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OIL PRICE FLUCTUATIONS AND NON-OIL SECTOR DEVELOPMENT: IMPLICATIONS FOR NIGERIA'S BALANCE OF TRADE

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Abstract

This study examined the effects of oil price fluctuations and non-oil sector development on Nigeria's balance of trade over the period 1991–2021. The study also incorporated foreign exchange reserves and government expenditure as additional explanatory variables. Annual secondary data were obtained from the World Bank Development Indicators. The Autoregressive Distributed Lag (ARDL) estimation technique were employed to examine the short- and long-run relationships among the variables. The findings revealed that oil price had a positive and statistically significant effect on the balance of trade in both the short and long run. Foreign exchange reserves had a positive and significant short-run effect but an insignificant long-run effect. Government expenditure exhibited a positive and significant short-run effect but a negative and significant long-run effect. Similarly, non-oil sector GDP had no significant short-run effect but a negative and significant long-run relationship with the balance of trade. The diagnostic tests confirmed that the model satisfied the relevant statistical requirements. The study concludes that Nigeria's balance of trade remains strongly influenced by oil price movements, while growth in the non-oil sector does not automatically translate into improved trade performance. The study recommends economic diversification, increased support for non-oil exports, productive government spending and prudent foreign exchange reserve management to improve Nigeria's balance of trade.

Keywords: Oil Price Fluctuations, Non-Oil Sector Development, Balance of Trade, Foreign Exchange Reserves, Government Expenditure.

1. Introduction

Despite ongoing efforts to diversify the economy, the oil sector remains an important source of revenue and foreign exchange earnings for Nigeria. Revenue from crude oil exports, petroleum taxes and domestic sales continues to contribute significantly to government revenue and the country's external trade position (Usman, 2022). This dependence on oil has made the Nigerian economy vulnerable to fluctuations in international oil prices, with considerable implications for its balance of trade. International trade promotes economic growth by expanding market opportunities, encouraging specialisation and facilitating technology transfer, particularly in developing economies (Ozigbu, 2024).

Nigeria's balance of trade has experienced considerable fluctuations over the years, recording periods of both surpluses and deficits. Between 1981 and 1983, and again in 1998, the country recorded trade deficits, while favourable trade balances were maintained between 1999 and 2014, largely supported by increased oil export earnings (Osinusi et al., 2022). However, declining international oil prices contributed to unfavourable trade balances in 2015 and 2016, while the COVID-19 pandemic further weakened trade performance in 2020 (Kunle, 2020). More recently, Nigeria recorded a merchandise trade surplus of approximately ₦17.78 trillion in 2025, with exports of ₦85.13 trillion exceeding imports of ₦67.35 trillion. The positive trend continued in the second quarter of 2026, when total exports stood at ₦27.02 trillion against imports of ₦14.42 trillion, resulting in a trade surplus of ₦12.60 trillion. Notably, non-crude oil exports reached ₦14.11 trillion, exceeding crude oil exports of ₦12.91 trillion for the first time. Nevertheless, these developments do not necessarily indicate complete diversification, as non-oil

products such as agricultural and manufactured goods accounted for only 13.80% of total exports in the second quarter of 2026 (NBS, 2026; CSEA, 2026).

The relationship between oil price fluctuations and the balance of trade is particularly important for oil-exporting economies such as Nigeria. An increase in international oil prices can improve export earnings and strengthen the country's trade position, while a decline can reduce foreign exchange inflows and weaken export performance. Conversely, rising oil prices may increase import costs for oil-importing economies, worsening their trade balances. The overall effect therefore depends on a country's position in the international oil market and the structure of its economy (Ozigbu, 2024; Ahad & Anwer, 2020). However, recent developments in Nigeria's petroleum industry, particularly the commencement of operations at the Dangote Petroleum Refinery, present an opportunity to reduce dependence on imported refined petroleum products and expand the export of refined products. This development could improve domestic value addition, strengthen export earnings and moderate the country's vulnerability to fluctuations in crude oil prices (International Energy Agency, 2026; EIA, 2026).

Beyond oil price movements, non-oil sector development is equally important in determining Nigeria's balance of trade. The country's continued dependence on crude oil exports and limited diversification of its export base have increased its vulnerability to external economic shocks. Developing the non-oil sector can strengthen domestic production, expand export opportunities and reduce excessive dependence on crude oil revenue. However, growth in the sector may also increase demand for imported machinery, raw materials and other production inputs. Consequently, its overall effect on the balance of trade depends on whether increased production translates into higher export earnings relative to imports (Adeyemi & Adewumi, 2022; Agu et al., 2023).

Despite the importance of oil exports to Nigeria's external trade performance and the growing recognition of non-oil sector development as a strategy for economic diversification, the extent to which oil price fluctuations and non-oil sector growth influence the country's balance of trade remains an important issue for empirical investigation (Bala et al., 2022). Understanding these relationships is necessary to determine how changes in international oil prices affect Nigeria's trade position and whether non-oil sector development can strengthen the country's external trade performance. It is against this background that this study examines oil price fluctuations and non-oil sector development, with particular emphasis on their implications for Nigeria's balance of trade. The study covers a period of 30 years, from 1991 to 2021, and relies on secondary data. The remainder of the paper is organised as follows: Section 2 reviews the relevant literature (conceptual issues, theoretical framework and empirical review); Section 3 presents the methodology; Section 4 presents and discusses the results; and Section 5 provides the conclusion and policy recommendations.

