



Research Article

Analysis of Trade Balance Dynamics under the Influence of Structural Adjustment Mechanisms

Martin Okokon Ufi ^{1,2,*} , Omotayo Emmanuel Olanipekun ² , and Uzochukwudinma Awele Otakpor ² 

¹ Centre for the Study of the Economies of Africa, Nigeria

² Sustainable Development Centre, University of Abuja, Nigeria

* Correspondence: mufi@cseaafrica.org

<https://doi.org/10.59652/jeime.v3i1.441>

Abstract: Nigeria's trade balance is influenced by key macroeconomic variables, particularly those shaped by structural adjustment policies. This study investigates the effects of GDP, inflation, and exchange rate depreciation on Nigeria's trade balance, aiming to provide deeper insights into their long-term relationships. Specifically, the research examines how these factors contribute to trade performance and economic stability. To achieve this, the study employs econometric techniques, including the Unit Root Test (Augmented Dickey-Fuller), the Autoregressive Distributed Lag (ARDL) Bounds Co-integration test, ARDL-Error Correction Model (ECM), and the cumulative sum (CUSUM) chart for stability diagnostics. Analysis of data from 1996 to 2022 reveals a positive long-run relationship between GDP, inflation, and trade balance, while exchange rate depreciation has a significant negative effect. This suggests that while economic growth and moderate inflation may support trade, excessive currency depreciation weakens Nigeria's trade balance. These findings underscore the need for policies that manage exchange rate volatility, promote economic diversification, and stabilize inflation to enhance trade performance. The study recommends long-term structural reforms that reduce dependence on oil exports, strengthen the non-oil sector, and ensure exchange rate stability. A well-coordinated macroeconomic framework integrating monetary and fiscal measures is essential for maintaining a stable and favorable trade balance. Ensuring sustainable economic growth while fostering an export-driven economy will be critical in improving Nigeria's trade performance and overall economic resilience.

Keywords: Structural Adjustment Programme; trade balance; inflation; exchange rate; GDP

Received: February 4, 2025

Accepted: February 19, 2025

Published: March 7, 2025



Copyright: © 2022 by the authors.
Submitted for open access publication
under the terms and conditions of the
Creative Commons Attribution (CC BY)
license
(<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

The foreign exchange market is unstable due to high volatility, which has hampered Nigeria's economic growth and development (Kelikume & Nwani, 2019). Due to its destructive impact on the economies of emerging countries, such as Nigeria, exchange rate volatility has become a key topic for discussion in current international finance literature (Barguelli et al., 2018). It is the continuous fluctuation in a country's foreign exchange market. The depreciation of the Naira in 1986 accompanying the implementation of the Structural Adjustment Programme (SAP) has been one of the major and transformational events which have marked Nigeria's economic history over the last three decades.

To overcome the shortcomings and inefficiencies of previous development planning efforts (from the First to Fourth National Development Plans), the SAP was put into place in 1986 in order to increase industrial efficiency in Nigeria, privatize and commercialize state-owned businesses, and encourage the development and use of domestic technology. Its goals also included encouraging the use of locally produced raw materials and intermediate inputs in place of imported ones. The SAP strategy also had a number of other objectives, including promoting investments, stimulating the export of nonoil products and providing foundations for private sector-led development (Chete et al., 2016). Nigeria's economy had been largely dependent on revenues from crude oil exports before SAP was implemented. However, the country was struck by serious external shocks in the 1980s due to a sharp drop in oil prices which triggered an economic crisis marked by high inflation, fiscal imbalances and depletion of foreign exchange reserves. It's becoming clear that reliance on oil exports is unsustainable

and poses significant risks for the country's economic stability (Omorie, 2020).

The development and execution of the controversial SAP policy, which was an important component of the Nigeria Economic Recovery Programme, which led to changes in the financial sector, was overseen by General Ibrahim Babangida. The fixed exchange rate was abolished in favour of a floating system as part of the changes that took place at the end of the 1980 decade. The current reform was based on the view that the cycle of booms and busts could be ended by exchange rate flexibility, leading to a growth path for the country. It was anticipated that the exchange rate channels would have a growth-enhancing effect on consumer price stability, volumes, investments, and trade terms (Omorie, 2020).

It is indisputable that exchange rate policies are essential for achieving government objectives of stability in the prices system, balance of payments (BP), equitable distribution of revenue and economic growth and development. At the time when SAP was introduced in 1986, N1 equaled USD 0.90, leading to speculation that Naira had indeed been overvalued. This had a negative impact on the economy since it supported imports while discouraging non-oil exports and an excessive reliance on imported inputs (Onuorah & Osuji, 2014). Since 1986, the official currency rate has steadily declined, going from N1/0.9 USD to N1/750 USD (CBN, 2021). The objective of boosting exports and attracting foreign investment has not yet been fully realized in Nigeria, despite the depreciation of the Naira and the subsequent unification of the exchange windows by President Bola Tinubu. Considering these circumstances, the present study analyzes data from 1996 to 2022 to investigate how exchange rate depreciation, inflation rate, and Gross Domestic Product (GDP) impact trade balance in Nigeria.

Since the SAP policy was adopted 1986, the Nigerian economy has undergone substantial economic changes thanks to support provided by International Financial Institutions such as World Bank and IMF. These changes seek to help the Nigerian economy overcome ongoing difficulties and move in the direction of sustained growth and development. Because changes in the exchange rate have an impact on a range of factors, such as exports, employment growth, trade, inflation, investment and general macroeconomic activity, concerns about their effects have increased dramatically in both developed and emerging nations, including Nigeria. Despite reports linking exchange rate volatility to macroeconomic instability, substantial empirical and theoretical studies on its causes and effects on Nigeria's internal and external stability are lacking.

