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EFFECT OF EXCHANGE RATE FLUCTUATIONS ON NON-OIL EXPORTS IN NIGERIA

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ABSTRACT

This study examines the impact of exchange rate movements and volatility on non-oil export performance in Nigeria using the Autoregressive Distributed Lag (ARDL) model with annual data from 1981–2024. The analysis includes inflation, interest rate, trade openness, and gross domestic product (GDP) as control variables to capture both short-run and long-run relationships. The ARDL bounds test confirms the existence of a long-run relationship among the variables. The findings indicate that exchange rate movements exert a mixed and largely insignificant effect on non-oil exports in both the short and long run, implying that exchange rate depreciation alone is insufficient to stimulate export growth. Exchange rate volatility also exhibits weak and inconsistent effects. Conversely, trade openness and GDP have significant positive effects on non-oil exports, underscoring the importance of economic growth and global market integration. Inflation and interest rates show mixed effects, reflecting the complexity of the macroeconomic environment. The error correction term is negative and statistically significant, indicating convergence to long-run equilibrium at a moderate speed of adjustment. The study concludes that structural factors are more influential than exchange rate adjustments in driving non-oil export performance. It recommends strengthening productive capacity, expanding trade openness, and maintaining macroeconomic stability to promote export diversification and sustainable economic growth.

Keywords: Foreign Exchange, Inflation, Trade Policy, International Economics, ARDL

Jell Code: F31; E31; O24; F10; C32

1. Introduction

Nigeria's economy has historically been dominated by crude oil exports, making it highly vulnerable to external shocks arising from fluctuations in global oil prices. This overdependence has limited the development and competitiveness of the non-oil sector, which is widely recognized as a critical driver of sustainable economic growth, employment generation, and export diversification. In response, successive governments have implemented various policies aimed at promoting non-oil exports, yet the performance of this sector remains relatively weak compared to its potential.

One of the key macroeconomic factors influencing non-oil export performance is the exchange rate. The exchange rate plays a crucial role in determining a country's international competitiveness by affecting the relative prices of domestic goods in the global market (Ullah & Nobanee, 2025). In Nigeria, the exchange rate regime has undergone significant transformations, ranging from fixed exchange rate systems in the pre-Structural Adjustment Programme (SAP) era to more flexible and market-determined systems in recent years. These shifts have been accompanied by considerable exchange rate fluctuations, reflecting both domestic economic conditions and external pressures.

Exchange rate fluctuations can have ambiguous effects on non-oil exports. On the one hand, a depreciation of the domestic currency is expected to enhance export competitiveness by making locally produced goods cheaper for foreign buyers, thereby stimulating export demand (Umeaduma & Dugbartey, 2023). On the other hand, persistent volatility in exchange rates introduces uncertainty, which may discourage investment in export-oriented industries (Makore & Chikutuma, 2025). Additionally, given Nigeria's heavy reliance on imported inputs for production, exchange rate depreciation can increase production costs, thereby offsetting potential gains from improved competitiveness.

Despite the theoretical importance of exchange rate movements, empirical evidence on their impact on non-oil exports in Nigeria remains mixed and inconclusive. While some studies find that exchange rate depreciation promotes export growth (Anagun & Agosu, 2024; Ijirshar et al., 2022; Gold & Yusuf, 2025), others show that exchange rate volatility may either enhance or hinder export performance depending on the economic context. For example, Rojid and Rojid (2024) report a positive effect of volatility on exports, whereas Ramoni-Perazzi and Romero (2022) and Urgessa (2024) find that volatility can negatively affect economic growth and export earnings. These contrasting findings highlight the need for further empirical investigation using robust econometric techniques that capture both short-run and long-run dynamics.

Against this backdrop, this study examines the effect of exchange rate fluctuations on non-oil exports in Nigeria over the period 1981–2024 using the Autoregressive Distributed Lag (ARDL) approach.

Research Question

The study seeks to answer the following research question:

- a) What is the effect of exchange rate movements on non-oil exports in Nigeria?
- b) What is the effect of exchange rate volatility on non-oil export performance in Nigeria?
- c) How do inflation rate, interest rate, trade openness, and gross domestic product influence non-oil exports in Nigeria?

Objective of the Study

The main objective of this study is to examine the effect of exchange rate fluctuations on non-oil exports in Nigeria.

The specific objectives are to:

- a) Determine the effect of exchange rate movements on non-oil exports in Nigeria;
- b) Examine the impact of exchange rate volatility on non-oil export performance in Nigeria; and
- c) Assess the influence of inflation rate, interest rate, trade openness, and gross domestic product on non-oil exports in Nigeria.

The remainder of this paper is structured as follows: Section 2 reviews the theoretical and empirical literature and presents key trends in exchange rate movements and non-oil export performance in Nigeria; Section 3 describes the methodology and data sources; Section 4 presents and discusses the empirical results; and Section 5 concludes the study and provides policy recommendations.

2 Literature Review

2.1 Conceptual Literature

This study focuses on the relationship between exchange rate fluctuations and non-oil export performance in Nigeria. Exchange rate refers to the price of one country's currency in terms of another country's currency. It plays a crucial role in international trade by influencing the competitiveness of domestic goods and services in foreign markets. Exchange rate fluctuations represent changes in the value of a currency over time, while exchange rate volatility refers to the degree of instability or unpredictability in exchange rate movements (Krugman et al., 2018; Salvatore, 2019).

Non-oil exports consist of all export products excluding crude oil and natural gas. In Nigeria, non-oil exports primarily include agricultural products, manufactured goods, solid minerals, and other processed commodities. The promotion of non-oil exports is considered essential for export diversification, foreign exchange earnings, employment generation, and sustainable economic growth.

Exchange rate movements may affect non-oil exports through various channels. Currency depreciation can improve export competitiveness by reducing the relative price of domestic products in international markets, thereby increasing foreign demand. However, excessive exchange rate volatility may create uncertainty for exporters, increase transaction costs, discourage investment in export-oriented activities, and reduce export performance (Bahmani-Oskooee & Hegerty, 2007).

In addition to exchange rate variables, other macroeconomic factors influence non-oil export performance. Inflation affects the cost competitiveness of domestic products, while interest rates influence the cost of financing production and export activities. Trade openness enhances access to international markets and promotes export expansion, whereas economic growth, measured by gross domestic product (GDP), reflects productive capacity and the ability of an economy to supply goods for export markets.