2. Literature Review

2.1 Conceptual Literature

2.1.1 Crude oil in Nigeria

Crude oil is one of Nigeria's most important natural resources and a major contributor to the country's export earnings and government revenue. Since the discovery of oil in commercial quantities, the petroleum industry has become a dominant component of the Nigerian economy, gradually replacing agriculture as the country's primary source of foreign exchange earnings (Ebimobowei, 2022; Usman, 2022). The importance of the sector is reflected in its contribution to external trade, as crude oil exports account for a substantial proportion of Nigeria's total export earnings. According to the International Monetary Fund (IMF, 2024), oil contributes approximately 90% of Nigeria's export revenue and about 40% of government revenue, despite accounting for only 5% of real GDP. This indicates the country's continued dependence on petroleum exports and its vulnerability to changes in the international oil market.

Despite its economic importance, excessive dependence on crude oil presents significant challenges to Nigeria's economic stability and diversification efforts.

Fluctuations in international oil prices directly affect export earnings, while declining production can further weaken the country's external trade position (Olujobi et al., 2022). The concentration of economic activities around the petroleum industry has also contributed to the neglect of other productive sectors, particularly agriculture and manufacturing, a situation associated with the resource curse and Dutch disease (Ogunjimi, 2020; Nwude et al., 2023). Furthermore, the commencement of operations at the Dangote Petroleum Refinery presents an opportunity to increase domestic refining, reduce petroleum product imports and expand refined petroleum exports. The IMF (2024) identifies domestic refining as a development that could improve Nigeria's external position through reduced transportation costs and lower dependence on imported refined products.

2.1.2 Balance of trade

Balance of trade refers to the difference between the total monetary value of a country's exports and imports of goods over a specified period. It is an important indicator of a country's external trade performance and international competitiveness. A trade surplus occurs when the value of exports exceeds imports, while a trade deficit arises when imports exceed exports (Keho, 2021). International trade promotes economic growth by encouraging specialisation, expanding market opportunities, facilitating technology transfer and enabling countries to benefit from economies of scale (Ozigbu, 2024). Consequently, the balance of trade provides an indication of a country's ability to generate export earnings and meet its import requirements through domestic production and international exchange.

The balance of trade is influenced by several macroeconomic factors, including international commodity prices, exchange rate movements, domestic production, income levels and the structure of exports and imports. For oil-exporting countries such as Nigeria, fluctuations in crude oil prices can significantly influence export earnings and overall trade performance. Similarly, inadequate domestic production and excessive dependence on imported goods can contribute to persistent trade deficits (Keho, 2021). Therefore, strengthening the balance of trade requires policies that promote export diversification, improve domestic productive capacity and reduce excessive dependence on imported goods. In Nigeria, the development of the non-oil sector is particularly important in this regard, as increased production and exportation of non-oil goods could complement petroleum earnings and strengthen the country's external trade position (Ebimobowei, 2022; Adeyemi & Adewumi, 2022).

2.1.3 Non-oil sector development

The non-oil sector comprises economic activities outside the petroleum industry, including agriculture, manufacturing, construction, solid minerals, trade, transportation and other services. Non-oil sector development refers to the expansion and improvement of these economic activities through increased production, investment, productivity and value addition. In Nigeria, the development of the non-oil sector has become increasingly important because of the need to reduce excessive dependence on crude oil exports and establish a more diversified economic structure. According to the Central Bank of Nigeria (CBN, 2026), the non-oil sector was estimated to grow by 3.70% in 2025, supported largely by services, particularly trade, real estate, and information and communications. This demonstrates the growing contribution of non-oil economic activities to Nigeria's overall economic growth.

The development of the non-oil sector has important implications for Nigeria's balance of trade because increased domestic production can expand the country's export base, generate foreign exchange earnings and reduce dependence on imported goods. However, the relationship is not necessarily positive in all circumstances, as expansion in non-oil production may also increase the demand for imported machinery, raw materials and intermediate goods. The overall effect therefore depends on whether increased domestic production translates into higher exports and reduced import dependence (Adeyemi & Adewumi, 2022; Agu et al., 2023). Evidence from the CBN (2025) indicates that non-oil sector output grew by 3.64% in the second quarter of 2025, contributing 3.51 percentage points to

overall GDP growth. Nevertheless, non-oil exports declined from US$2.40 billion in the first quarter to US$2.34 billion in the second quarter of 2025, highlighting the distinction between growth in domestic economic output and growth in export performance.

2.2 Theoretical Framework

This study is anchored on the Expenditure Switching Theory, while the Dutch Disease Theory provides a complementary explanation. According to Krugman et al. (2022) two major policy instruments can be used to influence total expenditure and achieve internal and external balance: expenditure-changing policies and expenditure-switching policies. Expenditure-changing policies involve adjustments to fiscal and monetary policies aimed at altering total expenditure levels. In contrast, expenditure-switching policies focus on shifting expenditure from imports to domestically produced goods by either depreciating or appreciating the currency. It refers to a macroeconomic strategy aimed at altering the distribution of a country's spending between domestic and foreign goods. Its primary goal is to adjust the current account balance by modifying the mix of foreign and domestic commodity purchases. The main tactics employed in expenditure switching policies include devaluation or revaluation of the currency. Devaluation, for instance, raises the cost of imports domestically while lowering the price of exports abroad, thereby reducing imports and increasing exports (Krugman et al., 2022). According to the theory, a nation's import and export mix can be impacted by shifts in relative pricing, such as those caused by swings in exchange rates (Ndamase, 2022). Since oil exports are a major source of foreign exchange revenues for Nigeria, changes in oil prices may have an impact on the country's exchange rate. Nigeria's export revenue rises in response to rising oil prices, which causes the currency rate to appreciate. As a result, imports may become more affordable and exports more expensive, thus causing patterns of spending to change in favor of imports rather than exports (Okwu et al., 2020).

