



IMPACT OF MACROECONOMIC VARIABLES ON INTERNATIONAL TRADE IN NIGERIA: 1990-2024

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Abstract

This study investigated the impact of macroeconomic variables on international trade in Nigeria from 1990 to 2024. The secondary data were collected on Total Trade (TTD), Exchange Rate (EXRR), Foreign Direct Investment (FDI), Inflation rate (IFR), interest rate (INT), and Trade openness (TRO) and analyzed. The stationary results with augmented dick fuller (ADF) INT, FDI, and TRO were stationary at level while EXRR, IFR and TTD became stationary after differencing. The ARDL-ECM showed the speed of adjustment of 82% disequilibrium in previous period is restored into equilibrium current period. The study further revealed that EXRR has a positive insignificant impact on international trade in Nigeria both in the short run and the long run while inflation rate has a negative significant and a positive significant impact on international trade in Nigeria at 10% and 5% level of significance in the short run and the long run, respectively. In a related development, INT has a negative insignificant and a significant impact on international trade in Nigeria at 5% level of significance in the short run and the long run, respectively. Finally, FDI and TRO have a negative significant impact on international trade in Nigeria at 5% level of significance both in the short run and the long run.

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***Related declarations are provided in the final section of this article.*

The study concluded that macroeconomic variables have significant impact on international trade in Nigeria and recommended that Nigerian government federal ministry of finance and Federal Ministry of Industry, Trade and Investment (FMITI) should make policies that will promote channeling of foreign investments into export-oriented and value-added sectors rather than consumption-based or extractive industries. Stronger backward linkages with local firms should be encouraged and central bank of Nigeria should pursue stable inflation through sound monetary and fiscal policies. A moderate and predictable inflation rate can encourage trade competitiveness should be put in place. Central Bank of Nigeria (CBN) should continue to pursue and maintain a stable and competitive exchange rate regime with a view to support export competitiveness while minimizing excessive import costs.

Keywords: Macroeconomic Variables, Total Trade, Trade Openness, Exchange rate, Inflation Rate, FDI, ARDL Model

Introduction

Globally, international trade particularly exports has become a major driver of national economic growth. Exports form the foundation for industrialization by providing raw materials for production, creating employment opportunities, and generating foreign exchange earnings, which collectively enhance the standard of living (El-Yaqub, Akintade, Akomolafe & Ismail, 2025). The foreign exchange obtained from exports is essential for financing domestic development and meeting import obligations (Euis, 2020). Exports also play a critical role in stimulating economic development by generating income, expanding job opportunities, and supporting technological advancement (Pablo et al., 2020). Additionally, they attract foreign investment, promote skills development, and encourage infrastructure expansion (IMF Report, 2020), thereby contributing to economic resilience and improved living conditions.

Over the past thirty years, many economies have increasingly embraced global trade, largely driven by the forces of globalization. International trade enhances both economic and social outcomes, especially in developing countries (Shawa & Shen, 2016). However, the developmental benefits of global trade depend on the purpose of engagement and the specific national context. Numerous empirical studies have documented the positive effects of global trade through different channels, including its influence on economic growth, poverty reduction, and inflation (El-Yaqub, Usman, Musa & Ismail, 2024; Mwegu, 2018).

The relevance of trade balance information varies across countries. Its impact tends to be more pronounced in nations with limited foreign exchange reserves, where trade data releases can significantly affect currency values. Since the trade balance constitutes the largest component of

the current account, financial analysts and investors closely monitor trade indicators as they provide insights into overall economic health (Sharif, Yassin & Sheikh, 2016). Current account deficits measured as a percentage of GDP are particularly scrutinized for potential policy mismanagement, and persistent deficits may lead to currency depreciation.

Macroeconomic variables serve as indicators of overall economic performance. These include exchange rates, GDP, inflation, foreign direct investment (FDI), interest rates, trade policies, political stability, global demand, transport infrastructure, technological innovation, labour market conditions, energy prices, and market access. Their interactions collectively influence a country's export performance (Akomolafe, Agunbiade & Ndayako, 2018). The effects of these variables differ depending on domestic economic conditions, policy measures, and the global economic climate (Helpman & Krugman, 2019; Anyanwu, Okoroafor & Akomolafe, 2017). The selection of FDI as a key macroeconomic variable stems from its strategic importance to export growth and the availability of primary data for empirical research. Higher FDI inflows tend to make a country more attractive to foreign investors (Usman & Ahmad, 2018; IMF Report, 2019; Ndagara et al., 2020; Agunbiade & Akomolafe, 2018; El-Yaqub, Akomolafe & Owunnah, 2025).

Macroeconomic indicators such as exchange rates, inflation, interest rates, and gross domestic product (GDP) growth play a significant role in shaping trade performance. Exchange rate variations, for example, have a direct impact on the global competitiveness of Nigerian exports as well as the cost of imported goods (Olufayo & Fagbohun, 2021; Alhassan, Abubakr & Akomolafe, 2021). International trade—an essential pillar of the world economy largely depends on exchange rates, which determine the relative value of one nation's currency against another. These rates are instrumental in establishing trade prices and influence inflation, balance of payments, other macroeconomic indicators, and the overall economic competitiveness of a country (Ismail, El-Yaqub & Eke, 2025). When a nation's currency appreciates, its exports become more expensive for foreign buyers, which may lead to reduced demand. Conversely, currency depreciation lowers export prices, raises import costs, stimulates foreign demand, but weakens domestic purchasing power (Imoughele & Ismaila, 2015; Sembiring & Sasono, 2018). Nigeria continues to struggle with maintaining exchange rate stability while fostering the growth of non-oil exports. Exchange rate movements shaped by both domestic and international forces often disrupt economic projections and undermine the ability of non-oil exporters to remain competitive in global markets (Olanipekun & Ogunsola, 2017; Akomolafe & Agunbiade, 2018).

