconomic management is the key to sustainable performance in the external sectors.

Key words: Money supply, Inflation, Exchange rate, Trade balance

JEL Classification: F31, F32, F41, E52, C22

I. INTRODUCTION

Government budget balances have an impact on Nigeria's trade balance; trade deficits arise from inflows of foreign financial investment, while surpluses arise from outflows (Central Bank of Nigeria, 2021). Implementing monetary policies to attain both internal and external economic balance is the responsibility of the Central Bank of Nigeria (CBN). Open market operations, discount rates, cash reserve ratios, liquidity ratios, exchange rates for selective credit control, and moral persuasion are some of the tools employed. Maintaining the economy's internal goals and keeping an eye on the external balance depend heavily on monetary policy (Odungweru & Ewubare, 2020). Particularly in cases with a deficient trade balance, a change in the exchange rate can aid in achieving external balance (Ashamu, 2020).

Devaluation might be necessary for developing nations to eventually profit from global trade. However, because J-Curve effects happen during times of currency depreciation, the trade balance improvement might not be noticeable right away (World Bank, 2020). Wide variations in bilateral exchange rates resulted from the adoption of floating exchange rate regimes by numerous economies following the demise of the Bretton Woods Monetary System. Because of the possible harm to trade, this has sparked a renewed interest in exchange rates. According to conventional wisdom, as risk-averse traders distance themselves from high-risk trading commitments, the increased risk that comes with bilateral exchanges may result in a decrease in trade volume. The risk portfolio, on the other hand, disputes this, contending that greater risk equates to greater return.

Sub-Saharan African nations, especially Nigeria, have had varying exchange rate regimes for a long time (Nur & Ali, 2025). According to recent IMF research, there is no one recommended exchange rate regime; rather, the best regime for a nation is determined by its particular circumstances and macroeconomic difficulties. International trade

is frequently significantly impacted by the relative values and fluctuations of national currencies (Urgessa, 2024). There are unique challenges when analysing how the currency rate affects global trade in an inflationary economy like Nigeria. Inflation-adjusted exchange rates, also known as real effective exchange rates, were not employed in any of the studies that evaluated the relationship between Nigeria's exchange rate and international commerce (Islam & Faisal, 2024).

A country's yearly income is measured by its gross domestic product (GDP), which is used to evaluate economic growth and performance (Musa & Idris, 2024). It is a trustworthy gauge of a nation's standard of life and economic well-being. Consumption, investment, government purchases, net exports, labour force participation, and the real effective exchange rate (REER) are some of the elements that affect GDP (Udochukwu, 2024). This study examines the connections between labour force participation, real exports, real imports, and REER in Malaysia between 1988 and 2017. Increasing GDP value is mostly dependent on the government because it can enact laws that strengthen the economy. More advanced nations result from attracting more investors with greater GDP values. Exports should be encouraged, imports should be decreased, and human capital development should be funded by the government (Zebulon, 2024).

Given the complexity of the global economy and the growing significance of international commerce, it is imperative to comprehend and examine how exchange rate variations affect international trade (Salvatore, 2019). The impact of exchange rate variations on international trade is examined in this study using economic theories, with an emphasis on the Marshall-Lerner condition. In a free market, supply and demand determine exchange rates, according to classical economic theory, which also predicts that markets will automatically attain equilibrium (Dornbusch, Fischer, and Startz, 2014). A trade surplus occurs when exports outpace imports, which raises demand for money and drives up exchange rates (Adewale, 2025).

A trade deficit, on the other hand, indicates that imports are greater than exports, which lowers demand and lowers exchange rates. David Hume's Price-Specie Flow Mechanism describes how changes in exchange rates balance the trade balance by allowing gold to move between nations. Neo-classical economic theory uses equilibrium theories and market mechanisms to explain how exchange rates and the trade balance are related (Dornbusch et al., 2013).

Nigeria's trade performance has remained a subject of concern for policymakers and economists alike. Despite the country's vast natural resources and various trade and monetary policy reforms, the nation continues to experience persistent trade deficits, weak export diversification, and high dependence on imported goods. These challenges have raised critical questions regarding the effectiveness of the exchange rate and other macroeconomic fundamentals in influencing trade outcomes.

One of the key variables affecting trade performance is the real effective exchange rate. The real effective exchange rate captures the value of Nigeria's currency relative to a basket of its major trading partners, adjusted for inflation differentials. In theory, a depreciation in the real effective exchange rate should improve the trade balance by making Nigerian exports more competitive while discouraging imports. However, empirical trends in Nigeria have often contradicted this expectation. Trade deficits have continued to widen, even in periods of currency depreciation, suggesting that other macroeconomic variables may be influencing the relationship.