However, the extent to which currency depreciation improves the balance of trade depends on the productive capacity of the domestic economy and the responsiveness of exports and imports to changes in relative prices. In this regard, the development of the non-oil sector is important because a stronger domestic production base can enable Nigeria to take advantage of changes in relative prices by expanding non-oil exports and reducing dependence on imported goods.

The Dutch Disease theory explains how a surge in oil prices can lead to an appreciation of the local currency, making non-oil exports less competitive and increasing dependency on imports (Mien, 2022). This phenomenon can exacerbate Nigeria's trade imbalance, as oil revenue drives up imports while domestic industries struggle to compete internationally. Additionally, the theory suggests that the influx of oil revenue may divert resources away from other sectors, hindering their development and further skewing the trade balance.

2.3 Empirical Review

Previous empirical studies have examined the relationship between oil price fluctuations and balance of trade across Nigeria and other oil-producing and oil-importing economies. The empirical review is therefore organised according to the relevance of these studies to the present research.

2.3.1 Oil price fluctuations and balance of trade in Nigeria

Ozigbu (2024) investigated the relationship between Brent crude oil prices and Nigeria's trade balance using annual data from 1981 to 2021. The study employed the bounds testing procedure for cointegration and the autoregressive distributed lag (ARDL) model. The findings revealed a long-run relationship among the variables, with increases in oil prices improving the trade balance in the long run, although the effect was statistically insignificant.

Kunle et al. (2020) examined the cointegration and causality between oil price volatility and Nigeria's trade balance using quarterly data from 1990Q1 to 2014Q4. The study employed the vector error correction model (VECM). The findings revealed a short-run unidirectional causal relationship running from oil price volatility to trade balance. In the long run, the study identified relationships between oil price volatility,

exchange rate, inflation and trade balance. The findings highlighted Nigeria's vulnerability to international oil price fluctuations because of its dependence on crude oil exports and imported goods.

Ogbonna and Ichoku (2023) investigated whether Nigeria's bilateral trade balances with Belgium, China, the United Kingdom and the United States respond symmetrically or asymmetrically to changes in oil prices and exchange rates. Using quarterly data from 1999Q1 to 2019Q4 and the nonlinear autoregressive distributed lag (NARDL) model, the study found that oil price increases and decreases affected Nigeria's bilateral trade balances differently. In particular, oil price declines generally had stronger effects on trade balances with the United Kingdom and the United States, although the pattern varied across countries and periods.

Owuru and Adetokunbo (2021) examined the responses of Nigeria's and South Africa's trade balances to symmetric and asymmetric changes in oil prices and exchange rates. The study used monthly data from January 1995 to December 2018 and applied the ARDL model. The findings showed that oil price increases had a significant negative effect on Nigeria's trade balance in the long run. Exchange rate depreciation also had a significant negative effect on Nigeria's trade balance. The authors recommended economic diversification and exchange rate stability as measures for improving trade performance.

These Nigerian studies generally confirm that oil price movements are relevant to the country's trade balance, although their findings differ regarding the direction and significance of the effects. Such differences may reflect variations in data periods, estimation techniques and the treatment of positive and negative oil price changes.

2.3.2 Oil price fluctuations and balance of trade in other economies

Forson et al. (2022) examined the effect of oil price volatility on the trade balance of sub-Saharan African countries using data covering January 2004 to December 2017. The study employed the Pooled Mean Group (PMG) and Common Correlated Effects Pooled Mean Group (CCEPMG) estimators. The findings revealed that crude oil price volatility negatively affected the trade balance of the countries studied. Inflation, interest rates and exchange rates were also identified as important channels through which oil price volatility influenced trade balances.

Bala and Chin (2023) investigated the impact of oil prices on the trade balances of Algeria, Angola, Nigeria and Libya using data from 1980 to 2016. The study applied the Fully Modified Ordinary Least Squares (FMOLS) technique and considered different international oil price measures. The findings indicated that increases in oil prices improved the trade balances of the countries studied. Exchange rate depreciation had a negative and statistically significant effect on imports, while its effect on exports was positive but insignificant.

Bala et al., (2022) examined the relationship among oil prices, oil exports and trade balance in four African OPEC member countries. The study employed panel FMOLS, panel Dynamic OLS and a panel threshold method. The findings showed that increases in oil prices and oil exports encouraged imports. The study also found that exchange rate depreciation discouraged imports and that the effect of oil exports on trade balance was stronger above an identified threshold level.

Balli, Çatık and Nugent (2021) examined the effects of oil demand and supply shocks on the trade balances of Russia and China using quarterly data from 1993Q1 to 2018Q3. The study employed a time-varying vector autoregression (VAR) model. The findings showed that oil demand shocks had a more pronounced effect than oil supply shocks. While oil demand shocks improved Russia's trade balance, they adversely affected China's trade balance. This difference demonstrates that the effect of oil price shocks depends partly on whether a country is a net oil exporter or importer.

Baek (2020) examined the symmetric and asymmetric effects of oil prices on the trade balances of Singapore, Indonesia, Thailand and Malaysia. Using the ARDL and NARDL techniques, the study found that oil prices significantly influenced the trade balances of the selected ASEAN countries in both the short and long run. The findings further revealed that trade balances responded differently to oil price increases and decreases.