Furthermore, arguments about Nigeria's exchange rate changes mostly stem from public economic discourses and contain very little empirical or theoretical information. As a Theoretical Framework, this study adopts as its basis the Optimal Currency Area (OCA) theory developed by Mundell (1961) and McKinnon (1963) to examine Nigeria's exchange rate fluctuations and their effects on trade flows, inflation, and economic growth in order to fill this gap and strengthen the shortcomings of earlier studies from the Nigerian context. The Orccut hypothesis that exchange rate changes affect trade flows more than price changes is also being investigated in this study with a view to examining its validity in the Nigerian context. Therefore, the purpose of this study is to answer the prevailing research questions so as to illustrate the complex relationship between trade patterns, inflation, exchange rate dynamics and GDP in Nigeria. The study's overall aim is to analyze the effects of exchange rate depreciation and inflation on trade balance. Specifically, the study seeks to:

- (1) examine the effect of inflation rate on Nigeria's trade balance;
- (2) assess how exchange rate depreciation impact Nigeria's trade balance.
- (3) investigate the extent to which GDP impact Nigeria's trade balance.

The following hypotheses will be tested:

H01: Inflation rate does not have a statistically significant impact on Nigeria's trade balance.

H02: Exchange rate depreciation does not have a statistically significant impact on Nigeria's trade balance.

H03: GDP does not have a statistically significant impact on Nigeria's trade balance.

2. Literature Review

2.1. Nigeria's Economy in Review

Several studies have examined the relationship between key macroeconomic variables and Nigeria's trade balance. Inflation, as a major economic factor, has been widely debated for its impact on trade performance. Asekunowo (2016) argued that high inflation rates erode Nigeria's export competitiveness by increasing the cost of goods, making them less attractive

in international markets. Conversely, Tule, Salisu, and Ebug (2019) suggested that moderate inflation could stimulate trade by increasing domestic production and encouraging exports. However, the overall effect of inflation on trade balance remains mixed, depending on other macroeconomic conditions.

Exchange rate depreciation has also been a critical determinant of trade balance in Nigeria. Imimole and Enoma (2011) found that exchange rate depreciation leads to increased import costs, worsening Nigeria's trade deficit. Similarly, some works (Eregha et al., 2016) highlighted that excessive exchange rate fluctuations create uncertainty in trade transactions, discouraging foreign investment and reducing export volumes. On the other hand, Godfrey and Agwu (2019) noted that under certain conditions, a depreciating currency could enhance trade balance by making Nigerian exports cheaper and more competitive.

GDP growth has been linked to trade balance through its influence on production capacity and export performance. Gylych et al. (2020) argued that periods of strong GDP growth in Nigeria often coincide with improved trade balances, largely driven by oil exports. However, Babatunde (2018) emphasized the need for economic diversification, noting that reliance on oil-driven GDP growth exposes Nigeria's trade balance to external shocks.

In summary, these studies underscore the complex interactions between inflation, exchange rate depreciation, and GDP in shaping Nigeria's trade balance, reinforcing the need for targeted economic policies.

2.2. Nigeria's Foreign Exchange Policies

Nigeria's exchange rate policies have undergone significant transformations, particularly from 1996 to 2022, in response to economic challenges and global financial trends. Following the liberalization of the Naira under the SAP in 1986, subsequent policies sought to manage exchange rate volatility while promoting trade balance and economic stability (Iheanachor & Ozegbe, 2021).

In 1995, the Autonomous Foreign Exchange Market (AFEM) was introduced to replace guided deregulation, allowing market forces to influence exchange rate determination (Agwu & Godfrey, 2019). However, persistent exchange rate instability led to further reforms. In 1999, the Nigerian government abolished the official exchange rate, consolidating multiple exchange rate windows into a single interbank system (Eregha et al., 2016).

To address growing demand pressures and depletion of foreign reserves, the Dutch Auction System (DAS) was introduced in 2002, which allocated foreign exchange through a bidding process to stabilize the Naira (Iheanachor & Ozegbe, 2021). The Wholesale DAS (WDAS) was later introduced in 2006, allowing authorized dealers to directly purchase foreign exchange, further liberalizing the market (Eregha et al., 2016).

Between 2015 and 2016, Nigeria faced a severe currency crisis due to declining oil prices and external shocks. In response, the Investors' and Exporters' (I&E) FX Window was introduced in 2017 to enhance liquidity and attract foreign investment by allowing market-determined exchange rates (Omoriegbe, 2020). The Naira-for-Dollar Scheme, launched in 2021, incentivized diaspora remittances to strengthen forex inflows (CBN, 2021). In 2023, the government moved toward a unified exchange rate system, eliminating multiple forex windows to enhance transparency and market efficiency (Ozili, 2024).

2.3. The SAP and Exchange Rate Reforms

During the mid-1980s, Nigeria adopted the SAP, which marked a turning point in the nation's economic history. It was a comprehensive package of reforms and policy initiatives designed to solve the economic difficulties Nigeria was experiencing at the time. The restructuring of the Nigerian economy was one of the main objectives of the SAP with a view to generating sustained economic growth, reducing dependence on petroleum exports as well as promoting competitiveness in nonoil sectors (Abah & Naankiel, 2016).

The SAP was introduced in 1986 under the supervision of the Nigerian government with support and funding provided by International financial institutions like the World Bank and IMF. The program was a response to Nigeria's failing economy, which was characterized by high inflation, yearly budget deficits, foreign debt, and an over reliance on oil revenues. The primary goals of the SAP, according to some findings (Isiani et al., 2021), were to stabilize the economy, foster fiscal prudence, and advance economic diversification. A key element of the SAP strategy for establishing macroeconomic stability and increasing nonoil exports was exchange rate liberalization. A series of efforts have been undertaken by SAP aimed at setting a more precise and market-driven exchange rate to reduce the overvaluation of Nigeria's Naira. These adjustments were made in an effort to diminish the nation's heavy reliance on

oil revenues and boost the competitiveness of non-oil exports (Isiani et al., 2021).