The conceptual framework of this study therefore posits that non-oil exports are influenced by exchange rate movements, exchange rate volatility, inflation rate, interest rate, trade openness, and gross domestic product. These variables are expected to interact in shaping the performance of Nigeria's non-oil export sector.

2.1.1 Trends in Exchange Rate Movement and Non-Oil Export Performance

Over the past four decades, Nigeria's exchange rate has undergone significant shifts, reflecting changes in economic policy, external shocks, and structural imbalances. During the early 1980s, the naira remained relatively stable under a fixed exchange rate regime; however, the introduction of the Structural Adjustment Programme (SAP) in 1986 marked a shift toward a more flexible exchange rate system. Since then, the naira has generally depreciated against major currencies, particularly the US dollar, due to persistent foreign exchange shortages, declining oil revenues, and macroeconomic pressures. Official data indicate that Nigeria's exchange rate (local currency units per US dollar) has exhibited a persistent upward trend from 1981 to 2024, reflecting substantial depreciation of the naira over time (see Figure 1). The exchange rate increased gradually from about ₦0.62 in 1981 to approximately ₦1.75 in the mid-1980s, before rising sharply following exchange rate reforms under the Structural Adjustment Programme (SAP). By the early 2000s, the exchange rate had reached double digits, exceeding ₦20 per US dollar, and continued to depreciate to over ₦100 by the late 2000s and early 2010s. In the post-2015 period, the naira experienced further depreciation, rising to above ₦400 per US dollar, and subsequently surged to over ₦600 and above ₦1,400 per US dollar in the early 2020s. This long-term depreciation is clearly reflected in the data (see Figure 1), which shows a persistent upward trend from ₦0.617708 in 1981 to ₦1,478.965 in 2024. The sustained depreciation highlights increased exchange rate flexibility, structural imbalances in the foreign exchange market, declining foreign reserves, and continued external pressures on the Nigerian economy over the study period.

This period of exchange rate depreciation has coincided with policy efforts to diversify Nigeria's export base away from crude oil toward non-oil sectors such as agriculture, solid minerals, and manufacturing. Although comprehensive long-term time-series data on non-oil exports remain limited in publicly accessible databases, aggregate export statistics reveal notable trends. Nigeria's total exports reached historic highs in 2024, with trade exports estimated at approximately \$50.4 billion. This performance was driven partly by exchange rate depreciation and complementary policy reforms that strengthened the trade balance. While crude oil continues to dominate export earnings, non-oil exports made a meaningful contribution to this growth (Nairametrics, 2025).

Recent data also indicate continued momentum in export performance. According to Eboh (2025), Nigeria's non-oil exports increased by nearly 20 percent in the first half of 2025, reaching \$3.225 billion, driven by strong global demand for commodities such as cocoa, urea, and cashew nuts. This trend reflects ongoing diversification efforts and improved access to international markets, including opportunities associated with the African Continental Free Trade Area (AfCFTA).

Figure 2 presents the trend in Nigeria's non-oil exports from 1981 to 2024. The figure shows that non-oil exports remained relatively low and stagnant throughout the 1980s and much of the 1990s, reflecting the country's heavy dependence on crude oil exports and limited export diversification. Beginning in the early 2000s, non-oil exports started to increase gradually, with more noticeable growth occurring from the mid-2000s onward. Although the overall trend was upward, the growth pattern was accompanied by periodic fluctuations, indicating the influence of both domestic and external economic factors on export performance.

The figure further reveals that non-oil exports experienced significant expansion during the late 2010s, reaching a notable peak around 2019. However, this was followed by a decline in 2020, likely associated with disruptions caused by the COVID-19 pandemic and the resulting slowdown in global trade. From 2021 onwards, non-oil exports recovered strongly and exhibited accelerated growth, culminating in a sharp increase between 2023 and 2024. By 2024, non-oil exports had reached their highest level during the study period, suggesting substantial improvements in export diversification efforts, increased international demand for non-oil products, and the possible benefits of recent trade and exchange rate reforms. Overall, the trend indicates a long-term improvement in Nigeria's non-oil export performance despite episodes of short-term volatility.

Despite these gains, the relationship between exchange rate movements and non-oil export performance remains complex. Periods of sharp depreciation have often enhanced the price competitiveness of Nigerian goods in international markets, thereby supporting export growth. However, persistent exchange rate volatility, alongside structural constraints, such as dependence on imported inputs and inadequate infrastructure, has, at times, weakened the potential benefits of a depreciating naira for non-oil exports. Furthermore, policy reforms aimed at stabilising the exchange rate and strengthening foreign exchange reserves in 2025 and early 2026 have contributed to reduced volatility and a more supportive environment for exporters (Eboh, 2026).

Overall, from 1981 to 2024, Nigeria's exchange rate has exhibited a long-term depreciation trend, while non-oil export performance has improved intermittently, influenced by both macroeconomic reforms and global demand conditions. These dynamics underscore the importance of understanding how exchange rate behaviour interacts with structural factors to shape non-oil export outcomes.

2.2 Theoretical Literature

The relationship between exchange rate movements and export performance is explained by several theoretical frameworks. One of the most prominent is the Marshall–Lerner condition, which states that a depreciation of a country's currency will improve its trade balance if the combined price elasticities of demand for exports and imports exceed one (Krugman et al., 2018). Under this condition, a weaker domestic currency makes exports cheaper and more competitive in international markets while making imports more expensive, thereby encouraging domestic production and export growth.

Closely related to the Marshall–Lerner condition is the J-Curve hypothesis, which posits that following currency depreciation, a country's trade balance may initially worsen before improving over time (Bahmani-Oskooee & Ratha, 2004). This occurs because import and export contracts are often fixed in the short run, causing the value of imports to rise before export volumes can adjust. As firms and consumers gradually respond to new relative prices, export earnings increase and the trade balance improves.

The elasticity approach to the balance of payments further emphasizes the responsiveness of export and import demand to changes in relative prices resulting from exchange rate fluctuations (Salvatore, 2019). According to this approach, the effectiveness of exchange rate depreciation in stimulating exports depends largely on the price elasticity of demand for exported goods. In developing economies such as Nigeria, where exports are heavily concentrated in primary commodities such as crude oil, export demand tends to be relatively inelastic. Consequently, exchange rate depreciation may have a limited impact on export volumes and earnings.