Ahad and Anwer (2021) investigated the relationship between oil prices and trade balance in the BRICS countries using quarterly data from 1992Q1 to 2015Q4. The study adopted the NARDL approach to examine the effects of positive and negative oil price shocks. The findings confirmed an asymmetric relationship among oil prices, wholesale prices, economic growth and trade balance. In particular, both increases and decreases in oil prices worsened the trade deficit positions of India, South Africa and China.

Faheem et al. (2020) examined the effects of oil price fluctuations on the trade balances of Saudi Arabia, Kuwait and the United Arab Emirates between 1980 and 2017. The study employed linear and nonlinear ARDL models and found that oil price changes had different effects across the selected countries. The NARDL results revealed asymmetric relationships between oil prices and trade balances. The study also identified the real effective exchange rate as an important factor influencing the relationship between oil prices and trade balance.

The findings from these international studies show that the effects of oil price fluctuations on trade balance are not uniform across countries. While oil price increases may improve the trade balances of oil-exporting economies, they can worsen the trade positions of oil-importing countries. The findings also suggest that exchange rate movements and the structure of domestic production influence how oil price changes affect trade performance.

2.3.4 Non-oil sector development and balance of trade

Obasanmi and Imahe (2020) examined the relationship between exchange rate changes and Nigeria's bilateral non-oil trade balance with Egypt using data from 1980 to 2018. Employing the distributed lag technique, the study found that the Marshall-Lerner condition held in both the short and long run. The findings suggest that currency devaluation could improve Nigeria's non-oil trade balance, provided that non-oil exports increase relative to imports.

Okon, Obi and Metu (2026) examined the effects of monetary and exchange rate policies on Nigeria's oil and non-oil trade balances using annual data from 1981 to 2023. The study employed the ARDL technique and found that the real exchange rate significantly affected trade balance components in both the short and long run. Monetary policy also moderated the effect of exchange rate movements on non-oil trade, highlighting the influence of macroeconomic conditions on non-oil trade performance.

Abere and Ekeoba (2023) investigated the relationship between Nigeria's non-oil sector and balance of payments equilibrium using annual data from 1970 to 2021. Applying the ARDL and error correction techniques, the study found that agricultural and service-sector exports had positive long-run relationships with balance of payments equilibrium, while manufacturing exports had a negative relationship. The findings highlight the importance of non-oil sector performance to Nigeria's external position, although the study examined the broader balance of payments rather than the balance of trade.

Overall, the reviewed studies have examined the effects of oil price fluctuations on Nigeria's trade balance and the contribution of non-oil activities to external trade performance, but these relationships have largely been investigated separately. There is therefore a gap in empirical literature on the combined effects of oil price fluctuations and non-oil sector development on Nigeria's balance of trade. This study addresses this gap by jointly examining the effects of both variables on Nigeria's balance of trade over the period 1991–2021.

3. Methodology

The main objective of this study is to examine the effect of oil price fluctuations and non-oil sector development on the balance of trade in Nigeria, using annual secondary data covering the period 1991–2021. The data are sourced from the World Development Indicators (WDI) database of the World Bank. To achieve this objective, the study modifies the model proposed by Ozigbu (2024), who examined the relationship between Brent crude oil prices and Nigeria's trade balance. The original model is specified as:

$$TRB_t = \beta_0 + \beta_1 OLP_t + \beta_2 \ln REER_t + \beta_3 INF_t + \beta_4 TOP_t + \mu_t \quad \text{..... (1)}$$

here TRB represents trade balance, OLP represents oil price, REER represents the real effective exchange rate, INF represents inflation rate, TOP represents trade openness, and μ is the error term. To ensure consistency with the objectives of the present study, the model is modified by retaining oil price as the main explanatory variable, introducing non-oil sector GDP to capture non-oil sector development, and including foreign exchange reserves as a control variable. In addition, the real effective exchange rate in Ozigbu's (2024) model is replaced with government expenditure to reflect the expenditure-switching channel through which fiscal spending influences import demand and Nigeria's balance of trade. The modified functional relationship is expressed as:

$$BOT = \beta_0 + \beta_1 OP + \beta_2 FER + \beta_3 GE + \beta_4 NOGDP + \mu \quad \text{..... (2)}$$

Where: Where BOT represents the balance of trade, OP denotes the price of oil, FER refers to foreign exchange reserves, GE represents government expenditure, and NOGDP denotes the non-oil sector GDP. The variables used in the study are further described in Table 1.

Table 1: Description of Variables and A-priori Expectations

Variable	Description	Data source	A-priori expectation
Balance of Trade (BOT)	The difference between the total value of a nation's exports and imports over a specific period. Measured in millions of US dollars (US$ million).	World Bank Development Indicators	Dependent variable
Price of Oil (OP)	The average international market price of a barrel of crude oil. Measured in US dollars per barrel (US$/barrel).	World Bank Development Indicators	$\beta_1 > 0$ (Positive)
Foreign Exchange Reserves (FER)	The total value of foreign currency and other reserve assets held by the Central Bank of Nigeria. Measured in billions of US dollars (US$ billion). Measured in millions of naira (₦ million).	World Bank Development Indicators	$\beta_2 > 0$ (Positive)
Government Expenditure (GE)	Total government spending on infrastructure, social programmes, defence, administration and other sectors.	World Bank Development Indicators	$\beta_3 > 0$ or $\beta_3 < 0$ (Positive or Negative)
Non-Oil Sector GDP (NOGDP)	The total monetary value of goods and services produced by all sectors of the Nigerian economy, excluding the oil and gas sector, within a specific period. Measured in millions of naira (₦ million).	World Bank Development Indicators	$\beta_4 > 0$ (Positive)

Source: Author's compilation, 2026.