A controlled float exchange rate system was implemented by the SAP, allowing the Naira to steadily weaken against the world's major currencies. This devaluation was intended to boost Nigerian goods' competitiveness in foreign markets, making exports more appealing. The exchange rate adjustments were supposed to encourage export-led development and diversify the Nigerian economy away from oil dependency by making non-oil goods cheaper to overseas purchasers (Iheanachor and Ozegbe, 2021).

Although the goal of the exchange rate modifications was to increase non-oil exports, results were conflicting. On the one hand, the Naira's devaluation did make exports considerably less expensive for international consumers, which fueled development in several non-oil export industries including agricultural items. However, issues including poor market access, inadequate infrastructure, and supply chain constraints prevented export potential from being fully realized (Imimole & Enoma, 2011).

2.4. The Price Changes, Inflation and Trade Flows Nexus

The impact of inflation on trade flows both domestically and internationally has been widely researched in recent literature. High inflation rates can make it difficult for a country to compete internationally and make its exports less desirable in contrast to those of countries with lower inflation rates (Asekunowo, 2016). As a result, this may cause exports to decline, resulting in negative trade balances. On the other hand, nations with significantly lower inflation rates than their trading partners may benefit from improved export competitiveness, which increases the likelihood of trade growth (Tule et al., 2019).

There is an intricate connection between Nigeria's oil exports and its trade balance. In terms of trade surpluses, strengthening foreign exchange reserves, stabilizing the currency and encouraging payment of imports, favorable oil prices enhance them. On the contrary, if oil prices fall, there may be a trade imbalance which can have an impact on currency stability and pose foreign exchange problems (Alfalih, 2024). Nigeria's trade dynamics are further strained by inflation-driven increases in the prices of imported goods, which affect both consumer purchasing power and the competitiveness of domestic industries (Perpetua, 2014). Managing the relationship between inflation and trade balance in an oil-dependent economy requires complex policy decisions, as fluctuations in global oil prices have far-reaching effects on fiscal revenues, exchange rate stability, and overall macroeconomic performance.

In order to handle the intricate economic interaction in Nigeria, effective policy alternatives are crucial. It becomes vital to diversify away from oil dependency, promote non-oil exports, and have robust trade mechanisms. It is still crucial to control inflation through responsible monetary and fiscal policy. Nigeria should aim to achieve steady economic development and improve its resilience in the face of global economic instability by negotiating the complex web of price shifts, inflation, and trade flows (Atan & Esu, 2021).

2.5. Exchange Rate volatility and GDP Growth

It has been demonstrated that exchange rate volatility affects uncertainty in international trade, including financial assets and products (Ufoueze et al., 2018) Effect of Foreign Exchange Rate Fluctuation in Nigerian Economy. Economic Series Issues, 1, 105-122. Given that exchange rates are viewed as volatile, forwards looking relative asset values reflecting unexpected fluctuations in local and foreign currency demand and supply, this volatility reflects an agent's expectations about changing drivers for money supply, interest rates or income. In 1986, following the introduction of the SAP in Nigeria, the SAP considered the devaluation of the currency as the primary tool for addressing the economic problems of the country (Okorontah & Odomena, 2016). According to Ehikioya (2019) and Warnes (2022), Nigeria's economy has not been transformed by the repeated and prolonged depreciation of the exchange rate because it was incorrectly expected that the economic structure would resemble that of industrialized economies.

Attention should be drawn to whether changes in currency arrangements will have a negative impact on economic growth and, if so, what extent they may contribute to fluctuations in the rate of economic production, as many developing countries have already made changes to their development strategies or are considering doing so. As a result of these moves, both nominal and real exchange rates are becoming more volatile (Morina et al., 2020). It is quite concerning that other macroeconomic factors, such as economic growth, are impacted by currency rates. Because rising inflation will reduce the purchasing power of local currency, making it more expensive, domestic investment, employment levels, government spending, the BP, and ultimately economic growth will be impacted (Okorontah &

Odoemena, 2016). Because of the cycle of exchange rate impacts, the relationship between exchange rate volatility and economic growth needs to be thoroughly examined.

2.6. Theoretical Foundation

2.6.1. OCA Theory

The need to ensure economic cycle and trade stability is emphasized by this theory. The hypothesis is founded on ideas like labor migration, trade openness, and macroeconomic shock symmetry. This theory proposes that, by reducing foreign exchange volatility and costs associated with hedging or stimulating investments via reduced currency premium on the interest rate, A fixed exchange rate system can hasten the expansion of international trade and productivity. However, by slowing down or discontinuing the essential process of relative price adjustments, this may also delay or stop production growth and trade (Iheanachor and Ozegbe, 2021).

2.6.2. Purchasing Power Parity (PPP) Theory

Gustaf Cassel proposed the concept of PPP in 1981. In response to the need for a new method of calculating exchange rates after the fixed exchange rate system failed, the notion of PPP was created. In accordance with this idea, the movement of the forces of supply and demand alone determines the exchange rate between the two currencies. According to the PPP theory, when two pairs of currencies are fixed at par, the differential in exchange rates should be taken into account with regard to Base Exchange Rate differences that arise because of buying power on a relative currency's side (Anyanwu et al., 2017).

According to this theory, it can be determined whether changes in domestic prices are reflected in exchange rates and how variations in inflation between Nigeria and its trading partners impact currency movements. A more detailed knowledge of how inflation dynamics are affecting trade balance and the nation's external economic ties can be achieved by examining Nigeria's adherence to PPP theory.

2.6.3. Mundell-Fleming Model

A pillar of open economy macroeconomics, the Mundell-Fleming model (also known as the IS-LM-BP model) explains the complex interactions between the equilibrium of the goods market (IS), the equilibrium of the money market (LM), and the equilibrium of the BP in a global context. Understanding how monetary and fiscal policies impact interest rates, trade balance, and exchange rates in an open economy requires a solid theoretical foundation. The model makes it obvious that nations with stable exchange rates can use their flexibility to pursue particular commercial objectives within the confines of macroeconomics and fiscal policy. For instance, fiscal expansion could result in a slow increase in production and interest rates as well as draw capital inflows that would improve the currency's value. On the contrary, it may result in an outflow of capital and subsequent currency depreciation if monetary policy takes a contractionary approach to production and lower interest rates (Leightner, 2024).