Despite the well-established link between macroeconomic conditions and trade performance, many developing countries, including Nigeria, continue to experience poor trade outcomes. Nigeria has struggled to maintain a favorable trade balance and diversify its export base beyond crude oil, despite various trade liberalization efforts. The persistent trade deficits, currency depreciation, and inflationary pressures raise concerns about the effectiveness of macroeconomic policies in promoting sustainable trade development.

One of the major problems is the unstable exchange rate. The Nigerian naira has undergone significant depreciation in recent years, especially following the unification of the official and parallel market rates in mid-2023. While currency devaluation is expected to enhance export competitiveness, in Nigeria's case, the intended benefits have been offset by weak domestic production, import dependence, and inflationary pressures. As a result, the trade balance continues to deteriorate, raising questions about the real impact of exchange rate movements on trade (CBN, 2024).

Another critical issue is inflation. Rising domestic prices have not only eroded consumer purchasing power but have also made Nigerian exports less attractive in international markets. Inflation in Nigeria reached over 33% in early 2024, driven by energy costs, supply chain disruptions, and monetary policy lags (NBS, 2024). This undermines the competitiveness of local products and contributes to a surge in imports, thereby worsening the trade deficit.

Interest rates also play a crucial role. The Central Bank of Nigeria has maintained a tight monetary policy stance to curb inflation, with the Monetary Policy Rate (MPR) standing at 24.75% as of March 2024. While this may be beneficial for stabilizing prices, high interest rates discourage investment in productive sectors, including manufacturing and agriculture, which are essential for export diversification and trade growth (El-Yaqub, Musa, & Ismail, 2024). Furthermore, Nigeria's trade openness has been undermined by policy inconsistencies, border closures, and heavy reliance on oil exports. These factors limit the country's integration into global markets and reduce the gains from international trade (World Bank, 2023).

On the other hand foreign direct investment (FDI) is widely regarded as a driver of economic growth and a facilitator of international trade. However, in the Nigerian context, its impact has become increasingly problematic. Despite policy reforms aimed at attracting foreign capital, the inflows have not translated into significant improvements in international trade performance.

Instead, FDI often creates dependency on foreign firms, leading to profit repatriation, weak domestic linkages and limited contributions to export diversification (Okechukwu & Luo, 2018)

The literature on the relationship between macroeconomic variables and international trade in Nigeria remains inconclusive, with some studies highlighting a positive link, while others report insignificant or negative effects. This discrepancy points to a critical research gap that needs to be addressed. Most existing studies also fail to incorporate recent macroeconomic shocks such as the naira unification policy, post-COVID recovery, and current inflation dynamics. Therefore, this study is timely and essential. It seeks to examine the impact of macroeconomic variables specifically exchange rate, inflation, interest rate, and GDP on international trade in Nigeria using recent data and robust econometric techniques. The study is divided into five sections, section one is the introduction, section two is literature review, section three is methodology, section four is data analysis and discussion of results, and section five is conclusion and recommendations.

2.0 Literature Review

International trade remains one of the oldest and most significant drivers of economic interaction among nations. At its core, it refers to the exchange of goods, services, and capital across national borders, often shaped by comparative advantage, technological progress, and global integration. Unlike domestic trade, international trade is influenced by factors such as exchange rates, trade policies, tariffs, and global demand conditions, making it a complex but vital phenomenon for modern economies. Scholars have approached the definition of international trade from different perspectives. According to Krugman and Obstfeld (2018), international trade is "the exchange of goods and services across national boundaries in a way that expands the consumption possibilities of nations." This definition underscores the idea that trade is not merely about selling and buying across borders but also about enabling countries to access goods and services they may not efficiently produce themselves. Similarly, Salvatore (2016) defines international trade as "the process of exchanging commodities and services between residents of different countries to achieve mutual economic benefits." His emphasis is on the mutual gains that arise when countries specialize in line with their resource endowments and production efficiencies.

The concept of the exchange rate is central to discussions on international trade and macroeconomic management. Broadly, the exchange rate refers to the price of one country's

currency in terms of another (Krugman, Obstfeld, & Melitz, 2018). It serves as the link between domestic and foreign economies, determining how competitive a nation's goods and services are in the global market. In other words, fluctuations in the exchange rate affect the relative prices of exports and imports, influencing trade balances, investment flows, and overall economic performance (Iyoha & Oriakhi, 2020).