Another important framework is the absorption approach, developed by Sidney Alexander (1952), which views the trade balance as the difference between national income and domestic absorption (consumption, investment, and government expenditure). The theory suggests that exchange rate depreciation can improve the trade balance only if it increases national output relative to domestic expenditure. Therefore, the success of exchange rate policy in promoting exports depends on the economy's capacity to expand production in response to improved competitiveness.

The portfolio balance approach provides a broader perspective by incorporating capital flows and investor expectations into exchange rate determination (Branson, 1981). According to this theory, exchange rates are influenced not only by trade flows but also by the demand and supply of domestic and foreign financial assets. Exchange rate volatility creates uncertainty regarding future returns, which may discourage investment in export-oriented industries. This effect is particularly significant in developing economies with relatively underdeveloped financial markets, where firms may lack adequate mechanisms to hedge against exchange rate risk.

Collectively, these theoretical frameworks suggest that exchange rate movements influence export performance through changes in price competitiveness, trade adjustment processes, domestic production capacity, and investment decisions. The extent of these effects depends on factors such as demand elasticity, the structure of exports, macroeconomic conditions, and the level of financial market development. These theories therefore provide a useful foundation for examining the impact of exchange rate fluctuations on export performance in Nigeria.

2.3 Empirical Literature

Empirical evidence on the relationship between exchange rate fluctuations and export performance remains inconclusive. While some studies indicate that exchange rate depreciation enhances export performance by improving price competitiveness, others reveal negative or insignificant effects, particularly when exchange rate volatility is high.

Kwajaffa (2025) investigated the effect of exchange rate dynamics on non-oil exports in Nigeria using the ARDL approach for the period 1981–2022. The results indicated the existence of a long-run relationship among the variables and showed that exchange rate depreciation has a positive but weak influence on non-oil exports. However, trade openness negatively affects export performance, while inflation and money supply produced mixed outcomes. The study suggests that exchange rate depreciation alone may not be sufficient to stimulate non-oil export growth without supportive macroeconomic conditions.

Similarly, Nwobia et al. (2020) assessed the impact of exchange rate fluctuations on Nigeria's external trade using annual data from 2000–2019 and the OLS estimation technique. The findings revealed that exchange rate movements significantly influence external trade, with exchange rate increases exerting a negative effect on trade performance. The study emphasized the need for export-oriented policies and exchange rate management to improve external sector performance.

Lawal et al. (2025) applied the VECM approach and observed that exchange rate volatility does not have a significant short-run effect but negatively influences exports in the long run. The study concluded that persistent exchange rate instability weakens export performance and recommended exchange rate stabilization measures and economic diversification.

Using ARDL estimation over the period 1980–2021, Ebhotemhen (2023) reported that exchange rate (lagged by three years) significantly reduces non-oil exports in both the short and long run, despite the existence of a long-run relationship among the variables. The study highlighted the importance of effective exchange rate management in promoting export growth. In contrast, Udo (2025) employed OLS and cointegration techniques and obtained mixed results. While some estimates showed a significant relationship between exchange rate fluctuations and non-oil exports, inconsistencies were observed regarding long-run effects. The study concluded that exchange rate instability remains an important determinant of non-oil export performance and recommended measures to strengthen export capacity.

Beyond the direct effect of exchange rates on exports, some studies have examined the relationship between export performance and exchange rate volatility. Nwolisa et al. (2023) analyzed the reverse relationship and reported that growth in non-oil exports contributes to exchange rate stability. Specifically, a 1% increase in non-oil exports reduces exchange rate volatility by 0.64%, suggesting that export diversification can enhance foreign exchange stability. Similarly, Ndidi and Alaba (2019), using an ECM framework, established that exchange rate volatility significantly reduces non-oil exports in Nigeria. The study also confirmed volatility clustering through ARCH effects and recommended policies aimed at maintaining exchange rate stability.

Ihugba et al. (2024) examined the effect of inflation and exchange rate volatility on MSME growth in Nigeria using the ARDL approach. The findings showed that exchange rate volatility produces mixed outcomes, with positive effects in the short run but adverse consequences in the long run. The study further demonstrated that macroeconomic instability negatively affects productive sectors, with possible implications for non-oil export performance.

Shawon et al. (2018) investigated the effect of exchange rate variation on the competitiveness of Nigeria's non-oil exports using the ARDL approach. The study established a long-run relationship among exchange rate variation, trade openness, GDP, real exchange rate, and non-oil exports. The findings indicated that exchange rate instability negatively affects non-oil exports in both the short and long run, while GDP contributes positively to export performance. The study recommended exchange rate stabilization policies to improve the competitiveness of Nigeria's non-oil export sector. Similarly, Akanbi et al. (2017) analyzed exchange rate volatility and non-oil exports in Nigeria using ARCH-type models (GARCH, TGARCH, and EGARCH) alongside an ECM framework. Based on quarterly data from 1986–2014, the study identified significant exchange rate volatility and established that instability in the foreign exchange market reduces export performance. The study recommended appropriate macroeconomic and exchange rate policies to promote export growth.

Gold and Yusuf (2025), using ARDL, FMOLS, DOLS, and CCR techniques, reported that exchange rate depreciation significantly improves non-oil exports. The study also showed that GDP and trade openness enhance export performance, while interest rates and fuel prices negatively affect exports. These findings emphasize the role of exchange rate stability and competitiveness in promoting export growth. Anagun and Agosu (2024) examined the relationship between exchange rate depreciation, trade balance, and economic growth using the ARDL approach. The findings revealed a long-run relationship, with exchange rate depreciation positively influencing economic growth, although short-run effects were insignificant. This suggests that exchange rate adjustments may generate benefits over time despite short-term challenges. Ijirshar et al. (2022) provided evidence supporting the J-curve hypothesis and Marshall–Lerner condition by showing that exchange rate depreciation negatively affects trade in the short run but improves performance in the long run. The study recommended policies that enhance domestic production and reduce excessive import dependence.