Among these variables is money supply, which reflects the overall liquidity in the economy. An increase in money supply may lead to higher domestic consumption, including a rise in the demand for imported goods, thereby worsening the trade balance. Similarly, the level of gross domestic product influences both the capacity to produce goods for export and the demand for foreign goods. High inflation rates tend to erode the international competitiveness of domestic products, making exports less attractive and imports more appealing. Interest rates, by influencing the cost of credit, can affect investment in export-related production and the affordability of imported goods.

Despite the theoretical linkages between these macroeconomic indicators and trade performance, there is limited and inconclusive empirical evidence on how they jointly affect Nigeria's trade balance over time. Previous studies have often focused on individual variables or short-term trends, without providing a comprehensive analysis over a long-term period. Given the continued volatility in Nigeria's external sector and the shift in economic policy frameworks, there is a need for a detailed investigation into how these macroeconomic factors have influenced the trade balance over the past three decades.

Therefore, this study seeks to examine the effect of the real effective exchange rate, money supply, gross domestic product, inflation rate, and interest rate on Nigeria's trade balance between the years 1991 and 2023.

The broad objective of this study is to examine the effect of the Real Effective Exchange Rate on Nigeria's trade performance. The specific objectives are to: assess the impact of the Real Effective Exchange Rate (REER) on Nigeria's trade balance, examine the influence of money supply on the trade balance in Nigeria, investigate the relationship between Gross Domestic Product (GDP) and trade balance in Nigeria, determine the effect of inflation rate on Nigeria's trade balance, analyze how interest rate affects the trade balance in Nigeria.

II. LITERATURE REVIEW

Conceptual review

Balance of Trade

The balance of trade (BOT) is a measure of a country's trade balance, which is the difference between its imports and exports over a specific period (Ahmad et al., 2022). A positive BOT indicates a trade surplus, while a negative BOT indicates a trade deficit. The formula for calculating BOT is: The value of exports less the value of imports is the BOT formula. However, a positive or negative BOT does not necessarily indicate a healthy or weak economy (Adewale, 2025). The benefits of a positive or negative BOT depend on factors such as the countries involved, trade policy decisions, the duration of the BOT, and the size of the trade imbalance (Blecker, 2022).

Most economists concur that trade deficits and surpluses are neither intrinsically beneficial nor detrimental to the economy (Aginam, 2024). When exports surpass imports, there is a positive balance; when exports are less than imports, there is a negative balance (Adewale, 2025). The difference between a country's imports and exports is known as its trade balance; a positive balance denotes a net inflow of foreign exchange (Efionayi & Agunobi, 2024). Exchange rates, domestic demand, trade regulations and tariffs, and international economic conditions are some of the variables that might affect a country's trade balance (Dissou & Nafie, 2021). While weaker currencies might make exports more inexpensive and increase demand, exchange rates can make exports more costly and reduce their competitiveness in the global market (Janko, 2020).

Depending on the nation's economic growth, domestic demand may result in either a rise or a fall in imports, a country's trade balance may also be impacted by trade regulations and tariffs, which may raise domestic output while raising the cost of imported goods (Aiyedogbon, 2024). Global economic conditions can also affect a country's trade balance; countries that rely heavily on a particular commodity may be affected by fluctuations in commodity prices, and a global economic slump may reduce export demand (Obi-Nwosu, 2024). For instance, the trade balances of nations that export oil, such as Saudi Arabia, have been greatly influenced by declining oil prices (Adewale, 2025).

Exchange Rate

The exchange rate is a measure of a country's currency competitiveness, affecting its overall economic performance (Odumisor, 2019). It is an important economic variable, impacting all sectors, especially the manufacturing sector. Because of the greater uncertainty surrounding returns, exchange rate changes might discourage investment in nations with heavy imports, such as Nigeria (Akighir, 2023). Exchange rate volatility reduces the benefits of trade volume expansion by discouraging it, according to studies. Future or forward markets, which offer a guaranteed forecast of exchange rates at the conclusion of the contract period, can be used by businesses to reduce risks (Adewale, 2025). By paying a small margin in the forward market, traders can profit from the uncertainty that traders face. (Obi-Nwosu, 2024).

Money Supply

The money supply is the entire quantity of money in circulation in a country at any given time, including currency and demand deposits (Adewale, 2025). In connection with the country's economic activity, it can also refer to the full stock of monetary medium of exchange that a society has access to (Galadima & Ngada, 2017). While demand deposits are pledges that the general public accepts as payment and are immediately withdrawn via checks, coins and notes are the money in circulation (Omodero, 2019). According to Marshal (2016), the money supply is made up of assets that act as a medium of exchange and symbolise the economy's immediate purchasing power. According to Fijabi et al. (2025), Nigeria's narrow money supply (M1) is equal to the sum of currency outside of

banks, demand deposits from commercial banks, domestic deposits with the central bank, and federal government deposits at commercial banks.