Inflation is one of the most widely discussed concepts in economics because of its direct impact on the welfare of households, the profitability of firms, and the effectiveness of government policies. Broadly, inflation refers to a sustained increase in the general price level of goods and services in an economy over time (Mankiw, 2019). When inflation rises, the purchasing power of money falls, meaning that consumers can buy fewer goods and services with the same amount of income (El-Yaqub & Ismail, 2025). For policymakers, inflation is both a sign of economic pressures and a variable that requires careful management to maintain macroeconomic stability (Iyoha & Oriakhi, 2020).

According to Mishkin (2019), an interest rate is “the payment made for the use of borrowed funds, expressed as a percentage of the principal per unit of time.” In other words, it is both a price and a signal that regulates the allocation of resources within an economy. In developing countries such as Nigeria, interest rate dynamics are particularly crucial because they shape investment behavior, business growth, and even international trade flows. High interest rate volatility often discourages private investment and limits access to credit, while more stable and predictable rates encourage productive economic activities (El-Yaqub, et al, 2024; Iyoha & Ekanem, 2021).

Foreign Direct Investment (FDI) has been defined as the investment of resources in business activities outside a firm's home country (Hill, 2003). OECD (1996), IMF (1999), and Adeoye (2009), define FDI as the long term investment that reflects the objective of a lasting interest and control by a resident entity of one economy (the direct investor) in an enterprise that is resident in another economy (the direct investment enterprise). The lasting interest reflects the continuation of a long-term relationship between the direct investor and the enterprise and a considerable level of influence on the management of the enterprise. According to the above definition, the terms “control” or “influence” and “long term” are used to make a distinction between FDI and international portfolio investment. Because FDI is about both ownership and control, such investments tend to be long term in their focus hence they are different from IPF

which is a short term investment where the investor does not seek to control the firm (Adeoye, 2009).

Scholars have developed both quantitative and qualitative definitions of trade openness. Quantitatively, it is often expressed as the ratio of trade (exports plus imports) to gross domestic product (GDP), which provides a direct measure of how much of a nation's income is derived from cross-border activities (Edwards, 1998). Qualitatively, it encompasses the institutional and policy frameworks such as tariff levels, non-tariff barriers, and exchange rate policies that either encourage or constrain international trade flows (Dollar & Kraay, 2003).

Empirical Review

Chude and Chude (2023) explored the effect of exchange rate policy on Nigeria's non-oil export performance using the ARDL technique and annual data from 1981 to 2021. Their study finds that both trade openness and exchange rate movements significantly and positively drive non-oil export growth, implying that access to international markets enhances export outcomes. Nonetheless, they argue that a weaker domestic currency does not automatically increase export volumes, thereby challenging traditional assumptions that devaluation stimulates growth.

Nnoli et al. (2023), employing an ARDL framework from 1986 to 2019, assessed how inflation and exchange rates affect agricultural exports in Nigeria. Their findings reveal that trade openness and exchange rates significantly contribute to rising inflation, whereas interest rates show an insignificant influence on agricultural export performance. Similarly, Umoru and Imimole (2022) examined exchange rate devaluation and relative price adjustments across 11 African countries, including Nigeria, using data from 1991 to 2020. They report that devaluation typically leads to a short-term drop in non-oil exports, largely due to heavy reliance on imported inputs. They further note that Rwanda and South Africa experience minimal effects, stressing the urgency for African economies to diversify into high-value manufacturing to cushion the impact of exchange rate instability.

Innocent et al. (2022) analysed the effect of exchange rate volatility on Nigeria's exports using quarterly data from 2005Q1 to 2020Q4. Export volume, real GDP, exchange rate volatility—measured through the nominal effective exchange rate—and the industrial production index were included as variables. Volatility was assessed using ARCH, GARCH, TARARCH, and EGARCH models, while ARDL bounds testing captured short- and long-run effects. Their results show that exchange rate volatility exerts a negative but insignificant effect on exports. In Kenya, Titus et

al. (2022) applied an Error Correction Model to evaluate how foreign exchange reserves moderate the link between exchange rate volatility and international trade. Their findings reveal that foreign reserves significantly and positively cushion the adverse effects of exchange rate instability on trade.

Nuraddeen et al. (2021) examined the asymmetric influence of exchange rate volatility on Nigeria's trade balance. Their study concludes that the real exchange rate does not significantly affect the country's trade volume. Likewise, Anifowose (2021) assessed the asymmetric effects of exchange rate movements on economic growth using the NARDL method. He finds that positive shocks to the exchange rate promote long-run economic growth. Similarly, Oyelami and Ajeigbe (2021) analysed exchange rate volatility in relation to non-oil export subsectors from 1996 to 2015, revealing that short-run volatility adversely affects agriculture, food processing, and manufacturing. However, these negative effects dissipate in the long run, leading them to recommend that Nigeria prioritise sectors such as agriculture and food production, which demonstrate stronger resilience to exchange rate fluctuations.

Nguyen et al. (2021), using ARDL and NARDL models, evaluated the effects of exchange rate movements on Vietnam's exports and imports. Their study concludes that trade disputes contribute more significantly to changes in trade flows than exchange rate variations, which appear to have limited influence. In the same vein, Aimon et al. (2020) assessed how macroeconomic disturbances and global uncertainty affect Indonesia's non-oil and gas exports to ASEAN countries between 2014 and 2019 using a VECM approach. Their results show that exchange rates do not substantially influence exports to most ASEAN countries, except Thailand, where the effect is significantly negative, and Vietnam, where it is positive.