Evidence from other developing economies also presents mixed outcomes. Rojid and Rojid (2024), in a study on Mauritius, reported that exchange rate volatility positively affects exports in both the short and long run, indicating that the impact of volatility may depend on country-specific conditions. Conversely, Ramoni-Perazzi and Romero (2022) showed that exchange rate volatility negatively affects economic growth, although the effect is weaker in countries with stronger financial systems and better institutional conditions.

Similarly, Urgessa (2024) found that exchange rate volatility reduces export earnings in Ethiopia, with asymmetric short-run effects but limited long-run influence. The study recommended exchange rate stabilization policies to improve export performance.

Overall, the empirical literature reveals that the effect of exchange rate fluctuations on export performance varies across countries, methodologies, and time periods. While some studies support the view that depreciation improves exports, others emphasize the adverse effects of exchange rate instability. The mixed findings suggest the need for further investigation, particularly in Nigeria’s non-oil export sector, using models that incorporate both exchange rate levels and volatility alongside relevant macroeconomic factors.

Despite extensive empirical work on exchange rate dynamics and export performance, there remains a lack of consensus in the literature regarding the effect of exchange rate fluctuations on non-oil exports in Nigeria. While some studies report positive effects of exchange rate depreciation, others emphasize the adverse impact of exchange rate volatility, leading to mixed and inconclusive findings. Moreover, many existing studies focus on aggregate trade or fail to simultaneously incorporate both exchange rate level (depreciation) and volatility within a unified empirical framework. In addition, limited attention has been given to recent data that reflect Nigeria’s evolving exchange rate regime and macroeconomic conditions. This study addresses these gaps by jointly examining the effects of exchange rate depreciation and volatility on non-oil exports using an updated dataset and a robust econometric approach capable of capturing both short-run and long-run dynamics.

3 Methodology

This study adopts an econometric approach to examine the relationship between exchange rate fluctuations and non-oil export performance in Nigeria. Time series data are analyzed to capture both short-run and long-run dynamics among the variables. The study employs the Autoregressive Distributed Lag (ARDL) model, which is appropriate for variables integrated of different orders. The ARDL bounds test is used to determine the existence of a long-run relationship, while the Error Correction Model (ECM) captures the speed of adjustment to equilibrium. Preliminary tests such as the Augmented Dickey-Fuller (ADF) test are used to check for stationarity, and diagnostic tests ensure the reliability of the results.

Data Sources

The study utilizes secondary data obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin and the World Bank Development Indicators. The data cover the period from (1981–2024).

Table 1: Data Source and Measurement of Variables

Variable	Description	Measurement	Source
Non-oil Exports (NOEXP)	Dependent variable representing Nigeria’s non-oil export performance	Total value of non-oil exports (₦ or USD)	CBN

Exchange Rate (EXCH)	Value of the domestic currency relative to a foreign currency; expected to have a positive (+) effect through improved export competitiveness or a negative (–) effect due to rising production costs	Official exchange rate (₦ per US\$)	World Bank
Exchange Rate Volatility (EXCHVOL)	Measures fluctuations/instability in exchange rate; expected to negatively (–) affect exports due to uncertainty	Standard deviation or log difference of exchange rate	Computed from World Bank
Inflation Rate (INF)	General price level changes; expected to negatively (–) affect exports by reducing competitiveness	Annual percentage change in CPI	World Bank
Interest Rate (INT)	Lending interest rate adjusted for inflation; expected to negatively (–) affect exports by increasing production costs	Monetary policy or lending rate (%)	World Bank
Trade Openness (TOP)	Degree of trade integration; expected to positively (+) influence exports by enhancing market access	(Exports + Imports) / GDP	Computed from CBN
Gross Domestic Product (GDP)	Overall economic output; expected to positively (+) affect exports through increased production capacity	GDP at constant prices	CBN

Source: Compiled by the Authors, 2026

Model Specification

The study is primarily anchored on the Elasticity Approach to the Balance of Payments, which posits that changes in exchange rates affect export performance through their impact on the relative prices of domestic and foreign goods. According to this theory, a depreciation of the domestic currency makes exports more competitive in international markets, thereby stimulating export demand. The Marshall–Lerner condition further explains that the effectiveness of currency depreciation in improving export performance depends on the responsiveness of export and import demand to price changes. In addition, the Portfolio Balance Approach is employed to explain the impact of exchange rate volatility on non-oil exports. The theory argues that exchange rate uncertainty influences investment decisions and international trade by increasing risk and reducing the predictability of future export earnings.

Consistent with these theoretical propositions, this study examines the effect of exchange rate fluctuations on non-oil exports in Nigeria by specifying a functional relationship between non-oil exports and selected macroeconomic variables. The model incorporates both the exchange rate level and exchange rate volatility to capture the effects of currency depreciation and exchange rate uncertainty on export performance. The functional form of the model is expressed as follows:

$$NOEXP_t = f(EXCH_t, EXCHVOL_t, INF_t, INT_t, TOP_t, GDP_t) \quad (1)$$

Long-Run (ARDL) Model

The long-run relationship derived from the ARDL model can be specified as:

$$LnNOEXP_t = \alpha_0 + \beta_1 LnEXCH_t + \beta_2 EXCHVOL_t + \beta_3 INF_t + \beta_4 INT_t + \beta_5 TOP_t + \beta_6 LnGDP_t + \varepsilon_t \quad (2)$$

Where:

- NOEXP = Non-oil exports
- EXCH = Exchange rate
- EXCHVOL = Exchange rate
- INF = Inflation rate
- INT = Interest rate
- TOP = Trade openness
- GDP = Gross Domestic Product

- ε_t = Error term

Short-Run (ARDL) Model

$$\begin{aligned} \ln NOEXP_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \ln NOEXP_{t-i} + \sum_{i=0}^{q_1} \beta_1 \Delta \ln EXCH_{t-i} + \sum_{i=0}^{q_2} \beta_2 \Delta EXCHVOL_{t-i} + \sum_{i=0}^{q_3} \beta_3 \Delta INF_{t-i} \\ & + \sum_{i=0}^{q_4} \beta_4 \Delta INT_{t-i} + \sum_{i=0}^{q_5} \beta_5 \Delta \beta TOP_{t-i} + \sum_{i=0}^{q_6} \beta_6 \Delta \ln GDP_{t-i} + \lambda ECM_{t-1} + \varepsilon_t \end{aligned} \quad (3)$$

Where:

