The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

THE EXCHANGE RATE VOLATILITY AND ITS IMPACT ON EXPORT IN THE SELECTED COUNTRIES

CHARLES O. MANASSEH[1], CHINE SP. LOGAN[2], OGOCHUKWU C. OKANYA[3], AFAMEFUNA J. NDUKA[4], KENECHUKWU K. EDE[5]*, AMAKA OKEKE[6], FAITH C. LAWAL[7] and UGWU OKEREKE JOHN[8]

[1,6]Department of Banking & Finance, Enugu Campus, University of Nigeria.
[2]Department of Public Policy, Liberty University, Lynchburg, VA 24502, US.
[3]Department of Banking & Finance, Institute of Management and Technology, Enugu.
[4]Department of Banking and Finance, Chukwuemeka Odumegwu Ojukwu University.
[5]Department of Economics, University of Nigeria, Nsukka.
[7]Department of Business Education, Kogi State College of Education, Ankpa, Nigeria.
[8]Department of Banking and Finance, Ebony State University, Abakaliki.
*Corresponding Author Email: edekenechukwuk@gmail.com

Abstract

This paper investigates the effect of exchange rate volatility on exports in selected G7, Asian, and West African countries, utilizing data from 1996 to 2018. A review of existing studies suggests that fluctuations in exchange rates negatively influence export performance. To assess this relationship, the study applies a long-run panel cointegration ARDL model, incorporating macroeconomic variables such as export competitiveness, real effective exchange rate, exchange rate volatility, trade balance, export price index, terms of trade, export taxes, balance of payments, real interest rate, inflation, and trade openness. The stationarity test results indicate that the variables are integrated at I(0) and I(1), while the cointegration test confirms a long-run association among them. The study ensures that all classical linear and ARDL model assumptions are met. Employing the Panel Autoregressive Distributed Lag (ARDL) approach, the findings reveal a significant negative impact of exchange rate volatility on exports. These insights carry important policy implications, emphasizing the necessity for exchange rate stability to support export growth. The study concludes by recommending that policymakers implement measures to reduce exchange rate fluctuations, thereby creating a more predictable and conducive environment for trade in the analyzed economies.

Keywords: Exchange Rate, Volatility, Export.

1. INTRODUCTION

Fluctuations in the exchange rates have profound insights on international trade especially exports (Manasseh et al. 2019). The relationship between exchange rate volatility and exports has been a critical area of economic research, particularly in regions with distinct economic structures like Asia, the G7, and West Africa. Exchange rate fluctuations influence trade competitiveness, investment decisions, and economic stability, with varying effects across different economies (Broll & Eckwert, 2020). In Asia, countries like China and India have experienced significant exchange rate movements due to their integration into global trade and reliance on foreign exchange reserves to stabilize their currencies (Aizenman et al., 2021). China's managed exchange rate system has helped buffer export volatility, whereas India's rupee fluctuations have impacted its export performance in sectors like textiles and IT services

The Seybold REPORT
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

(Choudhry & Hassan, 2015). In the G7 economies, exchange rate volatility plays a crucial role in shaping export competitiveness, given their status as major trading powers. The U.S. dollar's fluctuations, for instance, affect trade balances with countries like Canada and Japan, influencing export revenues (Engel, 2016). The euro's volatility within the Eurozone also impacts intra-G7 trade, particularly for Germany and France, whose export-dependent economies are highly sensitive to currency movements (De Grauwe & Schnabl, 2020). Japan, with its heavily export-oriented economy, has frequently intervened in currency markets to mitigate yen appreciation, ensuring stable export flows (Ito & Kawai, 2018). West African economies, particularly those within the Economic Community of West African States (ECOWAS), experience substantial exchange rate volatility due to their dependence on commodity exports such as oil, cocoa, and gold (Balogun, 2019). Countries like Nigeria and Ghana, which operate floating exchange rate regimes, have seen fluctuating export revenues due to currency depreciation and global market shocks (Adeniran et al., 2022). The CFA franc, used by eight West African countries, has provided relative stability due to its peg to the euro, but this has also constrained monetary policy flexibility and export competitiveness (Ndiaye & Korsu, 2020). Hence, understanding the role of exchange rate volatility in these regions is essential for formulating trade policies that enhance export stability. Policymakers in Asia, the G7, and West Africa must consider currency hedging strategies, trade diversification, and macroeconomic policies to mitigate the adverse effects of exchange rate fluctuations. Addressing exchange rate risks will be key to sustaining export growth in these regions as global trade dynamics evolve.