Furthermore, Fadol (2020) employed SVAR and NARDL methods to analyse the effects of GDP, exchange rate shocks, and inflation on Saudi Arabia's non-oil export performance from 1970 to 2019. The findings indicate that GDP growth, inflation, and exchange rate appreciation are generally associated with modest declines in non-oil exports. Notably, positive shocks exert stronger short-term effects than negative ones, reinforcing the importance of assessing these dynamics within the context of ongoing government efforts aimed at exchange rate unification and broader economic diversification.

Theoretical Framework

This study is anchored on the Mundell-Fleming model (Mundell, 1963; Fleming, 1962), which extends the IS-LM framework to an open economy setting. The model provides a comprehensive framework for analyzing how macroeconomic variables particularly interest rates, exchange rates, inflation, and income levels influence international trade under different exchange rate regimes. Unlike the closed-economy IS-LM model, the Mundell-Fleming model incorporates capital flows and international linkages, making it especially relevant for countries like Nigeria that are deeply engaged in global trade.

The Mundell-Fleming model emphasizes the interactions between three key markets: the goods market (IS curve), the money market (LM curve), and the balance of payments (BP curve). It posits that macroeconomic variables are not only determined by domestic policies but also shaped by external trade and financial linkages (El-Yaqub, Ismail, & Bappayo, 2024). For instance, changes in the exchange rate directly affect a country's export competitiveness and import costs, while fluctuations in the interest rate influence capital inflows, borrowing costs, and ultimately the trade balance. Similarly, inflation dynamics impact the real exchange rate and thereby alter international trade flows.

The model also highlights the role of trade openness, as increased integration into global markets exposes domestic trade flows to external shocks, policy changes, and fluctuations in global demand. By integrating these linkages, the Mundell-Fleming model provides a useful lens to assess how macroeconomic variables jointly shape international trade outcomes in Nigeria. Therefore, this study employs the Mundell-Fleming model as its theoretical anchor because it effectively connects key macroeconomic indicators with international trade dynamics in an open economy. Supporting perspectives such as Purchasing Power Parity (PPP), which links exchange rates and inflation, and theories of trade openness, which emphasize the benefits and risks of global integration, are also relevant. Together, these frameworks provide a robust theoretical basis for understanding the complex ways in which macroeconomic variables influence Nigeria's international trade.

3.0 Methodology

The study used Ex Post Facto Design. Ex Post Facto Design is an investigation technique that utilizes time series data to investigate the relationship between the variables. The study's time series data came from secondary sources. Total trade (TTD), inflation rate (IFR), and interest rate (INT) were sources from National Bureau of Statistics (NBS) publication (2024), and the Central

Bank of Nigeria Statistical Bulletin, (2024) while exchange rate (EXRR), foreign direct investment (FDI), and trade openness (TRO) were sourced from World Bank Development Indicators (WDI), 2024.

Model Specification

The study adapted Nguyen *et al.* (2021) model who investigated the impacts of exchange rate on exports and imports using empirical evidence from Vietnam. The model is specified as:

$$X_t = \beta_0 + \beta_1 \text{GDP_F}_t + \beta_2 \text{REER}_t + \beta_3 \text{VOL}_t + \varepsilon_t \quad (1)$$

Where:

X represents real exports; GDP_F denotes real foreign income; REER refers to the real effective exchange rate; and VOL signifies exchange rate volatility. Hence, the model is modified to accommodate more macroeconomic variables with introduction of inflation rate, interest rate, foreign direct investment and trade openness. Therefore, the model for this study is specified as follows:

$$\text{Log (TTD)}_t = \alpha_0 + \alpha_1 \text{EXRR}_{t-1} + \alpha_2 \log \text{FDI}_{t-1} + \alpha_3 \text{IFR}_{t-1} + \alpha_4 \text{INT}_{t-1} + \alpha_5 \text{TRO}_{t-1} + \mu_{1t} - - \quad (2)$$

The ARDL model is expressed as:

$$\begin{aligned} \Delta \text{TTD}_t = & \alpha_0 + \sum_{j=1}^m \alpha_{1j} \Delta \text{TTD}_{t-j} + \sum_{j=1}^m \alpha_{2j} \Delta \text{EXRR}_{t-j} + \sum_{j=1}^m \alpha_{3j} \Delta \text{FDI}_{t-j} + \sum_{j=1}^m \alpha_{4j} \Delta \text{IFR}_{t-j} + \sum_{j=1}^m \alpha_{5j} \Delta \text{INT}_{t-j} \\ & + \sum_{j=1}^m \alpha_{6j} \Delta \text{TRO}_{t-j} + \theta_1 \text{EXRR}_{t-1} + \theta_2 \text{FDI} + \theta_3 \text{IFR}_{t-1} + \theta_4 \text{INT}_{t-1} + \theta_5 \text{TRO}_{t-1} + \theta_6 \text{ECM}_{t-1} + U_t \text{-----} 3 \end{aligned}$$

Where:

TTD = Total Trade

EXRR = Exchange Rate

FDI= Foreign Direct Investment

IFR = Inflation rate

INT = Interest rate

TRO = Trade openness

δ_0 is the drift component; $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5,$ and $\alpha_6,$ are the coefficients of the short-run variables while $\theta_1 - \theta_5$ are long run estimated coefficients. Δ is the first difference operator symbol; the variables with first difference operator signs represent short-run dynamic structure; Log is natural logarithm; ECM refers to the error correction mechanism, which captures the residual from the co-integrating relationship, while θ_6 represents the error correction coefficient, indicating the speed at which the variables adjust back to long-run equilibrium, and it is theoretically expected to be statistically significant and negative; U_t is the error term; and t is time.