3.1 Method of Data Analysis

The study employs the Autoregressive Distributed Lag (ARDL) regression technique to estimate the model parameters and examine the short-run and long-run relationships among the variables. The analysis follows standard econometric and statistical procedures. First, the Augmented Dickey–Fuller (ADF) unit root test is conducted to determine the stationarity properties of the variables and their respective orders of integration. This is necessary to establish whether the variables are stationary at level or become stationary after first differencing. Following the unit root test, the ARDL bounds test is applied to determine whether a long-run relationship exists among the variables. Where cointegration is established, the ARDL model is used to estimate both the short-run and long-run effects of oil price, foreign exchange reserves, government expenditure and non-oil sector GDP on Nigeria's balance of trade. Finally, post-estimation diagnostic tests are conducted to assess the reliability of the estimated model. These include the Breusch–Pagan–Godfrey test for heteroskedasticity, the Breusch–

Godfrey serial correlation LM test for autocorrelation, and the Jarque–Bera test for the normality of the residuals.

4. Results and Discussion

4.1 Descriptive Statistics

Table 2 shows the summary statistics of each variable over the specified period: the average value (mean), the highest value recorded (maximum), the lowest value recorded (minimum) and the average amount of variability in the data set (standard deviation).

Table 2: Summary Statistics

Variable	Mean	Maximum	Minimum	Std. Dev.	Observations
BOT (US$'Million)	1,392,139	5,822,589	-7,905,599	2,949,751	31
OP (US$)	48.93065	99.67000	14.42000	28.09480	31
FER (US$'Million)	2.44E+10	5.36E+10	1.20E+09	1.77E+10	31
GE (#'Million)	4,160.129	19,965.04	66.58440	5,341.040	31
NOGDP (#'Million)	1,641.543	6,226.595	18.32520	1,704.752	31

Source: Author's Computation.

The descriptive statistics for the period 1991–2021 indicate that Nigeria recorded an average balance of trade of US$1,392,139 million, suggesting an overall trade surplus during the period. However, the minimum value of -US$7,905,599 million indicates that the country also experienced periods of trade deficit, while the standard deviation of 2,949,751 reflects considerable fluctuations in trade performance. Similarly, oil prices averaged US$48.93 per barrel, with a maximum of US$99.67 and a minimum of US$14.42, indicating substantial volatility in the international oil market. This variation is particularly relevant to Nigeria, given its dependence on crude oil exports as a major source of foreign exchange earnings.

Foreign exchange reserves averaged US$24 billion, ranging from US$1.2 billion to US$53.6 billion, reflecting considerable changes in the country's external financial position over the study period. Government expenditure recorded a mean of ₦4,160.13 million, with a minimum of ₦66.58 million and a maximum of ₦19,965.04 million, indicating significant variations in government spending. Similarly, non-oil sector GDP averaged ₦1,641.54 million, with values ranging from ₦18.33 million to ₦6,226.60 million, reflecting changes in the level of economic activities outside the oil sector.

4.2 Correlation Analysis

Table 3 presents the correlation coefficients of the relationship between balance of trade and the independent variables, as well as the correlations among the independent variables.

Table 3: Correlation Matrix of Variables

Variable	BOT	OP	FER	GE	NOGDP
BOT	1.000				
OP	0.5679***	1.000			
FER	0.3911**	0.8798***	1.0000		
GE	-0.3377*	0.3763**	0.5723***	1.000	

Variable	BOT	OP	FER	GE	NOGDP
NOGDP	-0.1828	0.5611***	0.6944***	0.9362***	1.000

*Source: Author's Computation *** p<0.01, ** p<0.05, * p<0.1*

The correlation results indicate that the balance of trade has a moderate positive relationship with oil price and foreign exchange reserves, while it exhibits negative relationships with government expenditure and non-oil sector GDP. The relationships between BOT and OP, and BOT and FER are statistically significant, whereas those with GE and NOGDP are statistically insignificant. Furthermore, oil price has a strong positive relationship with FER and moderate positive relationships with GE and NOGDP, with all three relationships being statistically significant. The correlations between FER and GE, and FER and NOGDP are also positive and statistically significant. The relationships among the explanatory variables are generally positive and statistically significant, with most showing moderate to strong associations. However, the relationship GE and NOGDP is particularly strong, positive and statistically significant.

4.3 Pre-estimation Tests

The unit root test follows the Augmented Dickey-Fuller procedure. The test was carried out to examine the stationarity of each of the variables used in the model in order to avoid spurious regression results arising from applying the Ordinary Least Squares method to non-stationary series.

Table 4: Augmented Dickey–Fuller Unit Root Test at Trend

Variable	t-Statistic	Probability (5% level)	Order of Integration
BOT	-8.117720	0.0000	I(1)
OP	-5.652797	0.0001	I(0)
FER	-5.078595	0.0003	I(0)
GE	-4.987011	0.0006	I(1)
NOGDP	-8.220602	0.0000	I(1)

Source: Author's Computation

Table 4 shows the ADF unit root test, revealing that all variables were stationary at first difference, I(1), except oil price, and foreign exchange reserves, which were stationary at level, I(0), at the 5% significance level. The implication is that there is a need to determine whether a long-run relationship (cointegration) exists between the variables. Thus, the ARDL Bounds Test is applied.