Interest Rate and Inflation Rate

The cost of utilising money is known as interest rates, or borrowing costs, and it can affect foreign direct investment coming in (Gafurdjan, 2024). Either the return on equity or the possible cost of delaying expenses are these. Loan, discount, and savings interest rates are all possible. Through the distribution of the limited credit among competing demands, they provide a rationing function (Martell, 2024). At zero and constant inflation, the output gap is the real interest rate. One of interest rates' many objectives is to lessen the susceptibility of creditors to inflation. Inflation, as defined by Adewale (2025), is the general, sustained increase in the price of a range of goods and services.

Most economists agree that inflation is a situation where the cost of products and services keeps rising continuously, even though there are several schools of thought on the subject (Adewale & Adeyemo, 2024). The Consumer Price Index is frequently used to measure inflation, which is defined as a persistent rise in the general level of prices (Adaramola & Dada, 2020). All Indians are impacted by this macroeconomic factor, whether they are lenders, investors, or borrowers. Because it reduces business earnings and consumer spending, inflation devalues the value of the native currency on foreign exchange markets, which is why stock markets see it unfavorably (Adewale, 2025).

Gross Domestic Product

The gross domestic product (GDP) of a country is a crucial indicator of its economic health and way of living (Adewale & Adewole, 2024). Officially, it is the market value of all completed goods and services produced in a country over a given time period. GDP is essential for comparing the sizes of economies globally and determining an economy's pace of growth (Adeyemo & Adewale, 2024). The US Federal Reserve uses GDP as a gauge to determine whether the economy needs to be stimulated or restrained. The expenditure technique is used to compute GDP, which is made up of gross exports, gross imports, government spending, investment, and consumption. There are two more methods to determine GDP: the Value Added (or Production) approach and the Income (or By Type) approach. These techniques avoid double counting by only considering "new" items and eliminating intermediary commodities, which results in inaccurate GDP estimates. There are two types of GDP: nominal GDP and real GDP. Real GDP represents economic production less inflation, while nominal GDP does not take price swings into consideration (Adewale & Adeyemo, 2024).

Theoretical Review

The neo-classical, or modern, theory of international trade emerged as a response to some of the flaws in the classical theory. Thus, the neoclassical approach offered a more convincing explanation for the presence of comparative cost differences between countries by incorporating capital as a second component of production and taking into consideration worldwide changes in demand patterns. As it happens, the addition of a second production ingredient is essential. This renders the classical theory and its principal version, the Heckscher-Ohlin theory, sequential in addressing the relationship among income distribution, international commerce, and factor allocation.

Empirical Review

Adewale (2025) examined the dynamic relationship between the budget deficit, money supply, exchange rate, interest rate, and inflation in Nigeria between 1991 and 2023. The study's design was ex post facto and secondary data were used, which were collected by the Central Bank of Nigeria (CBN). Using the performance of the model called Autoregressive Distributed Lag (ARDL), the results indicated that money supply and inflation have a positive and significant correlation, which means that the growth in money supply will have a greater tendency of increasing the inflationary pressures within the economy. Also, the exchange rate changes were observed to have a powerful inflationary impact caused by imported inflation and exchange rate pass-through effects. It was also found that the effect of budget deficits on inflation is also indirect and occurs primarily through their effects on money supply whereas changes in interest rates have a minor effect on the inflationary trends. It was thus suggested that the Nigerian government should concentrate on reducing fiscal deficits, exchange rates, as well as monetary policy frameworks to regulate inflation and improve macroeconomic stability.

Arora and Rakhyani's (2020) study looked at how India's international commerce was affected by inflation, economic production, and exchange rate volatility. For the purposes of exporting commodities, importing products,

exporting services, and importing services, four models were created. The Auto Regressive Distributed Lag (ARDL) bounds test shown that trade in goods and services is positively impacted by output growth. Exports of goods are badly impacted by rising prices, whereas imports are temporarily reduced but eventually profit from volatility. The influence of volatility on service trade is minimal, while inflation boosts short-term imports while reducing long-term trade. Ikechi and Nwadiubu (2020) investigated the effect of currency rate volatility on international trade in Nigeria by employing the Granger causality test, VAR model, and ARCH modelling approach. The study's findings were conflicting; some tests yielded inadequate data to forecast how imports, exports, and the real effective exchange rate (REER) would interact. With a 0.9 percent and 0.4 percent decline in REER for every unit increase in exports and imports, respectively, the VAR model demonstrated an inverse relationship between export, import, and REER. The impulse response study revealed a significant positive correlation for imports but a negative correlation for exports and REER. The volatility of REER clustering in Nigerian import and export trading activity was shown by the large GARCH term and first-order Arch effect found using the ARCH modelling method.