3. Materials and Methods

3.1. Research Design: Theoretical Framework and Stages of Research

This study adopts an ex-post-facto research design, as it investigates historical economic data that cannot be manipulated by the researcher. The study relies on secondary data to examine the impact of inflation, GDP growth, and exchange rate depreciation on Nigeria's trade balance.

The Mundell-Fleming Model, an extension of the IS-LM framework, serves as the theoretical foundation. This model is widely used in open economy macroeconomics to analyze how monetary and fiscal policies affect trade balance and exchange rates under different exchange rate regimes. Given Nigeria's economic structure and reliance on external trade, this model provides a strong theoretical basis for understanding how macroeconomic policies influence trade balance dynamics.

The research follows three key stages:

(1) Data Collection: Gathering time-series data from 1996 to 2022 for the dependent and independent variables.

(2) Model Specification & Estimation: Developing the trade balance function and testing relationships using econometric techniques.

(3) Analysis & Interpretation: Conducting statistical tests to assess stationarity, co-integration, and long-run equilibrium relationships



3.2. Samples: Data Sources and Selection

The study uses secondary data obtained from reputable sources, including: Central Bank of Nigeria (CBN) Statistical Bulletin – for exchange rate and inflation data. National Bureau of Statistics (NBS) – for GDP growth data.

World Bank & IMF Databases – for supplementary macroeconomic indicators.

The sample period (1996–2022) was chosen based on data availability and Nigeria’s evolving macroeconomic policies post-SAP. The study focuses on three key independent variables:

GDP Growth Rate (%) measures Nigeria’s economic performance and production capacity.

Inflation Rate (INF, %) represents price stability and purchasing power.

Exchange Rate Depreciation (EXGR, %) captures fluctuations in Nigeria’s currency value against major trading partners.

Trade balance (TB), the dependent variable, is defined as the difference between exports and imports, serving as an indicator of Nigeria’s external sector performance

3.3. Data Collection Instruments

Since this study relies on secondary data, the main data collection instruments include: Published economic reports from CBN, NBS, and international financial institutions.

Time-series datasets accessed through official statistical portals.

Data verification processes, such as cross-referencing figures from multiple sources to ensure consistency.

The collected data was cleaned and standardized to ensure compatibility with econometric analysis. Missing values were addressed using interpolation where necessary. All values were converted to annual percentage changes to facilitate meaningful interpretation

3.4. Data Analysis Methods

To examine the relationship between exchange rate depreciation, inflation, GDP growth, and trade balance, the study employs several econometric techniques:

Unit Root Test (Augmented Dickey-Fuller - ADF) is used to check the stationarity of variables and prevent spurious regression results.

Autoregressive Distributed Lag (ARDL) bounds Cointegration Test: Applied to determine the long-run relationship between the dependent and independent variables.

Error Correction Model captures short-run dynamics and the speed of adjustment toward long-run equilibrium.

Cumulative Sum (CUSUM) Stability Test ensures that the estimated model parameters are stable over time.

Descriptive Statistics: Used to compute means, standard deviations, and trends for each variable.

Explicitly, the model’s functional form is specified below:

$$TB = f(INF, EXGR, GDP) \dots \dots \dots (1)$$

Where:

TB = Trade Balance; INF = Inflation Rate; EXGR = Exchange Rate Depreciation; and GDP = Gross Domestic Product (growth rate %).

The model can be explicitly stated as:

$$TB_t = \beta_0 + \beta_1 INF_t + \beta_2 EXGR_t + \beta_3 GDP_t \dots \dots \dots (2)$$

The error correction specification is given as:

$$\Delta TB_t = \alpha_0 + \alpha_1 \Delta TB_{(t-1)} + \alpha_2 \Delta INF_t + \alpha_3 \Delta EXGR_t + \alpha_4 \Delta GDP_t + ECT_t \dots \dots (3)$$

$$ECT_t = TB_t - (\beta_0 + \beta_1 INF_t + \beta_2 EXGR_t + \beta_3 GDP_t) \dots \dots \dots (4)$$

$$TB_t = \beta_0 + \beta_1 INF_t + \beta_2 EXGR_t + \beta_3 GDP_t + \Omega ECT_{t-1} \dots \dots \dots (5)$$

Where:

β_0 = constant/intercept term; β_1 , β_2 , and β_3 = Slope coefficient/parameter estimates; ECT_{t-1} = error correction term; Ω = error correction term coefficient.

4. Results

4.1. Descriptive Statistics and Preliminary Analysis

To provide an overview of the dataset, Table 1 presents the descriptive statistics for the key variables used in this study: trade balance (TB), inflation rate (INF), exchange rate depreciation (EXGR), and GDP growth rate (GDP). The dataset consists of 108 observations covering the period from 1996 to 2022, sourced from the CBN Statistical Bulletin and the

NBS Statistical Bulletin.

Table 1 reveals that the trade balance (TB), inflation rate (INF), and GDP growth rate (GDP) exhibit positive skewness, indicating a long-right tail distribution. Additionally, platykurtic kurtosis values (Kurtosis < 3) for these variables suggest a flatter distribution with fewer extreme values. The Jarque-Bera test results indicate that all variables are not normally distributed, as their p-values (0.000368, 0.00, 0.00, and 0.004416, respectively) are below the 5% significance level. Therefore, the null hypothesis of normality is rejected.

Table 1. Descriptive statistics.