Table 5: ARDL Bounds Cointegration Test Results

Test Statistic	Value	K	Significance	I(0) Bound	I(1) Bound
F-statistic	12.96513	4	10%	2.45	3.52
			5%	2.86	4.01
			2.5%	3.25	4.49
			1%	3.74	5.06

Source: Author's Computation.

Table 5 shows the result of the ARDL bound test that was conducted to determine the long-run association among the variables. The F-statistic of 12.96513 is greater than the I(1) critical bound of 4.01 at the 5% significance level, which concludes that there is a long-run relationship among the stationary and non-stationary series in the model. Since the ARDL Bounds Test revealed that a long-run relationship exists among the variables, the ARDL cointegrating and long-run form, which is a short-run error correction technique, is

carried out to ascertain the short-run and long-run regression results.

4.4 Regression Analysis

Table 6: Short-Run ARDL (Cointegrating Form) Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
D(BOT(-1))	1.554196	0.292254	5.317972	0.0003
D(BOT(-2))	0.604173	0.434655	1.390003	0.1947
D(OP)	67030.474479	14332.052827	4.676963	0.0009
D(FER)	0.000086	0.000016	5.232822	0.0004
D(GE)	465.231772	140.505646	3.311125	0.0079
D(NOGDP)	789.161636	711.798244	1.108687	0.2935
CointEq(-1)	-2.658720	0.615946	-4.316481	0.0015

Source: Author's Computation

Table 7: Long-Run ARDL Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
OP	84252.135485	6447.656462	13.067094	0.0000
FER	0.000001	0.000008	0.090450	0.9297
GE	-221.023995	117.605362	-1.879370	0.0896
NOGDP	-530.843515	262.553392	-2.021850	0.0708
C	-1302411.497508	98566.335179	-13.213553	0.0000

Source: Author's Computation

Table 6 and 7 shows the ARDL estimation results for the short- and long-run relationship between oil price fluctuations, non-oil sector development and Nigeria's balance of trade, respectively. In the short run, oil price, foreign exchange reserves and government expenditure all have positive and statistically significant effects on the balance of trade, while non-oil sector GDP has a positive but statistically insignificant effect. This implies that increases in oil prices, foreign exchange reserves and government expenditure are associated with improvements in Nigeria's balance of trade in the short run. The positive effect of oil prices suggests that increases in international oil prices can improve export earnings and strengthen the country's trade position, given Nigeria's dependence on crude oil exports. This finding is consistent with Kunle et al. (2020), who established a short-run causal relationship between oil price volatility and Nigeria's trade balance. It also supports the findings of Bala and Chin (2023), who observed that increases in oil prices improved the trade balances of selected African oil-exporting countries. However, the insignificant short-run effect of non-oil sector GDP suggests that increases in domestic non-oil production do not immediately translate into improvements in Nigeria's balance of trade. This may be because increased output is largely absorbed by domestic demand, while non-oil industries continue to depend on imported machinery, raw materials and intermediate goods.

In the long run, oil price maintains a positive and statistically significant effect on the balance of trade, while foreign exchange reserves have a positive but statistically insignificant effect. In contrast, government expenditure and non-oil sector GDP exhibit negative and statistically significant effects at the 10% level. This indicates that sustained increases in oil prices improve Nigeria's balance of trade over time, reinforcing the importance of crude oil export earnings to the country's external trade performance. It findings agrees with Bala and Chin (2023), who established that higher oil prices

improved the trade balances of selected African oil-producing countries. However, the negative long-run relationship between non-oil sector GDP and the balance of trade suggests that expansion in non-oil economic activities does not necessarily translate into improved trade performance. One possible explanation is that increased domestic production may involve greater demand for imported machinery, raw materials and intermediate goods, thereby increasing imports. This finding differs from Obasanmi and Imahe (2020), whose findings suggest that the expansion of non-oil exports relative to imports could improve Nigeria's non-oil trade balance. It also contrasts with Abere and Ekeoba (2023), who found positive long-run relationships between agricultural and service-sector exports and balance of payments equilibrium. Nevertheless, the latter study examined the broader balance of payments rather than the balance of trade.

Moreover, the negative long-run effect of government expenditure suggests that increased public spending may contribute to higher import demand, particularly where government expenditure is directed towards imported goods, equipment and services rather than domestic productive activities. This may weaken the balance of trade over time. The finding also highlights the importance of the composition and efficiency of public expenditure in determining its contribution to trade performance. From the perspective of the Expenditure Switching Theory, government policies and changes in domestic expenditure can influence the distribution of demand between domestic and foreign goods. Similarly, the Dutch Disease Theory provides an explanation for how dependence on oil revenue and increased demand for imported goods can constrain the competitiveness and development of other tradable sectors. The negative long-run relationship between non-oil sector GDP and the balance of trade also suggests that growth in non-oil output alone may not be sufficient to improve trade performance without corresponding improvements in export capacity and reduced dependence on imported inputs.

Notably, the error correction term is negative and statistically significant at the 1% level, indicating the presence of a long-run relationship among the variables. However, its magnitude exceeds one, suggesting an oscillatory adjustment process characterised by overshooting of the long-run equilibrium following short-run disturbances.

4.5 Post-Estimation Tests

This section presents post-estimation tests to verify that the regression result does not violate the classical linear regression model assumptions and is thus valid for drawing conclusions. These tests include the heteroskedasticity test (Breusch-Pagan-Godfrey), the serial correlation test (Breusch-Godfrey LM test), and the residual normality test (Jarque-Bera).