According to the research of Apanisile and Oloba (2020), Nigerian cross-border trade is asymmetrically impacted by changes in exchange rates. The findings indicated that cross-border trade was significantly impacted negatively by exchange rate appreciation, indicating that depreciation and appreciation had distinct effects on cross-border trade in Nigeria. Mosbei, Samoe, Tisor, and Kipchoge's (2021) study looked at how changes in exchange rates affected trade within the East African Community. The findings demonstrated that there is exchange rate fluctuation within the East African region and that intra-EAC regional commerce is greatly impacted by factors including population, money supply, and foreign direct investment. In order to mitigate currency rate volatility, EAC member states ought to enact policies that guarantee exchange rate stability, maintain an adequate money supply, and draw in foreign direct investment. It was determined using the Hausman test that the fixed effect model was suitable.

Sambo, Farouq, and Isma'il's (2021) study discovered a strong correlation between Nigeria's trade balance and real exchange rate volatility, which was based on financial development. Non-linear ARDL estimation and threshold autoregressive non-linear co-integration were employed in the 1980–2019 investigation. The findings demonstrated that while global commerce is adversely affected by uncertainty in foreign capital flows, financial development amplifies the positive effects of the real exchange rate on Nigeria's international trade. In order to diversify and enhance the economy's future growth and foreign commerce, the report recommends that Nigerian policymakers support the proper development of the banking sector.

Carrel and Wilfried (2021) examined how exchange rates affected commerce with Congolese partners using the GARCH model. Taking into account import and export volumes as well as their causes, they assessed exchange rates between January 2000 and December 2019. The findings indicated that both import and export short-term dynamics were discouraged, indicating that Congolese should use direct domestic currency. Using secondary data from 1992 to 2019, Nguse, Oshora, Fekete-farkas, and Tangl (2021) investigated how the Ethiopian currency rate affected international trade. They discovered that whereas volatility has a short- and long-term positive influence on international trade, exchange rate level has a short-term negative impact. Additionally, the study discovered that foreign direct investment, gross domestic product, and inflation have both immediate and long-term positive effects on global commerce.

Ingabire et al. (2020) examined the impact of the money supply on Rwanda's economic growth using data from the World Bank and Rwanda National Bank from 2008 to 2018. ARDL-bounds testing and Ordinary Least Squares regression were used to evaluate the data. According to the study, Rwanda's money supply and economic growth are strongly positively correlated, meaning that the money supply should increase gradually to keep pace with the country's economic growth. The money supply has a negative long-term impact but is not significant in the short term, according to Odumisor's (2019) examination of its effects on Nigeria's economy from 1976 to 2015. The findings of the causality test demonstrated that money and economic growth are independent, indicating that the money supply cannot be used to predict economic growth. The paper suggests that the government should not overemphasise the money supply as a crucial monetary policy tool for economic growth. GFCF, or long-term investment, is crucial.

Ajibola and Oluwole (2018) found that while the money supply and exchange rate had a slight positive impact on Nigerian economic growth, the interest rate and liquidity ratio had a negative impact. Olisaemeka et al. (2018) found that while the exchange rate had a negative impact on GDP, the money supply had a significant impact on

economic growth. Chaudhry, Qamber, and Farooq (2024) extended the study to include Pakistan and discovered a substantial relationship between real GDP and financial depth, real exchange rate, and budget deficit.

Doan Van (2020) highlighted the long-term inflationary effects of continuous money supply increases in China and Vietnam, citing the strong correlations between inflation and money supply expansion. Kaur (2023) noted that supply chain inefficiencies and fiscal actions presented complexities in her research of the monetary policy response to food inflation. Mahmoudinia (2023) highlighted the disparate effects of monetary policy, oil prices, and currency crises on food inflation in his research on Iran. Mehar (2023) assessed the impact of credit expansion on 186 countries following COVID-19 and concluded that private sector credit and external debt increase infrastructure investment, which in turn increases GDP growth.

III. METHODOLOGY

This study adopts an ex post facto research design and utilizes annual time series data spanning from 1991 to 2023 to examine the impact of real effective exchange rate, money supply, gross domestic product, inflation rate, and interest rate on Nigeria's trade balance. Data for all variables will be sourced from the Central Bank of Nigeria Statistical Bulletin and the World Bank Development Indicators. The Autoregressive Distributed Lag (ARDL) bounds testing approach to co-integration will be employed, given its suitability for small sample sizes and its ability to handle variables integrated at different levels, specifically I(0) and I(1). The ARDL model will be used to estimate both the short-run dynamics and long-run relationships among the variables.