Exchange rate volatility limits a country's exports by creating uncertainty in pricing, making it difficult for exporters to predict future earnings and costs (Broll & Eckwert, 2020). Frequent currency fluctuations increase transaction risks, discouraging firms from entering long-term trade agreements (Adeniran et al., 2022). When a domestic currency appreciates unpredictably, exports become more expensive in foreign markets, reducing competitiveness and demand (Engel, 2016). Conversely, sharp depreciation raises import costs for production inputs, increasing export prices and lowering profit margins (Choudhry & Hassan, 2015). Small and medium-sized enterprises (SMEs) in developing countries are particularly vulnerable as they lack financial instruments to hedge against currency risks (Aizenman et al., 2021). Countries with floating exchange rate regimes, such as Nigeria and India, often experience unstable export revenues due to frequent currency fluctuations (Balogun, 2019). However, this ongoing discussion highlights the need to study the volatility of exchange rates to ascertain their influences on exports of goods and services. This paper broadly evaluates the impact of exchange rate volatility on exports in G7, Asian, and West African countries. We measured exchange rate volatility with the following – real effective exchange rate, real effective exchange rate volatility, real exchange rate, and real exchange rate volatility. Considering the effects of the real effective exchange rate (REER) and real exchange rate (RER) volatilities on exports is crucial because they directly influence a country's trade competitiveness and external balance (Kandil & Mirzaie, 2021). High exchange rate volatility creates uncertainty, discouraging exporters from engaging in long-term contracts and investments (Aizenman et al., 2021). A depreciating REER can boost exports by making goods cheaper internationally,

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

while excessive fluctuations can disrupt trade flows (Choudhry & Hassan, 2015). Conversely, an overvalued currency can reduce export demand, leading to trade deficits and economic instability (Engel, 2016). Therefore, understanding these dynamics helps policymakers design stable exchange rate policies to enhance export performance and economic growth. Hence, this study centred on addressing the following questions a). Is there a significant relationship between real effective exchange rates on exports in selected G7, Asian and West African Countries? b). Does real effective exchange rate volatility have significant impacts on exports in selected G7, Asian and West African Countries? c). What are the effects of the real exchange rate on export in selected G7, Asian and West African Countries? d). In what ways does real exchange rate volatility affect exports in selected G7, Asian and West African Countries?