- Δ = First difference operator
- ECM_{t-1} = Error correction term (captures long-run adjustment)
- λ = Speed of adjustment (expected to be negative and significant)
- $p, q_1, q_2, \dots, q_6$ = Optimal lag length
- ε_t = White noise error term

Estimation Technique

The estimation procedure begins with conducting unit root tests to determine the stationarity properties of the variables. Specifically, both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests are employed to ensure robustness in identifying the order of integration, with the expectation that the variables are integrated of order zero or one, I(0) or I(1), but not I(2). This is followed by the selection of the optimal lag length using the Akaike Information Criterion (AIC). Thereafter, the Autoregressive Distributed Lag (ARDL) model is specified to capture both short-run and long-run relationships among the variables. The ARDL bounds testing approach is then applied to test for the existence of a long-run cointegrating relationship. Upon confirmation of cointegration, the long-run coefficients are estimated, followed by the short-run dynamics through the Error Correction Model (ECM), where the error correction term is expected to be negative and statistically significant, indicating adjustment toward long-run equilibrium. Finally, diagnostic and stability tests, including tests for serial correlation, heteroskedasticity, normality, and stability tests such as the CUSUM and CUSUM of squares, are conducted to ensure the robustness and reliability of the model.

4. Results and Discussion of Findings

4.1 Result Presentation

Unit Root Tests

The unit root test is essential for determining the stationarity of time series data, as non-stationary variables may lead to spurious regression results (Granger & Newbold, 1974). This study employs the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests to examine the stationarity properties of the variables. While the ADF test accounts for serial correlation through lagged differences, the PP test provides robustness by correcting for autocorrelation and heteroskedasticity in the error terms. The results of the ADF and PP tests are presented in Table 2, showing the test statistics, p-values, and the order of integration for each variable.

Table 2: Unit Root Tests Result

Variable	ADF Test Statistic	p-value (ADF)	PP Test Statistic	p-value (PP)	Order of Integration (I)	Stationarity
LnNOEXP	-7.85	0.0000	-8.96	0.0000	I(1)	Stationary
LnEXCH	-5.02	0.0002	-5.03	0.0002	I(1)	Stationary
EXCHVOL	-5.07	0.0001	-5.08	0.0001	I(0)	Stationary
INF	-3.05	0.0380	-10.4	0.0000	I(0)/I(1)	Stationary
INT	-5.33	0.0001	-5.33	0.0001	I(0)	Stationary
TOP	-4.52	0.0001	-5.92	0.0000	I(1)	Stationary
LnGDP	-3.59	0.0101	-3.52	0.0123	I(1)	Stationary

Source: Author's computation using EViews 12 (2026)

The results of the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests are presented in Table 2. The findings reveal that the variables exhibit a mixed order of integration. Specifically, LnNOEXP, LnEXCH, TOP, and LnGDP are stationary after first differencing, indicating that they are integrated of order one, I(1), while EXCHVOL and INT are stationary at levels, implying that they are integrated of order zero, I(0). The inflation rate (INF) shows mixed stationarity across the ADF and PP tests but is ultimately considered stationary. Importantly, none of the variables is integrated of order two, I(2), thereby satisfying the precondition for the application of the Autoregressive Distributed Lag (ARDL) model. The combination of I(0) and I(1) variables justifies the use of the ARDL bounds testing approach for examining the long-run relationship among the variables.

Model Selection Based on Akaike Information Criterion (AIC)

The optimal lag length was selected using the Akaike Information Criterion (AIC). As shown in the AIC Figure 3, several ARDL model specifications were evaluated, with values ranging from approximately -1.90 to -2.28. The model with the lowest AIC value (about -2.28) was chosen, as lower AIC values indicate better model fit and efficiency. Accordingly, the ARDL(2, 4, 4, 4, 3, 4, 3) model was selected as the most appropriate specification, providing the best balance between goodness of fit and parsimony.