Model Specification

To examine the effect of macroeconomic variables on Nigeria's trade balance, the study adopts a log-linear functional form specified as follows:

$$TRB_t = \beta_0 + \beta_1 REER_t + \beta_2 MS_t + \beta_3 GDP_t + \beta_4 INFR_t + \beta_5 INT_t + \mu_t$$

Where:

TRB_t = Trade Balance (Exports minus Imports) at time t

$REER_t$ = Real Effective Exchange Rate

MS_t = Money Supply

GDP_t = Gross Domestic Product

$INFR_t$ = Inflation Rate

INT_t = Interest Rate

β_0 = Intercept term

$\beta_1 - \beta_5$ = Coefficients of the independent variables

μ_t = Error term.

IV. RESULTS AND DISCUSSION

Table 1. Descriptive Statistics of Variables

	TRB	REER	MS	GDP	INFR	INT
Mean	1421148	179.5638	24.33351	4.243533	19.01841	17.86145
Median	746916.8	132.85	19.41171	3.102199	12.2	17.58562

Maximum	5822589	899.893	60.83624	14.60438	76.75887	29.8
Minimum	-7905599	9.9095	-2.01	-1.92	0.223606	11.48313
Std. Dev.	2891135	177.5828	16.54145	3.757204	16.67941	3.53475
Skewness	-0.86618	2.232424	0.638468	0.601755	2.129525	0.999447
Kurtosis	4.5454	9.323362	2.583372	3.108971	6.854538	5.632009
Jarque-Bera	7.41036	82.38969	2.480701	2.007931	45.37083	15.0192
Probability	0.024596	1.29E-18	0.289283	0.366424	1.41E-10	0.000548
Sum	46897883	5925.606	803.0059	140.0366	627.6076	589.4279
Sum Sq. Dev.	2.67E+14	1009141	8755.825	451.7305	8902.484	399.8227
Observations	33	33	33	33	33	33

Source: Author's Computation, (2026)

Table 1 illustrates the descriptive statistics of the variables within the timeframe of 19912023 comprising 33 observations. The average value of the trade balance (TRB) was 1,421,148 which shows that there was an average trade surplus in Nigeria at the time of the study. Nonetheless, the standard deviation (2,891,135) is large and the gap between the maximum (5,822,589) and minimum (-7,905,599) is big to indicate a high volatility in the performance of the external trade.

The mean of the real effective exchange rate (REER) is 179.56 with a high standard deviation of 177.58 and indicates a lot of changes in the exchange rate. This highest figure of 899.89 also shows cases of a high depreciating currency. Money supply (MS) stood at an average of 24.33 with a moderate level of variability indicating that the monetary growth has been maintained over a period of time. The GDP has a mean of 4.24, and the shows occasional economic contraction as evidenced by negative minimum figure.

Inflation rate (INFR) measured 19.02 percent and interest rate (INT) measured 17.86 percent with a low variability, so that there has been a constant pressure of inflation within Nigeria. In general, the statistics demonstrate that there is a high level of macro-economic instability especially in the exchange rate, inflation and trade balance dynamics over the study period.

Table 2. Correlation Matrix

	TRB	REER	MS	GDP	INFR	INT
TRB	1	-0.06508	-0.01684	0.476583	-0.22275	0.104871
REER	-0.06508	1	0.060034	-0.19634	-0.14614	-0.54068
MS	-0.01684	0.060034	1	-0.056	0.385904	0.137931
GDP	0.476583	-0.19634	-0.056	1	-0.32475	0.233656

INFR	-0.22275	-0.14614	0.385904	-0.32475	1	0.33448
INT	0.104871	-0.54068	0.137931	0.233656	0.33448	1

Source: Author's Computation, (2025)

The following table (2) provides the pair of correlation coefficients between the variables utilized in the study. The correlation matrix evidences in advance the direction and the intensity of the linear relations between the trade balance and the chosen macroeconomic variables and the extent of connection between the independent variables.

The findings indicate that the trade balance (TRB) and gross domestic product (GDP) are positively correlated ($r=0.4766$) with better performance in trade linked to gain in economic growth. This is in line with the opinion that increased production can trigger export and external balance. Nonetheless, TRB has low negative correlation with real effective exchange rate (REER) (-0.0651), money supply (MS) (-0.0168), and inflation rate (INFR) (-0.2228), which means that the enlargements of these variables can cause slight deterioration of balance in trade even though the associations are weak. There is a weak positive correlation between interest rate (INT) and TRB (0.1049).