	TB	INF	EXGR	GDP
Mean	1388451	12.81481	1.59672	4.848594
Median	915635.5	12.07500	0.140669	5.285000
Maximum	5735128	41.90000	35.67921	15.33000
Minimum	-1890256	-1.430000	-43.7659	-6.10000
Std. Dev.	1560237	5.799339	8.08499	3.636187
Skewness	0.937351	1.264185	0.051124	0.227443
Kurtosis	2.993263	8.083748	16.41461	4.484296
Jarque-Bera	15.8155	145.0672	809.830	10.84525
Probability	0.000368	0.00	0.00	0.004416
Sum	1.50E+08	1384.000	172.4458	523.6482
Sum Sq. Dev.	2.60E+14	3598.660	6993.60	1414.738
Observations	108	108	108	108

Source: Author's computation (2025).

Before estimating the ARDL model, stationarity tests were conducted using the ADF test, as presented in Table 2. The results show that trade balance (TB), inflation rate (INF), and GDP growth rate (GDP) are non-stationary at level but become stationary at first difference (I(1)). However, exchange rate depreciation (EXGR) is stationary at level (I(0)), justifying the use of the ARDL model, which accommodates variables with mixed integration orders.

Table 2. Unit Root Test (ADF) result.

Variable	Test Order	ADF-Statistics	Critical Value	Level of Significance	p-value	Order of integration
TB	1st Difference	-2.888932	-13.85502	5%	0.0000	I(1)
	Level	-2.888932	-2.291013	5%	0.1768	
INF	1st Difference	-8.022815	-3.454032	5%	0.0000	I(1)
	Level	-3.283494	-3.457301	5%	0.0752	
EXGR	Level	-10.64428	-3.453179	5%	0.0000	I(0)
GDP	1st Difference	-10.40353	-3.452764	5%	0.0000	I(1)
	Level	-2.858845	-3.452358	5%	0.1802	

Source: Author's computation (2025).

To establish whether a long-run relationship exists among the variables, the ARDL Bounds Cointegration Test was conducted, with results presented in Table 3. The F-statistic value (6.339896) exceeds both the lower and upper bounds critical values at a 5% significance level, confirming that inflation, exchange rate depreciation, GDP, and trade balance are cointegrated. This result validates the use of the ARDL-ECM approach for analyzing both short-run and long-run relationships.

Table 3. ARDL Bounds Cointegration Test

Test Statistics	Value	Sig.	I(0)	I(1)
------------------------	--------------	-------------	-------------	-------------



<i>f</i> -statistics	6.339896	10%	3.47	4.45
K	3	5%	4.01	5.07
		2.50%	4.52	5.62
		1%	5.17	6.36

Source: Author's computation (2025).

4.2. Impact of Inflation Rate on Trade Balance

To analyze the impact of inflation rate (INF) on trade balance (TB), results from the ARDL long-run model (Table 4) were examined. The estimated coefficient for inflation is 37,806.60, suggesting a positive relationship between inflation and trade balance. However, this relationship is not statistically significant ($p = 0.7132, p > 0.05$), implying that inflation does not have a meaningful effect on trade balance in the long run.

The hypothesis test results indicate that:

H01: 'Inflation rate does not have a statistically significant impact on Nigeria's trade balance' is accepted.

This suggests that inflation fluctuations do not significantly alter trade balance outcomes in Nigeria.

In the short-run model (Table 5), inflation was also found to have no immediate impact on trade balance, reinforcing the long-run findings.

Table 4. Long-run ARDL-ECM regression.

Levels Equation				
Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF	37806.60	102577.4	0.368567	0.7132
EXGR	-259990.07	116698.4	-2.227880	0.0282
GDP	241139.53	136324.3	1.768867	0.0800

Note: $EC = TB - (37806.60 * INF - 259990.07 * EXGR + 241139.53 * GDP)$

Source: Author's computation (2025).

4.3. Impact of Exchange Rate Depreciation on Trade Balance

The effect of exchange rate depreciation (EXGR) on trade balance (TB) was analyzed using results from the ARDL long-run model (Table 4). The estimated coefficient for exchange rate depreciation is -259,990.07, indicating a negative relationship between exchange rate depreciation and trade balance. This result suggests that a weaker Naira worsens the trade balance by making imports more expensive and increasing trade deficits.

The hypothesis test results indicate that:

H02: 'Exchange rate depreciation does not have a statistically significant impact on Nigeria's trade balance' is rejected.

Since the p-value is 0.0282 ($p < 0.05$), the effect is statistically significant.

These findings suggest that excessive depreciation of the Naira negatively impacts Nigeria's trade balance by increasing import costs.

In the short-run ECM model (Table 5), the CointEq(-1) term is -0.180635 ($p < 0.05$), meaning that approximately 18.04% of any disequilibrium in trade balance caused by exchange rate depreciation is corrected within one period.

Table 5. Short-run ARDL-ECM model.

ECM Regression				
Case 5: Unrestricted Constant and Unrestricted Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	63655.51	161950.1	0.39056	0.6951
TREND	-707.3605	2593.075	-0.272788	0.7856
D(TB(-1))	-0.264344	0.089170	-2.964486	0.0038
D(EXGR(-1))	-23391.62	8278.191	-2.825692	0.0057
CointEq(-1)*	-0.180635	0.042706	-4.229775	0.0001



R-squared	0.760608	Mean dependent var	2357.204
Adjusted R-squared	0.710137	S.D. dependent var	911805.5
S.E. of regression	815474.0	Akaike info criterion	30.10695
Sum squared resid	6.72E + 13	Schwarz criterion	30.23258
Log likelihood	-1590.668	Hannan-Quin criter.	30.15787
F-Statistic	7.568104	Durbon-Watson stat	1.934858
Prob(F-statistic)	0.000023		

Note: p-value incompatible with t-Bounds distribution.
 Source: Author’s computation (2025).

4.4. Impact of Exchange Rate Depreciation on Trade Balance

The effect of GDP growth rate (GDP) on trade balance (TB) was analyzed using results from the ARDL long-run model (Table 4). The estimated coefficient for GDP growth is 241,139.53, suggesting a positive relationship between GDP and trade balance. However, this effect is not statistically significant ($p = 0.0800, p > 0.05$).