Table 8: Diagnostic Test

Statistic	F-Statistic Value	Probability
Breusch–Pagan–Godfrey Test	1.823332	0.1687
Breusch–Godfrey LM Test	0.537768	0.6038
Jarque-Bera	1.809365	0.404670

Source: Author's Computation

Table 8 reports the diagnostic test results for the ARDL model. The results reveal that the model is homoscedastic, as the Breusch–Pagan–Godfrey test is statistically insignificant. Similarly, the Breusch–Godfrey LM test indicates the absence of serial correlation in the residuals, while the Jarque–Bera test confirms that the residuals are normally distributed, as their probability values are all greater than 0.05. Overall, the diagnostic tests confirm that the estimated ARDL model is statistically adequate and suitable for drawing inferences about the relationships among the variables.

5. Conclusion and Recommendations

Oil price fluctuations remain an important factor influencing Nigeria's external trade performance, given

the country's dependence on crude oil exports as a major source of foreign exchange earnings. This study examined the effects of oil price fluctuations and non-oil sector development on Nigeria's balance of trade over the period 1991–2021. Foreign exchange reserves and government expenditure were included as additional explanatory variables. The study employed the ARDL bounds testing approach to establish the existence of a long-run relationship, and the ARDL model to estimate the short- and long-run effects.

The findings reveal that oil price has a positive and statistically significant effect on Nigeria's balance of trade in both the short and long run, indicating that increases in international oil prices improve the country's trade position. Foreign exchange reserves also have a positive and significant short-run effect but no significant long-run effect. Government expenditure has a positive and significant short-run effect but a negative and significant long-run effect, suggesting that while public spending may support trade performance in the short run, sustained increases may contribute to higher import demand over time. Similarly, non-oil sector GDP has no significant short-run effect but exhibits a negative and significant long-run relationship with the balance of trade. This suggests that expansion in non-oil economic activities does not necessarily improve trade performance, particularly where increased domestic production is accompanied by higher demand for imported machinery, raw materials and intermediate goods. In conclusion, the findings establish that Nigeria's balance of trade remains significantly influenced by oil price movements, while the contribution of non-oil sector development to trade performance depends on its capacity to strengthen domestic production and expand export earnings.

Based on the findings, the following recommendations are made:

i. Economic diversification: The government should strengthen efforts to diversify the economy by promoting agriculture, manufacturing, solid minerals and other productive sectors. This will reduce excessive dependence on crude oil exports and minimise the vulnerability of Nigeria's balance of trade to international oil price fluctuations.

ii. Non-oil export promotion: Greater attention should be given to improving the productive and export capacity of the non-oil sector. This can be achieved through improved infrastructure, access to finance, technological development and support for local industries to enhance the competitiveness of Nigerian products in international markets.

iii. Effective management of government expenditure: Government spending should be directed towards productive investments, particularly infrastructure, local manufacturing and industries capable of reducing dependence on imported goods. This will ensure that public expenditure supports domestic production rather than increasing import demand.

iv. Prudent management of foreign exchange reserves: Appropriate foreign exchange reserve management policies should be maintained to strengthen external sector stability and provide a buffer against adverse movements in international oil prices. Reserves should also support policies that enhance productive capacity and export competitiveness.

v. Strengthening domestic productive capacity: Policies should encourage the use of locally produced raw materials and intermediate goods by domestic industries. This will reduce reliance on imported production inputs, strengthen local value chains and ensure that growth in non-oil sector output contributes more effectively to improving Nigeria's balance of trade.

References

Abere, B. O., & Ekeoba, A. A. (2023). The nexus between non-oil sector and balance of payment equilibrium in Nigeria. International Journal of Social Sciences: Current and Future Research Trends, 18(1), 112–126.

Adeyemi, P. A., & Adewumi, A. K. (2022). Impact of non-oil exports on balance of payment disequilibrium in Nigeria. International Journal of Finance Research, 3(1), 1–9. https://doi.org/10.47747/ijfr.v3i1.585

Agu, C., Obodoechi, D. N., & Nebo, I. K. (2023). Addressing balance of payment disequilibrium through non-oil export and exchange rate stability in Nigeria: An empirical investigation. Journal of Globalization and Development, 14(1), 147–169.

Ahad, M., & Anwer, Z. (2020). Asymmetrical relationship between oil price shocks and trade deficit: Evidence from Pakistan. The Journal of International Trade & Economic Development, 29(2), 163–180. https://doi.org/10.1080/09638199.2019.1655782

Akdeniz, C., Çatık, A. N., & Ballı, E. (2022). Inflationary effects of oil price and exchange rate shocks in South Africa: Evidence from time-varying pass-through coefficients. South African Journal of Economics, 90(3), 301–328. https://doi.org/10.1111/saje.12327

Bala, U., & Chin, L. (2023). Increases in oil price or oil exports: Which one is more positive on trade balance for African OPEC member countries? OPEC Energy Review, 47(1), 19–33.

Bala, U., Chin, L., & Mustafa, G. (2022). Threshold effects of oil price and oil export on trade balance in Africa. Journal of Economic Impact, 4(1), 14–27.

Baek, J., & Choi, Y. J. (2020). Do oil price changes really matter to the trade balance? Evidence from Korea-ASEAN commodity trade data. Australian Economic Papers, 59(3), 250–278.

Balli, E., Çatık, A. N., & Nugent, J. B. (2021). Time-varying impact of oil shocks on trade balances: Evidence using the TVP-VAR model. Energy, 217, 119377.