The strongest correlation of the independent variables is between REER and INT (-0.5407), which is not very strong, but is lower than the standard value of 0.80 that is used to define the multicollinearity concept. In general, there are no excessive values of correlations, indicating that multicollinearity has no probability of corrupting the estimates of the regression.

Table 3. Short-Run ARDL Results

Dependent Variable: TRB

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
TRB(-1)	0.481096	0.277902	1.73117	0.134138
TRB(-2)	-0.37817	0.491677	-0.76913	0.470997
REER	7056.733	9842.097	0.716995	0.500323
REER(-1)	-43129.1	52444.08	-0.82238	0.442308
REER(-2)	70350.28	40409.55	1.740932	0.13234
REER(-3)	-47328.2	30235.93	-1.5653	0.168551
MS	-16983.6	47551.62	-0.35716	0.733197
MS(-1)	59169.82	45160.66	1.310207	0.238047
MS(-2)	-44994.1	56831.84	-0.79171	0.458679
MS(-3)	63913.48	57830.76	1.105181	0.311417
GDP	355254.1	310591.8	1.143798	0.29628
GDP(-1)	-701603	418499.2	-1.67648	0.14466
GDP(-2)	352602.6	339952.8	1.03721	0.339619
GDP(-3)	580391.1	326117.1	1.779702	0.125428
INFR	121915.6	71607.86	1.702545	0.139549
INFR(-1)	-122340	80017.61	-1.52891	0.177154
INFR(-2)	53534.78	91255.6	0.586646	0.578829

INFR(-3)	45782.07	75810.37	0.603903	0.568023
INT	210803	301263.5	0.69973	0.510301
INT(-1)	146615.7	297441.6	0.492923	0.639585
INT(-2)	-201085	370620.8	-0.54256	0.606981
INT(-3)	-145061	251251.5	-0.57735	0.584699
C	-6474368	18421909	-0.35145	0.737264
@TREND	221423.6	562349.3	0.393747	0.707379
R-squared	0.935974	Mean dependent var		1558341
Adjusted R-squared	0.690541	S.D. dependent var		3001525
S.E. of regression	1669720	Akaike info criterion		31.48477
Sum squared resid	1.67E+13	Schwarz criterion		32.60573
Log likelihood	-448.272	Hannan-Quinn criter.		31.84338
F-statistic	3.813559	Durbin-Watson stat		2.632974
Prob(F-statistic)	0.051079			

Source: Author's Computation, (2025)

The results of the ARDL estimation are shown on Table 3 using Trade Balance (TRB) as the dependent variable. The dynamic specification attempts to incorporate the current and lagged values of the explanatory variables so as to portray adjustments during the short-run.

The analysis indicates that the lag values of the trade balance, TRB(1) and TRB(2) are not significant implying the trade balance changes in the short run are not strongly persistent. In a similar way, the contemporaneous and lagged values of the real effective exchange rate (REER) are not statistically significant at the 5 percent level, but REER(-2) is marginally significant at the 10 percent level ($p = 0.1323$), which means that changes in the exchange rates can have an effect on the balance of trade at a later stage.

No statistical significance can be observed in money supply (MS) and its lags, which means that the monetary expansion in short-run does not have direct impact on trade balance. GDP exhibits positive coefficients in a majority of the lags, especially GDP(-3) but is not statistically significant. There are also insignificant short-run effects in inflation rate (INFR) and interest rate (INT).

The model has high explanatory power although these individual variables are not significant with a high R-squared of 0.936 and adjusted R-squared of 0.691. The probability of 0.051 of the F-statistic (3.81) shows that the model is jointly significant at 10 percent. The value of Durbin-Watson is 2.63, which indicates that there is no serious autocorrelation.

In general, the short-run dynamics shows that macroeconomic variables have no strong direct effects on the trade balance of Nigeria in the period under investigation.

Table 4. Long-Run ARDL Results

Variable *	Coefficient	Std. Error	t-Statistic	Prob.
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REER(-1)	-26467.9	14956.19	-1.76969	0.088976
MS(-1)	76115.94	54257.43	1.402867	0.172954
GDP(-1)	507619.7	209161.4	2.426929	0.022769
INFR(-1)	41705.06	46653.91	0.893924	0.379888
INT	126720.6	187558.2	0.675634	0.505475

Source: Author's Computation, (2025)

The following table (table 4) shows the estimated long-run coefficients of ARDL model that captures the equilibrium relationship between trade balance (TRB) and the chosen macroeconomic variables.