The hypothesis test results indicate that:

H03: ‘GDP does not have a statistically significant impact on Nigeria’s trade balance’ is accepted.

This suggests that, while GDP growth may contribute to trade balance improvements, the effect is not strong enough to be statistically significant.

The short-run ECM model (Table 5) also does not show a significant impact of GDP growth on trade balance, reinforcing the long-run findings.

4.5. Stability Test and Model Robustness

To ensure the reliability and stability of the estimated ARDL model, a Heteroskedasticity Test (Table 6) was first conducted to check for variance instability. The Breusch-Pagan-Godfrey test results indicate the presence of heteroskedasticity ($p < 0.05$), suggesting that variances are not constant over time.

Table 6. Heteroscedasticity Test result.

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
<i>f</i> -statistic	7.283849	Prob. <i>f</i> (3,104)	0.0002
Obs* <i>R</i> -squared	18.75199	Prob. Chi-square (3)	0.0003
Scaled explained SS	18.60322	Prob. Chi-square (3)	0.0003

Source: Author’s computation (2025).

Additionally, the CUSUM stability test was conducted, with results presented in Figure 1. The CUSUM plot remains within the 5% critical bounds, confirming that the model is structurally stable over time.

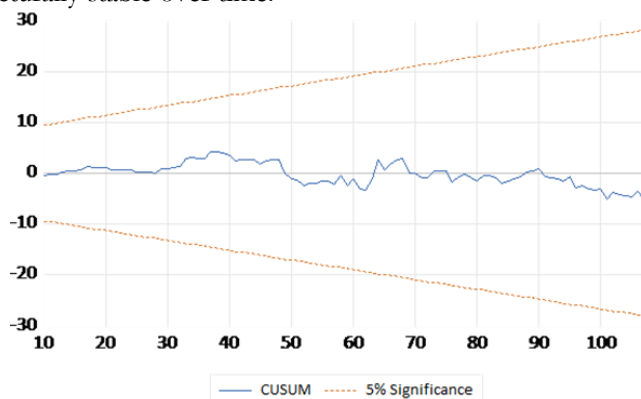


Figure 1. CUSUM.

Source: Author’s computation using Eviews 12 (2025).

These results indicate that the estimated ARDL model is appropriate for policy analysis, as it is both statistically robust and reliable for long-term forecasting. The findings further

highlight the significant role of exchange rate depreciation in shaping Nigeria's trade balance, while inflation and GDP growth show weaker direct effects. These insights provide a foundation for the discussion of macroeconomic policy implications, which are explored in the next section.

5. Discussion

By comparing the results of regression analysis with certain empirical literature, the complicated relationships between inflation rates, exchange rate depreciation, GDP, and trade balance in Nigeria's economic context have been demonstrated. It was discovered that the trade balance and inflation had an enduringly favorable but not statistically significant link.

The result that the inflation rate has no significant impact on trade is consistent with the findings of Duong (2022), who investigated the impact of inflation on trade in Latin America. Their research indicates that, while inflation can have an impact on trade, it is frequently overshadowed by other variables such as exchange rate fluctuations and trade policy dynamics (Duong, 2022).

While the findings of Duong (2022) confirm the lack of significance shown in the current study, the opposing findings of Morales-Zumaquero and Sosvilla-Rivero (2014) highlight the necessity for thorough analyses that take into consideration a variety of parameters. This variation among locations and economic situations emphasizes the significance of examining the influence of inflation on trade in a comprehensive manner, taking factors like exchange rates, trade policy, and regional dynamics into account.

Findings also revealed a negative long-run relationship between exchange rate depreciation and trade balance. The results are consistent with empirical research, highlighting the complex link between exchange rate changes and trade dynamics. The findings of the current study are supported by the research of Inoue and Rossi (2019) investigating the effects of exchange rate volatility on trade in developing economies. Their research highlights how excessive exchange rate fluctuations might impede cross-border trade ties, emphasizing the negative consequences of exchange rate volatility on trade expansion (Inoue & Rossi, 2019).

In a similar vein, the study of Baskaya, di Giovanni, Kalemli-Özcan, Peydro, and Ulu (2021) explores the subject of how exchange rate volatility affects export dynamics. The significance of exchange rate volatility in influencing the export patterns of the Turkish economy is shown by their empirical investigation. The alignment between the findings of some scholars (Baskaya et al., 2021) and the current study emphasizes the current study's wider importance within the debate on the effects of exchange rate volatility on trade. The findings highlight the urgent need for cautious exchange rate management measures to reduce volatility's negative impacts and promote stable trade patterns.

The importance of exchange rate depreciation as a key factor affecting the complex web of dynamics which affects international trade has been collectively supported by past empirical studies. The findings of the present study, which highlight the need for policymakers and professionals to gain a better understanding of how exchange rate volatility impacts the country's trade balance as well as what it takes to establish an environment conducive to lasting business relationships, are in line with these investigations.

The study further found the existence of a positive long run relationship between GDP and trade balance in Nigeria. The long-term positive correlation between economic growth and the trade balance in Nigeria highlights the importance of understanding how resource dependence affects trade dynamics (Babatunde, 2018). Nigeria's economy is highly dependent on oil exports, and the positive association between GDP growth and the trade balance that has been established may mostly be attributable to changes in oil output and price (Okere et al., 2023). Higher oil prices and increased oil output, both of which greatly boost export revenue, frequently correspond with rising GDP.

In many research, empirical data consistently supports the link between resource dependency and trade balance (Babatunde, 2018; Okere et al., 2023). Oil-dependent economies, such as Nigeria, have a high positive association between GDP growth and improved trade balances. During periods of rising global oil prices, these countries see an increase in export profits, as oil exports account for a significant portion of their total exports. This increase in revenue has the potential to result in trade surpluses and an increasingly positive trade balance.