A Priori Expectations

Theoretically, macroeconomic variables like inflation rate and interest rate should have a negative relationship with total trade (TTD) and FDI and Trade openness (TRO) should a positive relationship with total trade (TTD). Depending on whether the Nigerian economy is export- or import-dependent, the exchange rate (EXRR) is expected to have a positive or negative connection with the total trade (TTD). It is expressed mathematically as: $\alpha_2, \alpha_5 > 0$; $\alpha_4, \alpha_3 < 0$; and $\alpha_1 < 0$ or > 0 .

Definition and Measurement of Variables

Interest Rate (INR): An essential macroeconomic variable that has a direct impact on industrial output. It is the percentage of a loaned sum that the lender charges the borrower as interest, represented as an annual percentage and Exchange Rate (EXR) is the nominal exchange rate of one country's currency against another country's currency. Foreign direct investment: is the net outflows % of GDP, it is the value of outward direct investment made by residents of a country to other countries. It measured in millions of dollars. Trade openness: is the ratio of the total trade (exports + imports) to GDP. It measured in percentage. Inflation: Is the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals. It is measured in percentage. Total trade: is the sum of exports and imports of goods and services expressed in millions of naira.

Estimation Procedure

The conducted unit root test with Augmented Dick Fuller (ADF), ARDL bound test was to determine the existence of long run relationship among the variables while diagnostics checks were carried out as well including, stability test with CUSUM and CUSUM of squares statistics, the serial correlation LM test to ensure suggests that the residual of the ARDL model does not suffer from autocorrelation, heteroskedasticity was carried out with Breusch-Pagan-Godfrey, and normality test of the residual of the model was conducted. The study used E-view to estimate the mode with Autoregressive Distributed Lag Model (ARDL_ECM). The Autoregressive Distributed Lag (ARDL) co-integration technique, also known as the bound test of co-integration (Pesaran and Shin 1999 and Pesarsn et al 2001), is a tool that is utilized to re-parameterize non-stationary series to the Error Correction model (ECM) and ascertain the long-term relationship between them.

4.0 Data Analysis and Discussion of Results

Descriptive Statistics of the Variables

Table 1: Summary of Descriptive Statistics for the Variables

	TTD	EXRR	FDI	IFR	INT	TRO
Mean	50270.62	193.7943	5415.791	18.19223	18.08610	52.17403
Median	53691.73	132.1470	4573.035	19.23805	17.43478	54.10604
Maximum	86634.78	1482.608	9944.568	28.81583	29.54573	78.71710
Minimum	1417.897	8.037808	677.7280	1.965834	5.330921	21.12739
Std. Dev.	24154.28	256.6994	3099.698	7.982517	8.287593	17.64552
Skewness	-0.396063	3.769385	0.088027	-0.399851	0.025249	-0.363543
Kurtosis	2.334654	19.37762	1.528484	2.060942	1.491296	2.025977
Jarque-Bera	1.560634	474.0452	3.203015	2.218642	3.323161	2.154504
Probability	0.458261	0.000000	0.201592	0.329783	0.189839	0.340530
Sum	1759472.	6782.801	189552.7	636.7280	633.0135	1826.091

Sum Sq. Dev. 1.98E+10 2240417. 3.27E+08 2166.500 2335.263 10586.39

Observations 35 35 35 35 35 35

Source: Author Computation, E-views 10 Output, 2025

The result in Table 1 shows that Total Trade (TTD), Exchange Rate (EXRR), foreign direct investment (FDI), Inflation rate (IFR), interest rate (INT), and Trade openness (TRO) have the mean values of 50270.62, 193.7943, 5415.791, 18.19223, 18.08610, and 52.17403, respectively. They also have a positive median of all the variables to be 53691.73, 132.1470, 4573.035, 19.23805, 17.43478, and 54.10604 respectively indicating that the central tendency of the variables is skewed towards higher values. The study reveals the maximum value of 86634.78 for total trade, 1482.608 for exchange rate, 9944.568 for foreign direct investment, 28.81583 for inflation rate, 29.54573 for interest rate and 78.71710 for trade openness. They also have minimum values of 1417.897, 8.037808, 677.7280, 1.965834, 5.330921, and 21.12739, respectively.

Table 1 also shows that exchange rate, foreign direct investment and interest rate have a positive skewness that is they are symmetric indicating that they all have a long right tail while total trade, inflation and trade openness have a negative skewness that is they are asymmetric indicating that they have a long left tail. Table 1 further revealed that total trade, foreign direct investment, inflation rate, interest rate and trade openness with their kurtosis all less than 3 are therefore platykurtic meaning they have lower values than the sample mean, only exchange rate have a kurtosis to be greater than 3 meaning exchange rate is leptokurtic that means it have more higher values than the sample mean.