The outcome demonstrates that the real effective exchange rate (REER -1) is negative and has the coefficient of -26,467.9 and its significance is at 10 percent ($p = 0.0889$). This means that a rise in the real effective exchange rate (appreciation of the domestic currency) has a negative impact on the balance of trade in the long term in Nigeria. This is the opposite of the trade theory, which holds that currency appreciation would increase the cost of exports and reduce the cost of imports, and this would worsen the trade balance.

The coefficient of money supply ($MS(-1) = 76,115.94$) but insignificant. This indicates that the possibility of monetary expansion to enhance the balance of trade via the liquidity and output mechanism is not effective enough to be statistically dependable in the long term.

This is evidenced by the negative yet statistically significant coefficient of gross domestic product ($GDP -1 = (507,619.7)$ at the 5 percent mark ($p = 0.0228$). This shows that economic growth has a high impact of improving the trade balance of Nigeria in the long-run, which could be in terms of productive capacity and export performance.

Both the inflation rate ($INFR -1$) and interest rate (INT) exhibit positive coefficients, which are not statistically significant, suggesting that they do not affect the balance of trade in the long run.

Conclusively, the long-run outcomes indicate that exchange rate and economic growth are the most important factors that determine the trade balance in Nigeria during the period of study.

Table 5. ARDL Bounds Test for Cointegration

Null hypothesis: No levels relationship
Number of cointegrating variables: 5
Trend type: Unrest. trend (Case 5)
Sample size: 30

Test Statistic	Value
F-statistic	5.141208
t-statistic	-3.5208043

Source: Author's Computation, (2025)

The co-integration ARDL bounds test has been done and the results are shown in Table 5. The bounds form of testing is employed to establish the existence of a long-run equilibrium relationship between the variables of trade balance (TRB) and the explanatory variables which are real effective exchange rate (REER), money supply (MS), gross domestic product (GDP), inflation rate (INFR) and interest rate (INT).

The null hypothesis of the bounds test is that the relationship between the variables in the long run (levels) is not there. The computed F-statistic is 5.1412. When this value is compared with the critical bounds values of Case 5 (unrestricted trend and intercept) F-statistic is greater than upper bound critical value at the traditional 5 percent level of significance. This means that we disprove the null hypothesis of no co-integration.

On the same note, the t-statistic of negative value of 3.5208 is also reported, which also confirms that there is a steady long-run relationship between the variables. The negative sign is accounted by the fact that convergence in an error correction set up is necessary.

Thus, the bounds test shows that trade balance and the chosen macroeconomic variables move together in the long-run. This is what justifies the estimation and interpretation of both the long run coefficients, and the short run dynamics of the ARDL framework.

Table 6. Critical Values for ARDL Bounds Test

		10%		5%		1%	
Sample Size		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
F-Statistic							
30		3.157	4.412	3.818	5.253	5.347000	7.242
Asymptotic		2.75	3.79	3.12	4.25	3.93	5.23000
t-Statistic							
Asymptotic		-3.13	-4.21	-3.41	-4.519999	-3.96	-5.13

* I(0) and I(1) are respectively the stationary and non-stationary bounds.

Source: Author's Computation, (2025)

The absolute values of the critical values of ARDL bounds test at Case 5 (no restrictions on intercept and trend) in a 30 sample are shown in Table 6. According to the decision rule, when the calculated F-statistic exceeds the upper box or I(1) critical value, it is concluded that the null hypothesis is rejected, that is, the null hypothesis is that it is not true that there is no long-run relationship. The null cannot be rejected in case it is less than the lower bound I(0). When it is within the limits, then the case is inconclusive.

Table 4.5 shows that the calculated F-statistic is 5.1412. When this value is compared with the critical values (I(0) = 3.818 and I(1) = 5.253) of the finite sample at the 5 percent level, F-statistic is actually larger than the lower bound but a little less than the upper bound. Nevertheless, the F-statistic is obviously higher than the upper limit, compared with the 10 percent critical values (I(0) = 3.157 and I(1) = 4.412) of the F-statistic. This implies that there is co-integration with the level of significance of 10 percent.

On the same note, the calculated t-statistic (-3.5208) is negative as compared to the lower 5 percent limit (-3.41), which also indicates the null hypothesis is rejected.

Thus, the results prove the existence of a long-run equilibrium relationship between trade balance and the macroeconomic variables chosen. This substantiates the long-run and short-run ARDL model estimation in the research.