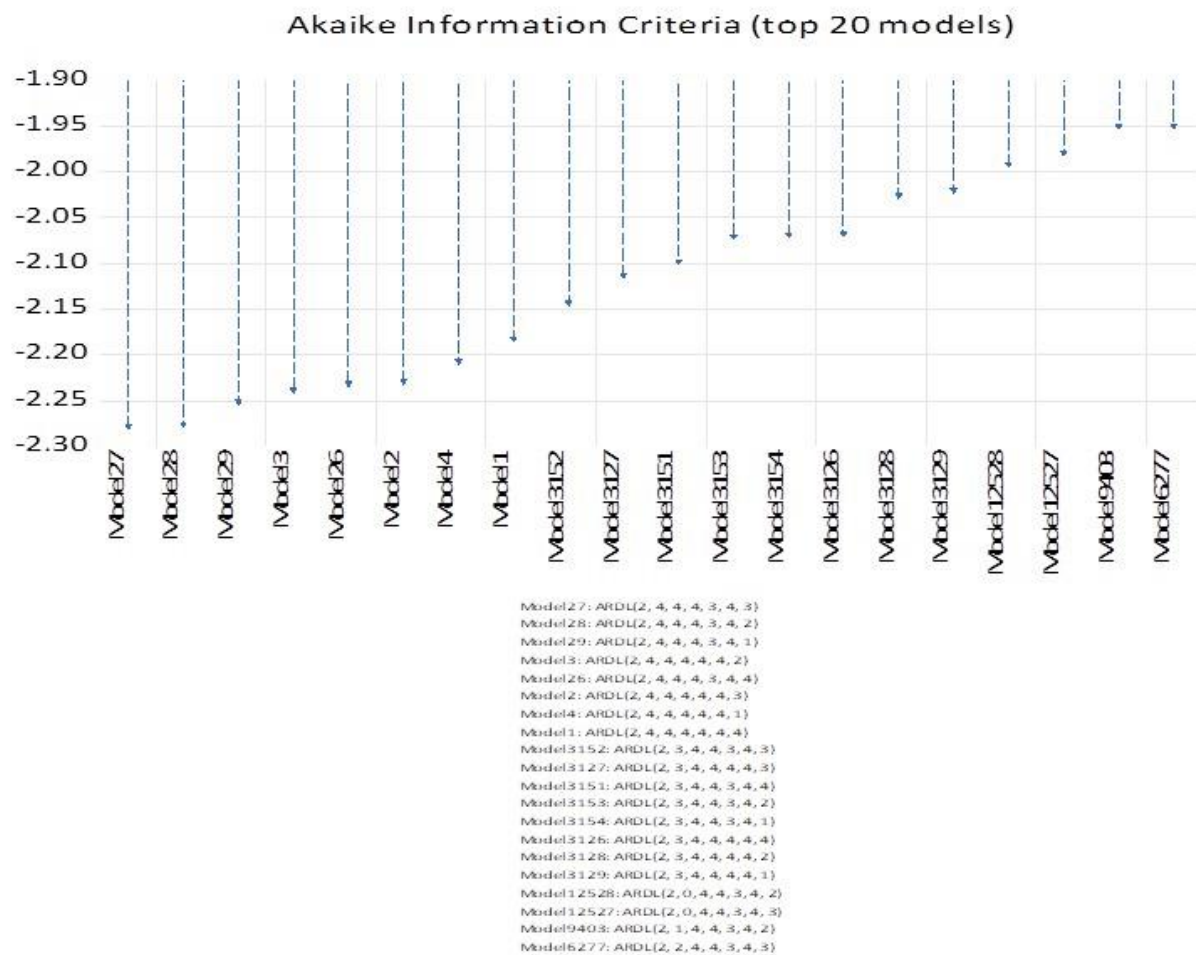


Figure 3: Model Selection Using Akaike Information Criterion (AIC)

Cointegration Testing

The Autoregressive Distributed Lag (ARDL) bounds testing approach, as developed by Pesaran, Shin, and Smith (2001), was employed to examine the existence of a long-run relationship among the variables in the model. This technique is appropriate when the variables are integrated of mixed orders, that is, $I(0)$ and $I(1)$, as established in this study. The null hypothesis of the bounds test states that no long-run relationship exists among the variables.

Table 3: Bounds Test

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	10.25222	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61

Actual Sample Size	40	1%	2.88	3.99
		10%	2.218	3.314
		5%	2.618	3.863
		1%	3.505	5.121

Source: Author's computation using EViews 12 (2026)

The result of the ARDL bounds test is presented in Table 3. The computed F-statistic is 10.252, which exceeds the upper bound critical values at the 1%, 5%, and 10% significance levels for both asymptotic and finite sample cases. Specifically, the F-statistic is greater than the upper bound value of 5.121 at the 1% level for the finite sample size. Based on this result, the null hypothesis of no long-run relationship is rejected. This indicates the existence of a stable long-run (cointegrating) relationship among the variables included in the model. Consequently, it is appropriate to proceed with the estimation of both the long-run coefficients and the short-run dynamics using the ARDL framework.

Model Estimation

After establishing stationarity through unit root tests and confirming the existence of a long-run relationship using the ARDL bounds test, the next step involves estimating the ARDL model. The Autoregressive Distributed Lag (ARDL) approach, developed by Pesaran, Shin, and Smith (2001), is suitable for this study as it accommodates variables integrated of mixed orders, $I(0)$ and $I(1)$, but not $I(2)$. This flexibility makes the ARDL technique appropriate for examining the effect of exchange rate fluctuations on non-oil exports in Nigeria over the period 1981–2024.

Long run Estimation

Following the confirmation of a long-run relationship among the variables using the ARDL bounds test, the long-run coefficients were estimated. The results of the long-run estimation are presented in Table 4.

Table 4: Estimated Long-Run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNNOEXP(-1)	0.294973	0.159175	1.853132	0.0969
LNNOEXP(-2)	0.544552	0.148043	3.678345	0.0051
LNEXCH	-3885.765	17321.97	-0.224326	0.8275
LNEXCH(-1)	9173.076	16837.85	0.544789	0.5991
LNEXCH(-2)	10487.69	13414.10	0.781841	0.4544
LNEXCH(-3)	-39093.88	17919.69	-2.181617	0.0570
LNEXCH(-4)	23318.34	17207.86	1.355099	0.2084
EXCHVOL	3885.895	17321.91	0.224334	0.8275
EXCHVOL(-1)	-5287.417	17717.31	-0.298432	0.7721
EXCHVOL(-2)	-15775.46	16894.93	-0.933740	0.3748
EXCHVOL(-3)	23318.70	17207.89	1.355117	0.2084
EXCHVOL(-4)	0.341889	0.096164	3.555289	0.0062
INF	0.010635	0.003021	3.519932	0.0065
INF(-1)	-0.010359	0.003023	-3.426834	0.0075
INF(-2)	-0.002189	0.002378	-0.920327	0.3814
INF(-3)	0.010260	0.002929	3.502440	0.0067

INF(-4)	-0.007884	0.002458	-3.207787	0.0107
INT	0.024531	0.003284	7.469390	0.0000
INT(-1)	-0.003971	0.003961	-1.002454	0.3423
INT(-2)	-0.014577	0.003811	-3.824799	0.0041
INT(-3)	0.006614	0.003021	2.189346	0.0563
TOP	0.099005	0.007166	13.81573	0.0000
TOP(-1)	-0.035169	0.019120	-1.839365	0.0990
TOP(-2)	-0.078842	0.017757	-4.439977	0.0016
TOP(-3)	0.000774	0.006630	0.116816	0.9096
TOP(-4)	-0.026370	0.008375	-3.148465	0.0118
LNGDP	3.372225	0.449831	7.496650	0.0000
LNGDP(-1)	-2.094482	0.690624	-3.032739	0.0142
LNGDP(-2)	-0.869681	0.789561	-1.101474	0.2993
LNGDP(-3)	0.278733	0.400312	0.696290	0.5038
C	-2.693094	0.702105	-3.835740	0.0040

Source: Author's computation using EViews 12 (2026)

The estimated ARDL results in Table 4 indicate that exchange rate (LNEXCH) exhibits a mixed and largely insignificant relationship with non-oil exports in the short run, although some lagged terms, such as LNEXCH(-3) = -39093.88 ($p = 0.0570$), show weak statistical significance. This suggests that exchange rate movements may have limited and delayed explanatory power on export performance. Similarly, exchange rate volatility (EXCHVOL) shows no consistent short-run effect, with most coefficients being statistically insignificant, except for EXCHVOL(-4) = 0.341889 ($p = 0.0062$), which is positive and significant. This implies that volatility does not exert a stable influence on non-oil exports in the short run, although delayed effects may exist.