Results of the Unit Root Tests

Table 2: Summary of Unit Root Test Outcomes

Time Series	ADF Statistics at level	Critical Value at level		ADF Statistics at 1 st Diff	Critical Value at 1 st Diff		Stationary Status at 5%
		1% level	5% level		1% level	5% level	
EXRR	-1.5344	-3.64634	1% level	-5.257897	-4.27328	1% level	-1
		-2.95402	5% level		-3.55776	5% level	

		-2.61582	10% level		-3.21236	10% level	
IFR	-2.3712	-4.26274	1% level	-4.518598	-4.27328	1% level	-1
		-3.55297	5% level		-3.55776	5% level	
		-3.20964	10% level		-3.21236	10% level	
INT	-3.3983	-3.64634	1% level	-7.123659	-4.28458	1% level	0
		-2.95402	5% level		-3.56288	5% level	
		-2.61582	10% level		-3.21527	10% level	
TRO	-6.0846	-3.64634	1% level	-3.940297	-3.65373	1% level	0
		-2.95402	5% level		-2.95711	5% level	
		-2.61582	10% level		-2.61743	10% level	
TTD	0.896135	-4.26274	1% level	-3.911439	-4.27328	1% level	-1
		-3.55297	5% level		-3.55776	5% level	
		-3.20964	10% level		-3.21236	10% level	
FDI	-5.5962	-4.25288	1% level	-6.946457	-4.27328	1% level	0
		-3.54849	5% level		-3.55776	5% level	
		-3.20709	10% level		-3.21236	10% level	

Source: Author Computation, E-views 10 Output, 2025

The ADF unit root result in Table 2 shows the existence of mixed order of integration among the study variables. Specifically, interest rate, foreign direct investment and trade openness are stationary at level (integrated at order zero). However, exchange rate, inflation rate and total trade becomes stationary after differencing (integrated at order one). The existence of mixed order of intergration of the model variables allows for the application of ARDL technique.

Lag Length Selection

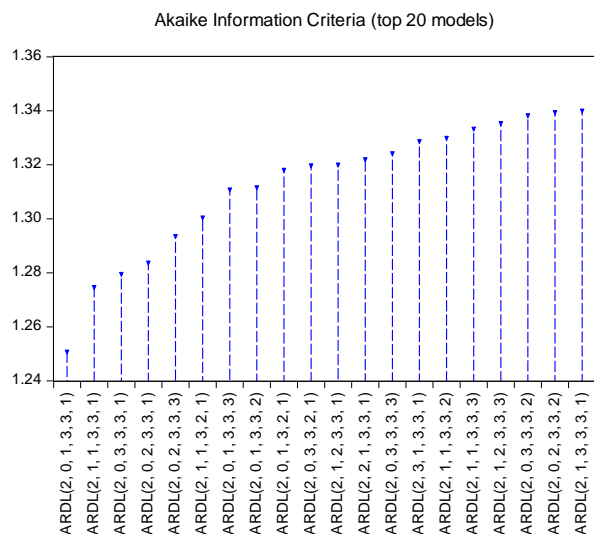


Fig 1: Lag Length Selection, Source: Author Computation, E-views 10 Output, 2025

The lag length criteria considered is Akaike information criteria which is automatically selected by the software and lag 4 is used as the optimal lag given that it produces most efficient result. The reason for using Akaike information criteria is because of its suitability in producing reliable and valid estimates even for small sample.

ARDL Bound Test

Table 3: Result of ARDL Bounds Test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	11.34642	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Author Computation, E-views 10 Output, 2025

The ARDL bound test result in Table 3 shows that there is long-run link among variables incorporated in the model given that the F-statistical value of 11.34642 is larger than the Upper Bound critical value for the actual sample size at 5% level of significance, implying long run interaction among the variables in the model. The presence of long run interaction allows for the consideration of long run estimates for making inference.

Short Run Results

Table 4: ARDL Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(FDI)	-0.395311	0.072113	-5.481861	0.0001
D(IFR)	-0.015261	0.007789	-1.959251	0.0677
D(INT)	-0.006757	0.007727	-0.874416	0.3948
D(TRO)	-0.022070	0.002765	-7.982410	0.0000
EXRR**	3.96E-06	0.000349	0.011356	0.9911
CointEq(-1)*	-0.819350	0.078404	-10.45033	0.0000

R-squared = 0.943255, R² Adjusted = 0.920041 DW = 2.20

Table 4 is the short run estimation which shows the impact of foreign direct investment is negative and it is statistically significant at 5% level of significance, the short run results shows that 1% increase in foreign direct investment in the short run will lead to about 0.39 % decrease in total trade in Nigeria over the specified period of time. Inflation rate was also found to have a negative relationship with total trade in the short run but was found to be statistically not significant at 5% level of significance, the results further show that a 1% increase in inflation rate will lead to about 1.5% decrease in total trade in Nigeria over the specified period of time. Furthermore, the coefficient of interest rate was negative indicating that a negative relationship exist between interest rate and total trade, it was found to be not significant at 5% level and that a 1% increase in interest rate will lead to about 0.6% decrease in total trade. Furthermore, the impact of trade openness was negative indicating that increase in trade openness will lead to decrease in total trade and it was found to be statistically significant, the results further showed that a 1% increase in trade openness in the short run will lead to about 2.2% decrease in total trade in Nigeria between the period 1990 to 2024. Lastly, exchange rate was found to have a positive impact on total trade and was not statistically significant at 5% level of significance.