Nevertheless, while the positive correlation between GDP growth and trade balance highlights the role of resource dependence, it also underscores Nigeria's economic vulnerability to global oil market fluctuations (Okere et al., 2023). This study emphasizes the

need for a strategic policy shift toward economic diversification to mitigate the risks associated with overreliance on oil exports. By fostering a more diverse and resilient economy, Nigeria can enhance its trade balance stability and reduce exposure to external shocks. Strengthening non-oil exports, improving industrial capacity, and adopting policies that promote exchange rate stability will be crucial in ensuring long-term trade sustainability and economic resilience in a highly volatile global market.

6. Conclusions

This study has examined the impact of exchange rate depreciation, inflation rate, and GDP growth rate on Nigeria's trade balance using an ARDL-ECM approach to assess both short-run and long-run relationships. The findings reveal that exchange rate depreciation has the most significant effect, with a negative and statistically significant relationship with trade balance. This suggests that a weakening Naira worsens Nigeria's trade position, increasing import costs without substantially boosting exports. In contrast, inflation was found to have no significant impact on trade balance, aligning with previous research indicating that its effects are often overshadowed by exchange rate fluctuations and trade policy dynamics. Lastly, GDP growth exhibited a positive but statistically insignificant relationship with trade balance, highlighting Nigeria's economic vulnerability to global oil price fluctuations and reinforcing the need for economic diversification to reduce exposure to external shocks.

The findings of this study have important policy implications for macroeconomic management in Nigeria. Given the strong influence of exchange rate movements on trade balance, policymakers should stabilize the exchange rate through a combination of monetary policy coordination, foreign exchange reserves management, and targeted interventions in the forex market. To mitigate the risks of resource dependency, Nigeria must also prioritize industrialization, agricultural expansion, and the promotion of non-oil exports. Strengthening macroeconomic policies to manage inflation effectively while maintaining trade competitiveness will be crucial for ensuring sustained trade balance improvements.

While this study provides valuable insights into trade balance dynamics, further research is needed to broaden the scope of analysis. Future studies could examine additional macroeconomic factors, such as interest rates, external debt, and trade policy reforms, to develop a more comprehensive understanding of trade determinants. Additionally, with the growing role of digital trade and financial technology, future research should explore how technological advancements impact Nigeria's trade performance. Lastly, conducting sectoral trade balance analysis – focusing on industries such as manufacturing, agriculture, and services – would help develop industry-specific policy recommendations that support Nigeria's economic transformation agenda.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

References

- Abah, D., & Naankiel, P. W. (2016). Structural Adjustment Programme in Nigeria and its Implications on Socio-Economic Development, 1980-1995. *The Calabar Historical Journal*, 6(2).
- Agwu, E. C. and Godfrey, O.U. (2019). Modeling Volatility and Daily Exchange Rate Movement in Nigeria. *International Journal of Economics and Financial Research*, 5(11), 264-275.
- Alfalih, A. A. (2024). The impact of oil prices, foreign direct investment and trade openness on unemployment rates in an oil-exporting country: The case of Saudi Arabia. *Heliyon*, 10(3), e25094. <https://doi.org/10.1016/j.heliyon.2024.e25094>
- Anyanwu, F. A., Ananwude, A. C., & Okoye, N. T. (2017). Exchange Rate Policy and Nigeria's Economic Growth: A Granger Causality Impact Assessment. *International Journal of Applied Economics, Finance and Accounting*, 1(1), 1-13. <https://doi.org/10.33094/8.2017.11.1.13>
- Asekunowo, V.O. (2016). The Causes of Persistent Inflation in Nigeria. *CBN Journal of Applied Statistics*, 7(2), 3. <https://dc.cbn.gov.ng/jas/vol7/iss2/3>
- Atan, J. A., & Esu, G. E. (2021). Fiscal decentralization and economic growth in Nigeria: new evidences. *Journal of Business and Economic Development*, 6(2), 82-96. <https://doi.org/10.11648/j.jbed.20210602.14>
- Babatunde, M. A. (2018). Oil Price Shocks and Trade Balance in Nigeria. In A. Adenikinju, A. Iwayemi, W. Iledare (eds), *Energy Access for Economic Development: Policy, Institutional Frameworks and Strategies Options* (pp. 459-477). NAEF.
- Barguelli, A., Ben-Salha, O., & Zmami, M. (2018). Exchange Rate Volatility and Economic Growth. *Journal of Economic Integration*, 33(2), 1302-1336. <https://doi.org/10.11130/jei.2018.33.2.1302>
- Baskaya, Y. S., di Giovanni, J., Kalemli-Özcan, Ş., Peydro, J. L., & Ulu, S. B. (2021). International spillovers and local credit cycles. *Journal of International Economics*, 132, 103420. <https://doi.org/10.1093/restud/rdab044>
- CBN. (2021). Naira 4 Dollar Scheme. Available at <https://www.cbn.gov.ng/out/2021/ccd/naira4dollar.pdf>