Inflation (INF) demonstrates mixed effects, with both positive and negative significant lagged coefficients, such as INF = 0.010635 ($p = 0.0065$), INF(-1) = -0.010359 ($p = 0.0075$), and INF(-4) = -0.007884 ($p = 0.0107$). This indicates an unstable relationship with non-oil exports, where inflation impacts vary across different lags. Interest rate (INT) shows a predominantly positive and significant effect in the short run, with INT = 0.024531 ($p = 0.0000$), although some lagged terms, such as INT(-2) = -0.014577 ($p = 0.0041$), are negative and significant. This suggests that financial conditions influence export performance, but the effects are not uniform over time.

Trade openness (TOP) is positively significant in the short run, with TOP = 0.099005 ($p = 0.0000$), implying that increased openness enhances non-oil export performance. However, some lagged terms, such as TOP(-2) = -0.078842 ($p = 0.0016$) and TOP(-4) = -0.026370 ($p = 0.0118$), show negative effects, indicating mixed dynamics. Gross domestic product (LNGDP) shows a strong positive and significant effect, with LNGDP = 3.372225 ($p = 0.0000$), indicating that economic growth promotes non-oil export performance in Nigeria, although the lagged term LNGDP(-1) = -2.094482 ($p = 0.0142$) suggests some short-term adjustment effects.

Short-Run Dynamics (Error Correction Model)

The short-run dynamics of the model are captured using the error correction representation of the ARDL model. The results are presented in Table 5.

Table 5: Estimated Short-Run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNNOEXP(-1))	-0.544076	0.092703	-5.869003	0.0002
D(LNEXCH)	-3866.492	7448.416	-0.519103	0.6162
D(LNEXCH(-1))	5352.805	6850.764	0.781344	0.4547
D(LNEXCH(-2))	15786.26	5857.903	2.694865	0.0246
D(LNEXCH(-3))	-23412.88	8381.018	-2.793560	0.0209
D(EXCHVOL)	3866.621	7448.405	0.519121	0.6162
D(EXCHVOL(-1))	-7627.400	9347.980	-0.815941	0.4356
D(EXCHVOL(-2))	-23413.58	8381.024	-2.793642	0.0209
D(EXCHVOL(-3))	-0.341838	0.056243	-6.077830	0.0002
D(INF)	0.010644	0.001492	7.135837	0.0001
D(INF(-1))	-0.000187	0.001170	-0.160019	0.8764
D(INF(-2))	-0.002375	0.000948	-2.504316	0.0336
D(INF(-3))	0.007884	0.001260	6.256789	0.0001
D(INT)	0.024532	0.001448	16.94061	0.0000
D(INT(-1))	0.007954	0.002124	3.744378	0.0046
D(INT(-2))	-0.006616	0.001502	-4.404561	0.0017
D(TOP)	0.099015	0.003896	25.41676	0.0000
D(TOP(-1))	0.104387	0.011779	8.862322	0.0000
D(TOP(-2))	0.025590	0.004513	5.670299	0.0003
D(TOP(-3))	0.026364	0.004149	6.354211	0.0001
D(LNGDP)	3.370998	0.231616	14.55426	0.0000
D(LNGDP(-1))	0.589999	0.349962	1.685895	0.1261
D(LNGDP(-2))	-0.277248	0.251299	-1.103261	0.2985
CointEq(-1)*	-0.160465	0.013422	-11.95525	0.0000

Source: Author's computation using EViews 12 (2026)

The error correction term (CointEq(-1)) in Table 5 is negative and statistically significant at the 1% level, with a coefficient of -0.1605. This indicates that approximately 16.05% of any short-run disequilibrium is corrected each period, implying a relatively moderate speed of adjustment towards long-run equilibrium. This confirms the existence of a stable long-run relationship among the variables and validates the results of the bounds test. In the short run, the results show that exchange rate changes and exchange rate volatility have mixed effects on non-oil exports, with some lagged terms being statistically significant. Inflation and trade openness positively influence non-oil exports, while interest rate also exhibits a positive and significant impact in the short run. GDP shows a strong positive effect, indicating that economic growth enhances non-oil export performance.

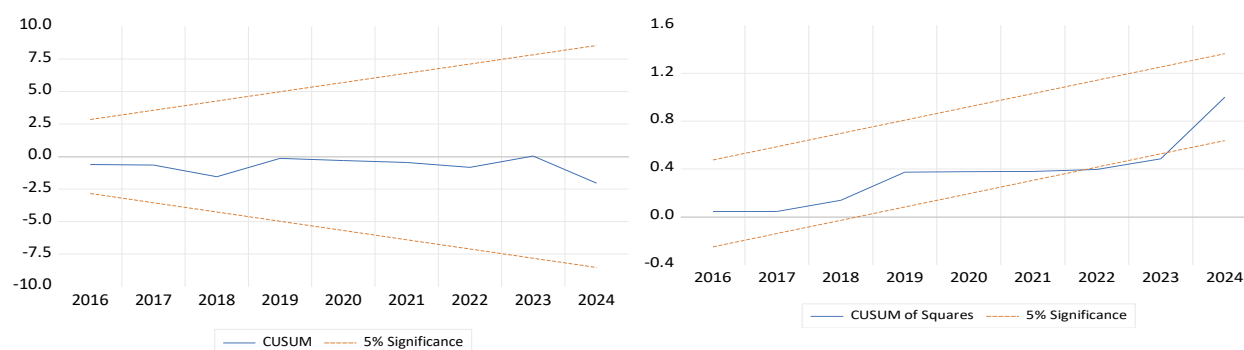
Diagnostic and Stability Tests

To verify the appropriateness and robustness of the ARDL model, several post-estimation diagnostic and stability tests were conducted. These include the Serial Correlation LM test, the Heteroskedasticity test (ARCH), the Normality test (Jarque-Bera), the Functional Form test (Ramsey RESET), and stability tests using the CUSUM and CUSUM of Squares. Table 6 presents a summary of the diagnostic test results, providing insights into the robustness, reliability, and validity of the estimated model.