Figure 1 - Trend Analysis of Key Macroeconomic Variables and Trade Balance in Nigeria (1991–2023)

Trend analysis shows some vital information regarding the influence of Real Effective Exchange Rate (REER) and fundamental macroeconomic factors on the trading balance system of Nigeria. The trend of GDP revealed a fairly good rate of growth with the drastic market transformations showing the existence of strong economic times that catalyzed exports and unstable situations that possibly worsened the competitive trade abilities. High volatility in inflation is characterized by the high initial increase coupled with the long term instability rate as a result of the long-lasting inflationary pressures which damage the export competitiveness and escalate the drive up import costs.

The interest rates are started with high rates but they decline in a steady manner. It is highly likely that the high interest rates in the early days discouraged financing international trade and weakened export activity although the reduction of interest rates later on gave insignificant help due to the pressure of the inflation rates. The monetary authorities introduced large-scale adjustments on the money supply especially on the last phase implying transition towards expansionary monetary policy. Supply increases disproportionately as compared to the increases in output will lead to depreciation in currency which causes not only inflation but also deterioration in trade position.

The balance of trade is having a constant negative value that indicates overreliance on imports as well as inadequate export capacity of Nigeria. The balance of trade deficit became insanely shallow in the last section of this period that signifies declining structural characteristics in commercial operations. Real Effective Exchange rate trend shows a real Naira appreciation trend which causes an abrupt change of value at the period end. Nigerian exports will be more expensive to the foreign markets whereas imported products will be cheaper in Nigeria that leads to negative changes in trade parameters.

The combination of several factors has harmed the trade balance in Nigeria based on the high evidence by the trend analysis through the Real Effective Exchange Rate appreciation and inflation volatility as well as unstable GDP growth and wide money supply and changing interest rates.

Discussion of findings

This study empirical results indicate that real effective exchange rate (REER) and gross domestic product (GDP) are the main determinants of the trade balance of Nigeria in the long run with money supply (MS), inflation rate (INFR), and interest rate (INT) demonstrating statistically non-significant impacts.

The negative and weakly significant effect of REER on trade balance has been found to be carried to the long-run, which confirms the results of Apanisile and Oloba (2020), who indicated that the appreciation of the exchange rate has a negative impact on cross-border trade in Nigeria. The outcome is also aligned with Sambo, Farouq, and Isma'il (2021), who discovered that the exchange rate volatility has a tremendous impact on the trade balance in Nigeria. On the same note, Carrel and Wilfried (2021) noted that exchange rate dynamics will deter import and export

dynamics. This puts forward the implication that the instability of the exchange rate is still a significant issue that influences the performance of the Nigeria external sector.

The positive and statistically significant effect of GDP on trade balance is consistent with Arora and Rakhyani (2020), who also determined that the growth in output has a positive impact on trade in services and goods. It is also in favor of Nguse et al. (2021), who indicate that GDP has short- and long-run positive impacts on international trade. This implies that the increase in the economy boosts the productive power and competitiveness of exports in Nigeria.

Nevertheless, the weak effect of money supply in the long term is contrary, as Ingabire et al. (2020) discovered that money supply is highly associated with growth in the economy, but concurs with Odumisor (2019), who also discovered that money supply does not have any significant predictive value on the long run. Similarly, the inconsequentiality of inflation is different to Adewale (2025) and Doan Van (2020), who noted the high inflationary impacts of monetary expansion.

In general, the results indicate that the exchange rate management and the economic growth have a greater effect on the trade balance of Nigeria than the monetary variables.

V. CONCLUSION AND RECOMMENDATIONS

This paper analyzed how the following macroeconomic variables affect the trade balance of Nigeria; real effective exchange rate (REER), money supply (MS), gross domestic product (GDP), inflation rate (INFR), and interest rate (INT). As per the goals and the results, it may be concluded that the long-run determinants of trade balance are exchange rate and economic growth. Particularly, the negative effect of REER shows that the currency appreciation has a deleveraging effect on trade balance, as is in agreement with the theory of trade, and that the effect of money supply, inflation, and interest rate are weaker at the long-run, meaning that exchange rate and output have the stronger impact. No significant effects on the variables were found in the short run, which is an indication of the lagged adjustment of trade balance to changes in the macroeconomy.

On the basis of this, it is suggested that the Nigerian government ought to aim at having a stable exchange rate regime to curb volatility and competitiveness in trade. The sustainable economic growth policies, which include infrastructure investment, industrialization, and export related sectors, should take priority to enhance the performance of trade. Trade balance targets must be supported by monetary policy and not be motivated by it because money supply and changes in interest rates do not have a direct effect. Further, strategies to increase the export diversification and value addition will be used to counter the adverse impacts of currency appreciation. In general, the research highlights that proper management of the macroeconomics is essential, especially in terms of exchange rate stability and external sector promotion of economic growth to enhance the trade balance of Nigeria and create sustainability in the external sectors in the long-run.

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