The error correction term is negative (-0.819350) and statistically significant at 5% level. It shows that deviation from the long run path will take an average speed of 81% for the variables to revert back to the equilibrium within the shortest possible time. The model also has a strong goodness of fit given its high explanatory power of 0.943255 R-squared. It could be inferred that movement or variations in the dependent variable is found to be jointly explain by 94% of contributions of independent variables.

ARDL Long-Run Estimated Result

Table 5: ARDL Long-Run Estimated Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXRR	4.84E-06	0.000426	0.011352	0.9911
FDI	-0.953359	0.429884	-2.217711	0.0414
IFR	0.112893	0.038474	2.934243	0.0097
INT	-0.040675	0.020120	-2.021630	0.0603
TRO	-0.014285	0.007841	-1.821938	0.0872

Source: Author Computation, E-views 10 Output, 2025

The long-run estimates indicate that although the exchange rate exhibits a positive relationship with total trade, the effect is not statistically significant at the 5% significance level. Consequently, the null hypothesis stating that there is no significant relationship between the exchange rate and total trade is accepted, it further revealed that a 1% increase in exchange rate will lead to about 484% increase in total trade in the long run. Furthermore, log of foreign direct investment was found to have a negative relationship with total trade and was found to be statistically significant at 5% level of significance, thereby leading to the rejection of the null hypothesis of no significant relationship between foreign direct investment and total trade and acceptance of the alternative hypothesis, the results showed that a 1% increase in foreign direct investment will lead to about 95% increase in total trade. Inflation rate with a positive coefficient indicates that increase in inflation will lead to increase in total trade and it is statistically significant at 5% level of significance, the results indicate that a 1% increase in inflation will lead to about 11% increase in total trade. Furthermore, interest rate was found to have a negative relationship with total trade and was found to be statistically not significant at 5% level of significance, the results also indicate that a 1% increase in interest rate will lead to about 4% decrease in total trade in Nigeria. Lastly, trade openness was also found to have a negative relationship with total trade but it was not statistically significant at 5% level of significance, the result further indicated that a 1% increase in trade openness will lead to about 1.4% decrease in total trade in Nigeria.

Diagnostic Results

Table 6: Diagnostic Results

Test Statistics	Assumption	Probability
Breusch-Godfrey	Serial Correlation	0.4989

Breusch-Pagan-Godfrey	Heteroskedasticity	0.8878
Jargue Bera	Normal Distribution	0.994166

Source: E-view Version 10.0 Output, 2025

Table 6 contains Autocorrelation, heteroskedasticity, and normality tests with insignificant probability values of 0.4989, 0.8878, and 0.994166, respectively. This study reveals the absence of serial correlation heteroskedasticity, and non-normality assumptions indicating that the estimated model is useful policy formulation and decision making.

Stability Test

The stability of the estimated model was also ascertained using CUSUM (Cumulative Sum) and Cumulative Sum of Squares (CUSUMSQ) tests are employed to assess the stability and structural integrity of a model over time as seen in Figure 2 and 3 below.

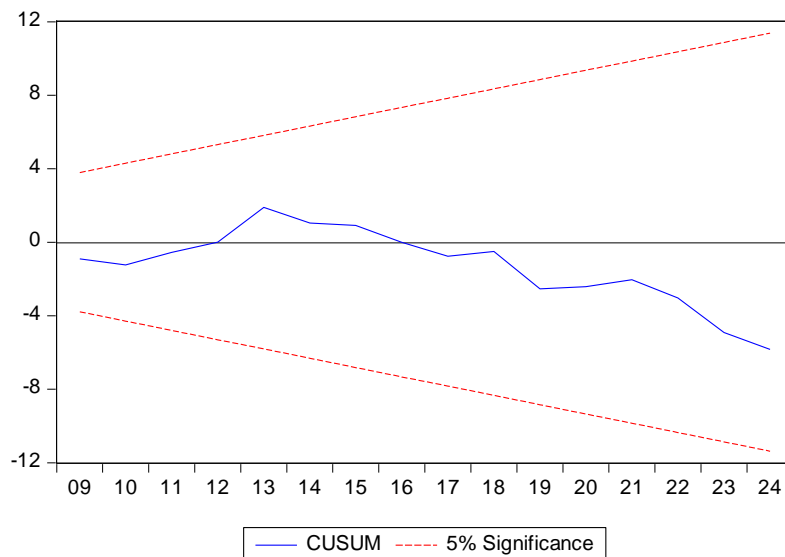


Figure 2: CUSUM Graph, Source: Author Computation, E-views 10 Output, 2025

The CUSUM graph in Fig 2 remains within the critical bounds (typically represented by two horizontal lines or bands). The cumulative sum of residual line stays within these bounds throughout the sample period, it indicates that the model parameters are stable.