Table 6: Summary of Diagnostic Test Results

Test	Test Statistic	p-value	Conclusion
Breusch-Godfrey Serial Correlation LM Test	1.5104	0.2849	No Serial correlation
ARCH Heteroskedasticity Test (ARCH)	3.7508	0.0604	No heteroskedasticity
Jarque-Bera Normality Test	1.7709	0.4125	Residuals are normally distributed
Ramsey RESET Test (F-statistic)	0.5045	0.4977	Model is correctly specified
CUSUM Test	Stable	—	Parameters are stable
CUSUM of Squares Test	Stable	—	Parameters are stable

Source: Author's computation using EViews (2026)



The diagnostic test results presented in Table 6 indicate that the ARDL model is statistically sound and reliable. The Breusch-Godfrey Serial Correlation LM test produced a test statistic of 1.5104 with a p-value of 0.2849, which is greater than 0.05. This implies that there is no evidence of serial correlation in the residuals, confirming that the model errors are independently distributed. The ARCH heteroskedasticity test yielded a statistic of 3.7508 with a p-value of 0.0604, which is slightly above the 5% significance level. This suggests that the model is free from heteroskedasticity, indicating that the variance of the residuals is constant over time. The Jarque-Bera normality test reports a statistic of 1.7709 with a p-value of 0.4125, indicating that the residuals are normally distributed. This confirms that the error terms satisfy the normality assumption required for valid statistical inference. The Ramsey RESET test shows an F-statistic of 0.5045 with a p-value of 0.4977, suggesting that the model is correctly specified, with no evidence of omitted variables or functional form misspecification. Finally, the stability tests using CUSUM and CUSUM of Squares indicate that the model parameters are stable over the sample period, as both tests fall within the critical boundaries. This confirms that the estimated coefficients are reliable and do not suffer from structural instability.

4.2 Discussion of Findings

The findings indicate that exchange rate movements have a mixed and largely insignificant effect on non-oil exports in both the short and long run. This outcome suggests that exchange rate depreciation alone may not be sufficient to improve Nigeria's non-oil export performance. The result provides limited support for the Marshall-Lerner condition, implying that the price responsiveness of demand for Nigeria's non-oil exports may be relatively weak. This is consistent with the elasticity approach (Salvatore, 2019), which argues that the effectiveness of exchange rate adjustments depends on the elasticity of export demand and the structure of exported commodities. Given Nigeria's dependence on primary and less diversified exports,

exchange rate depreciation may not generate substantial export expansion. The presence of some delayed exchange rate effects also provides partial support for the J-curve hypothesis (Bahmani-Oskooee & Ratha, 2004), although the absence of a significant long-run improvement suggests that exchange rate adjustments have limited influence on non-oil export growth.

Exchange rate volatility produces mostly insignificant effects on non-oil exports, indicating that exchange rate uncertainty does not exert a strong immediate influence on export performance. This finding provides limited support for the portfolio balance approach (Branson, 1981), which suggests that exchange rate uncertainty affects investment and trade decisions through risk and expectations. The weak effect may reflect the limited participation of non-oil exporters in formal financial markets and the inadequate availability of hedging instruments in Nigeria.

Inflation exhibits mixed effects across different periods, suggesting that its influence on non-oil exports depends on the timing and persistence of price changes. While moderate inflation may improve export competitiveness through relative price adjustments, sustained inflation can increase production costs and reduce export capacity. Interest rate records a positive short-run effect, indicating that financial conditions may support export-related activities in the immediate period. However, the negative lagged effects suggest that higher financing costs may constrain production and investment over time.

Trade openness has a positive and significant effect on non-oil exports, implying that greater integration with international markets enhances export opportunities and competitiveness. This finding supports the argument that openness can promote access to larger markets, technology, and trade opportunities. Similarly, GDP has a strong positive effect on non-oil exports, confirming that economic expansion improves productive capacity and supports export growth. This result is consistent with the absorption approach (Alexander, 1952), which emphasizes the importance of income and production capacity in determining external sector performance.

The significant and negative error correction term confirms the existence of a stable long-run relationship among the variables. The adjustment coefficient of approximately 16% indicates that deviations from long-run equilibrium are corrected gradually over time, suggesting that changes in exchange rate conditions and macroeconomic factors influence non-oil exports through a slow adjustment process.

The findings are broadly consistent with Kwajaffa (2025) and Udo (2025), who reported weak and mixed effects of exchange rate movements on Nigeria's non-oil exports. The limited influence of exchange rate volatility agrees with Lawal et al. (2025), although it contrasts with Ndidi and Alaba (2019) and Akanbi et al. (2017), who reported significant negative effects of volatility on export performance. The positive contributions of GDP and trade openness support the findings of Gold and Yusuf (2025), while the delayed exchange rate effects are consistent with Ijirshar et al. (2022), who provided evidence supporting the J-curve hypothesis.

Overall, the findings suggest that improving Nigeria's non-oil export performance requires more than exchange rate adjustments. Policies that promote production capacity, export diversification, macroeconomic stability, and access to international markets are essential for achieving sustainable export growth.

5 Conclusion and Recommendation

5.1 Conclusion

This study examined the impact of exchange rate movements and volatility on non-oil export performance in Nigeria using the ARDL approach. The results reveal that exchange rate variables exert a mixed and largely insignificant influence on non-oil exports in both the short and long run, suggesting that exchange rate depreciation alone is insufficient to drive export growth. Exchange rate volatility also shows weak and

inconsistent effects, indicating limited immediate impact on export performance. In contrast, macroeconomic fundamentals such as GDP and trade openness consistently demonstrate strong positive effects on non-oil exports, while inflation and interest rate exhibit mixed but significant influences across different lags. The significant and negative error correction term confirms the existence of a stable long-run relationship among the variables, with a moderate speed of adjustment toward equilibrium.

Overall, the findings suggest that improving non-oil export performance in Nigeria requires more than exchange rate adjustments. Policies should focus on enhancing productive capacity, promoting trade openness, and maintaining macroeconomic stability. Strengthening export diversification and addressing structural constraints will be crucial for achieving sustainable export-led growth.

5.2 Recommendations

- a) Policymakers should complement exchange rate stability with structural reforms that enhance productivity and improve the competitiveness of non-oil exports.
- b) Government should promote trade openness by reducing trade barriers and improving access to international markets for non-oil exporters.
- c) Authorities should maintain macroeconomic stability by ensuring low inflation and access to affordable credit to support export-oriented activities.

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