- Chete, L. N., Adeoti, J. O., Adeyinka, F. M., & Ogundele, O. (2016). Industrial development and growth in Nigeria: Lessons and challenges. Working Paper No. 8, Learning to Compete. The Brookings Institution. https://www.brookings.edu/wp-content/uploads/2016/07/L2C_WP8_Chete-et-al-1.pdf
- Duong, T. H. (2022). Inflation targeting and economic performance over the crisis: evidence from emerging market economies. *Asian Journal of Economics and Banking*, 6(3), 337-352. <https://doi.org/10.1108/AJEB-05-2021-0054>
- Ehikioya, B. I. (2019). The impact of exchange rate volatility on the Nigerian economic growth: An empirical investigation. *Journal of Economics & Management*, 37(3), 45-68. <http://doi.org/10.22367/jem.2019.37.03>
- Eregba, P., Ndoricimpa, A., Olakojo, S., Nchake, M., Nyang'oro, O., & Togba, E. (2016). Nigeria: should the government float or devalue the Naira? *African Development Review*, 28(3), 247-263. <https://doi.org/10.1111/1467-8268.12203>
- Godfrey, O. U., & Agwu, E. C. (2019). Exchange Rate Management and Regime: Quo Vadis Nigeria? *International Journal of Economics and Financial Research*, 5(12), 282-291. <https://doi.org/10.32861/ijefr.512.282.291>
- Gylych, J., Jibrin, A. A., Celik, B., & Isik, A. (2020). Impact of oil price fluctuation on the economy of Nigeria, the core analysis for energy producing countries. In *Global Trade in the Emerging Business Environment*. IntechOpen. <https://doi.org/10.5772/intechopen.94055>
- Iheanachor, N., & Ozegebe, A. E. (2021). The consequences of exchange rate fluctuations on Nigeria's economic performance: An autoregressive distributed lag (ARDL) approach. *International Journal of Management, Economics and Social Sciences*, 10(2-3), 68-87. <https://www.ijmess.com/volumes/volume-X-2021/issue-II-12-2021/full-1.pdf>
- Imimole, B. & Enoma, A. (2011). Exchange Rate Depreciation and Inflation in Nigeria (1986-2008). *Business and Economic Journal*, 11(BEJ-28). <https://www.hilarispublisher.com/open-access/exchange-rate-depreciation-and-inflation-in-nigeria-2151-6219-2-028.pdf>
- Inoue, A., & Rossi, B. (2019). The effects of conventional and unconventional monetary policy on exchange rates. *Journal of International Economics*, 118, 419-447. <https://doi.org/10.1016/j.jinteco.2019.01.015>
- Isiani, M. C., Anthonia Obi-Ani, N., Obi-Ani, P., Chidume, C. G., & Okoye-Ugwu, S. (2021). Interrogating the International Monetary Fund (IMF) Policies in Nigeria, 1986-2018. *Cogent Arts & Humanities*, 8(1). <https://doi.org/10.1080/23311983.2021.1932283>
- Kelikume, I., & Nwani, S.E. (2019). A Vector Autoregression Analysis of the Efficacy of External Reserves Management on Exchange Rate Stability: Evidence from Nigeria. *Journal of Economics, Management and Trade*, 24(5). <https://journaljemt.com/index.php/JEMT/article/view/787>
- Leightner, J. E. (2024). Small-Country Mundell-Fleming (IS/LM/BP) Model Predictions Under Both Fixed and Flexible Exchange Rates: Evidence from Australia and S. Korea. *Journal of Risk and Financial Management*, 17(11), 495. <https://doi.org/10.3390/jrfm17110495>
- McKinnon, R. I. (1963). Optimum Currency Areas. *The American Economic Review*, 53(4), 717-725. <https://www.jstor.org/stable/1811021>
- Morales-Zumaquero, A., & Sosvilla-Rivero, S. (2014). Growth dynamics, financial crises and exchange rate regimes. *Applied Economics Letters*, 22(10), 767-771. <https://doi.org/10.1080/13504851.2014.975327>
- Morina, F., Hysa, E., Ergün, U., Panait, M., & Voica, M. C. (2020). The Effect of Exchange Rate Volatility on Economic Growth: Case of the CEE Countries. *Journal of Risk and Financial Management*, 13(8), 177. <https://doi.org/10.3390/jrfm13080177>
- Mundell, R. A. (1961). A Theory of Optimum Currency Areas. *The American Economic Review*, 51(4), 657-665. <http://www.jstor.org/stable/1812792>
- Okere, K. I., Muoneke, O. B., Ogbolu, G., & Egbo, O. P. (2023). The mediating role of oil price in the export-exchange rate nexus for selected African economies: Evidence from MATNARDL model. *Heliyon*, 9(4), e15343. <https://doi.org/10.1016/j.heliyon.2023.e15343>
- Okorontah, C. F., & Odoemena, I. U. (2016). Effects of Exchange Rate Fluctuations on Economic Growth of Nigeria. *International Journal of Innovative Finance and Economics Research*, 4, 1-7
- Omoriege, O. K. (2020). Foreign Exchange and the Capital Market Dynamics: New Evidence from Non-linear Autoregressive Distributed Lag Model. *International Journal of Management, Economics and Social Sciences*, 9(1), 1-23. <https://doi.org/10.32327/IJMESS/9.1.2020.1>
- Onuorah, A. C., & Osuji, C. C. (2014). Exchange rate and the economic growth in Nigeria. *International Journal of Management Sciences*, 2(2), 78-87.
- Ozili, P. K. (2024). Exchange Rate Unification in Nigeria: Benefits and Implications. In A. Derbali (Ed.), *Recent Developments in Financial Management and Economics* (pp. 115-123). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3693-2683-1.ch007>
- Perpetua, O. I. (2014). Impact of Exchange Rate Variation and Inflation on the Economic Growth of Nigeria: An Empirical Approach. *Research Journal of Finance and Accounting*, 5(22), 166-176. <https://core.ac.uk/download/pdf/234630293.pdf>
- Tule, M. K., Salisu, A. A., & Ebuh, G. U. (2019). A test for inflation persistence in Nigeria using fractional integration & fractional cointegration techniques. *Economic Modelling*, 87, 225-237. <https://doi.org/10.1016/j.econmod.2019.07.024>
- Ufoueze, L.O., Okuma, C.N., Nwakoby, C., & Alayekwu, U.B. (2018) Effect of Foreign Exchange Rate Fluctuation in Nigerian Economy. *Economic Series Issues*, 1, 105-122. <https://doi.org/10.26458/1814>
- Warnes, I. (2022). The impact of exchange rate volatility on economic growth and international trade. *Cultura Económica*, 40(104), 49-67. <https://doi.org/10.46553/cecon.40.104.2022.p49-67>