Central Bank of Nigeria. (2025). Economic report: Second quarter 2025. https://www.cbn.gov.ng/Out/2025/RSD/Second%20Quarter%202025%20Economic%20Report.pdf

Central Bank of Nigeria. (2026). Macroeconomic outlook for Nigeria, 2026: Consolidating macroeconomic stability amid global uncertainty. https://www.cbn.gov.ng/Out/2025/CCD/CBN%20Macroeconomic%20Outlook%20for%20Nigeria%20Report_28_122025_DG.pdf

Centre for the Study of the Economies of Africa. (2026, September 11). Nigeria economic update, Issue 35. https://cseaafrica.org/postdetails/nigeria-economic-update-issue-35-11

Ebimobowei, A. (2022). Oil revenue and economic growth of Nigeria: 1990–2019. African Journal of Economics and Sustainable Development, 5(1), 17–46.

Faheem, M., Azali, M., Chin, L., & Mazlan, N. S. (2020). Asymmetric effect of oil price changes on trade balance in Saudi Arabia, Kuwait and United Arab Emirates. Pakistan Journal of Commerce and Social Sciences, 14(3), 685–714. https://www.econstor.eu/handle/10419/224960

Forson, P., Dramani, J. B., Frimpong, P. B., Arthur, E., & Mahawiya, S. (2022). Effect of oil price volatility on the trade balance in sub-Saharan Africa. OPEC Energy Review, 46(3), 340–361. https://doi.org/10.1111/opec.12231

International Monetary Fund. (2024). Nigeria: 2024 Article IV consultation—Press release; staff report; staff statement; and statement by the executive director for Nigeria (IMF Country Report No. 24/102). https://www.imf.org/en/-/media/files/publications/cr/2024/english/1ngaea2024002.pdf

Keho, Y. (2021). Determinants of trade balance in West African Economic and Monetary Union (WAEMU): Evidence from heterogeneous panel analysis. Cogent Economics & Finance, 9(1). https://doi.org/10.1080/23322039.2021.1970870

Krugman, P. R., Obstfeld, M., & Melitz, M. (2022). International economics: Theory and policy (12th ed.). Pearson.

Kunle, A. S. (2020). Oil price volatility and trade balance: Co-integration and causality analysis in Nigeria. International Journal of Scientific and Management Research, 3(1), 24–30. http://ijsmr.in/doc/ijsmr_01_6888_25.pdf

Mien, E. (2022). Relevance and limits of the Dutch disease in developing countries: The case of natural resources in Africa [Doctoral dissertation, Université Clermont Auvergne].

National Bureau of Statistics. (2026, September 7). Foreign trade statistics report: Q2 2026. https://microdata.nigerianstat.gov.ng/index.php/catalog/84/related-materials

Ndamase, A. Z. (2022). An analysis of the link between monetary policy, exchange rate pass-through effect and domestic prices in South Africa.

Nwude, C., Nwaeze, C., & Nwude, C. A. (2023). Government expenditure and economic growth: Evidence from the critical sectors in an emerging economy. Qeios. https://doi.org/10.32388/CBTRTL

Obasanmi, J. O., & Imahe, O. J. (2020). An empirical evaluation of the bilateral non-oil export trade balance between Nigeria and Egypt: A test of Marshall-Lerner condition. Journal of Economics, Management and Trade, 26(9), 19–27. https://doi.org/10.9734/jemt/2020/v26i930287

Ogbonna, O. E., & Ichoku, H. E. (2023). Symmetric or asymmetric: How is Nigeria's bilateral trade balance responding to oil price and exchange rate changes? Journal of Economic Studies, 50(3), 464–479. https://doi.org/10.1108/JES-10-2021-0537

Ogunjimi, J. A. (2020). Oil price asymmetry and sectoral output in Nigeria. International Journal of Economics, Business and Management Studies, 7(1), 1–15.

Okwu, A. T., Obiakor, R. T., Akpa, E. O., & Oseni, I. O. (2020). Oil export revenue and exchange rate: An investigation of asymmetric effects on households' consumption expenditure in Nigeria. Babcock Journal of Economics, 7, 13–28.

Okon, A. N., Obi, O. K., & Metu, A. G. (2026). Interaction effects of monetary and exchange rate policies on oil and non-oil trade balance in Nigeria. ADSU International Journal of Applied Economics, Finance & Management, 11(2), 1–21.

Olujobi, O. J., Olarinde, E. S., & Yebisi, T. E. (2022). The conundrums of illicit crude oil refineries in Nigeria and its debilitating effects on Nigeria's economy: A legal approach. Energies, 15(17), 6197.

Osinusi, K. B., Lawal, N. A., & Bisiriyu, S. O. (2022). Trade balance, exchange rate and money supply in Nigeria: Growth implications and lesson for African countries. Management & Economics Research Journal, 4(2), 25–44. https://doi.org/10.48100/merj.2022.213

Ozigbu, J. C. (2024). Oil price shock and trade balance in Nigeria. IIARD International Journal of Economics and Business Management, 9(5), 13–25. https://doi.org/10.56201/ijebm.v9.no5.2023.pg13.25

Owuru, J. E., & Adetokunbo, A. M. (2021). Testing asymmetric response of trade balance of Nigeria and South Africa to exchange rate and oil price dynamics. Augustine University Journal of Social Science, 1(1).

U.S. Energy Information Administration. (2026, August 24). Dangote refinery drives increase in petroleum shipments from Nigeria. https://www.eia.gov/TODAYinENERGY/detail.php?id=68004

Usman, Z. (2022). Economic diversification in Nigeria: The politics of building a post-oil economy. Bloomsbury Academic.