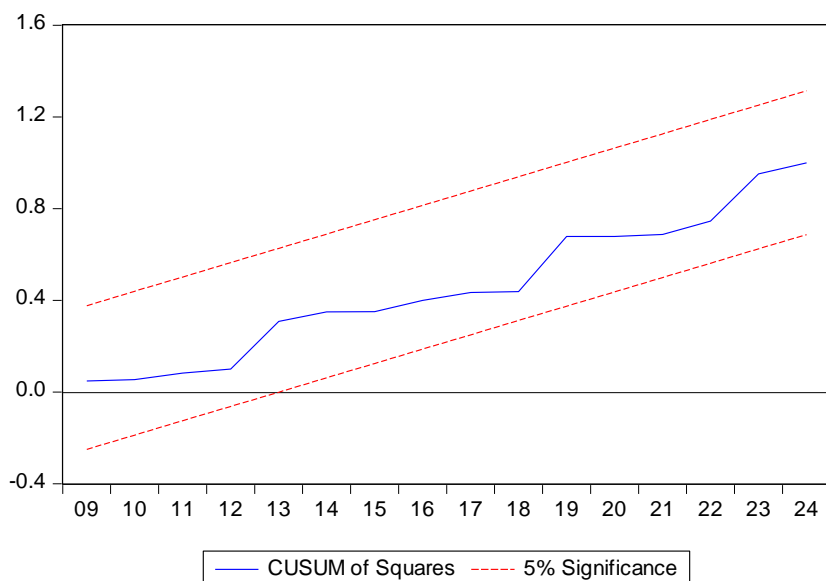


Figure 3: CUSUMSQ Graph, Source: Author Computation, E-views 10 Output, 2025

The CUSUMSQ graph in Fig 3 remains stable and within the 0.05 critical bounds, it reinforces the reliability of the model's estimates and inferences. It suggests that the variance of the residuals has not experienced significant changes that could affect the accuracy of the model.

Discussion of Findings

The short run results show that the impact of foreign direct investment is negative and it is statistically significant over the specified period of time, this is against the popular assumption that foreign capital inflows is expected to stimulate openness and integration into global markets but in the case of Nigeria many foreign owned firms particularly in the manufacturing and telecommunication sector depend mostly on imports of raw materials, machinery and even basic inputs. Despite contributing to higher trade volumes they can also widen trade deficit because exports are often minimal and this imbalances can lead to a statistically negative relationship between FDI and total trade performance of Nigeria.

Inflation rate was also found to have a negative relationship with total trade in the short run but was found to be statistically not significant but has a positive impact in the long run and statistically significant, this may be explained by the fact that rising prices reduce consumers purchasing power, increase the cost of production and create uncertainty in the business environment this will make firms to cut back on production and households will have to reduce their spending which will have negative effect on the economy. On the contrary, the long run effect of inflation being positive and significant maybe due to the fact that overtime businesses

and households gradually adapt to inflationary conditions through wage adjustments, and shifts investment strategies. However, moderate and predictable inflation can stimulate economic agents to invest in physical assets, real estate etc thereby boosting the economy.

Furthermore, the coefficient of interest rate was negative in both the short run and long run indicating that a negative relationship exist between interest rate and total trade. This can be as a result of high interest rate causes an increase in the cost of borrowing for businesses and traders, firms that rely on credit to finance importation of raw materials are discouraged by the high cost of borrowing, this naturally reduces trade activity and therefore bringing about a negative impact on total trade.

The impact of trade openness was negative in both short run and long run indicating that increase in trade openness will lead to decrease in total trade and it was found to be statistically significant, trade openness is often associated with increased trade flows but Nigerian firms often struggle with high production costs, poor infrastructure, unstable power supply and policy inconsistencies which makes them less competitive globally. When the economy becomes more open, local industries are easily displaced by cheaper and better quality imports this will rather than boosting Nigeria's share of trade, it may erode domestic productive capacity and reduce the contribution of non-oil exports, thereby producing a negative outcome.

Lastly, exchange rate was found to have a positive impact on total trade and was not statistically significant in both the short run and long run this is because depreciation of the naira is expected to make Nigerian exports cheaper and more competitive internationally, this will boost exports and total trade.

5.0 Conclusion and Recommendation

The study concluded that macroeconomic variables have significant impact on international trade in Nigeria for the period under study and underscore that Nigeria's trade performance is highly sensitive to its macroeconomic environment. The results caution against viewing international trade in isolation from monetary, fiscal, and investment policies. Instead, a coordinated macroeconomic framework that enhances domestic production, stabilizes prices, lowers the cost of credit, and ensures that FDI is trade-supportive is essential for sustainable trade growth.

Recommendations

- i. Federal ministry of finance and Federal Ministry of Industry, Trade and Investment (FMITI) should make policies that will promote channeling of foreign investments into export-oriented and value-added sectors rather than consumption-based or extractive industries. Stronger backward linkages with local firms should be encouraged.
- ii. Central bank of Nigeria should pursue stable inflation through sound monetary and fiscal policies. A moderate and predictable inflation rate can encourage trade competitiveness should be put in place.
- iii. The Central Bank of Nigeria should design targeted credit schemes for exporters and manufacturers, making financing cheaper and more accessible.
- iv. Federal Ministry of Industry, Trade and Investment (FMITI) should ensure that trade liberalization should be gradual and tied to strengthening Nigeria's productive capacity, industrial base, and export diversification.
- v. Central Bank of Nigeria (CBN) should continue to pursue and maintain a stable and competitive exchange rate regime with a view to support export competitiveness while minimizing excessive import costs.

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