We addressed these questions by employing the panel autoregressive distributed lag (ARDL) model. The Autoregressive Distributed Lag (ARDL) model is highly effective for estimating the relationship between exchange rate volatility and exports due to its ability to capture both short-run and long-run dynamics in a single equation (Pesaran et al., 2001). Unlike traditional cointegration methods, ARDL is applicable irrespective of whether variables are integrated at the level I(0) or first difference I(1), making it flexible for mixed-order data (Nkoro & Uko, 2016). It also provides unbiased long-run estimates even in small sample sizes, which is beneficial for studies on developing economies (Narayan, 2005). Moreover, the bound testing approach of ARDL simplifies hypothesis testing for cointegration, reducing potential estimation errors (Bahmani-Oskooee & Hegerty, 2010). The model's ability to accommodate structural breaks further enhances its reliability in capturing export fluctuations due to exchange rate volatility (Mishra & Mohanty, 2020). Therefore, ARDL is a robust econometric tool for analyzing exchange rate dynamics and their trade implications. Previous scholars like (Urgessa 2024, Yanuso 2020, Javaid 2023, Bosunpeng et al. 2024, Handoyo et al. 2022, Arize et al. 2021, Tarasenko 2021, Sugiharti et al. 2020) investigated the influence of exchange rate fluctuations/volatility on export trades in their respective capacities but failed to incorporate the roles of real effective exchange rate, real effective exchange rate volatility, real exchange rate, and real exchange rate volatility on exports in in their respective studies. Even with their various contributions, as well as government policies and reforms in G7, Asian and West African countries such as NAFTA (now USMCA, 2020) and CETA (2017, Canada-EU) to expand market access for exporters in the region, Germany's Mittelstand support programs, China's Managed Float Exchange Rate System, South Korea's Exchange Rate Stabilization Fund, India's Inflation-Targeting and Forex Reserves Strategy, Nigeria's Exchange Rate Unification (2023-2024), Ghana's Forex Market Interventions (2022-Present), the West African Monetary Zone (WAMZ) and Eco Currency Initiative, Côte d'Ivoire and WAEMU's CFA Franc Stability Policy, to mitigate exchange rate volatility and improve export competitiveness across different regions, exchange rate volatility worsen exports in these regions at incriminating level and therefore needs to be addressed to boost export trades in G7, Asian and West African economies.

This paper contributes to the body of existing studies knowledge by firstly exploring the holistic impacts of exchange rates – real effective exchange rates and real exchange rates on exports in G7, Asian, and West African countries. By so doing, an in-depth analysis of the

The Seybold REPORT
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

influence of exchange rates on exports was conducted in G7, Asian and West African countries. Secondly, given the volatile nature of exchange rates, this paper analyzed the impacts of real effective exchange rates volatility and real exchange rates volatility on exports in G7, Asian and West African countries. Studying the effects of Real Effective Exchange Rates (REER) and Real Exchange Rates (REXR) is crucial for understanding export competitiveness, as they determine the relative pricing of goods in global markets. Their fluctuations impact trade balances, economic growth, and foreign exchange stability, influencing policymakers' decisions on monetary and trade policies. Effective management of REER and REXR ensures sustainable export growth, attracting foreign investment and enhancing a country's global trade position. Thirdly, our study conducted interactive effects of tariff trade restrictive index, trade openness, export price index, terms of trade, tax on export, balance of payment, net exports, real trade balances, government subsidy, and government expenditure with the real effective exchange rates, real exchange rates and their volatilities to ascertain their influences on exports in G7, Asian and West African countries. Fourthly, this study evaluates the impacts of exchange rate volatility on exports in the panel and also investigates their effects in G7, Asian and West African countries for critical evaluation of these effects in the regions. The remaining sections of the paper were organized as follows. Section 2 contains the literature review, Section 3 discusses the methodology, Section 4 – the empirical results and discussion and Section 5 contains the conclusion and policy recommendations.

2. LITERATURE REVIEW

2.1 Theoretical Literature

There are plenty of theories on the impact of exchange rate volatility on exports. However, it has been argued conventionally that exchange rate volatility will negatively influence exports. Clark (1973) analyses a very early example, in which a firm produces a homogenous commodity and exports its products entirely to one foreign market. In this basic model, the market is considered as perfectly competitive, and imported inputs are not required. The firm receives payments for its exports in foreign currency and hedging possibilities are extremely limited. Owing to adjustment costs, the firm cannot change its output over the planning horizon. The unpredictable variation of the exchange rate, therefore, is solely blamed for uncertainty about future export sales as well as future profits in domestic currency. For the sake of maximizing the expected value of utility, which depends on both the expected value and the variance of profits, the risk-averse firm would reduce its exposure to risk in response to higher volatility in the exchange rate. That is, the volume of production, and hence exports would be cut down in this circumstance. This simple model is also developed by some authors, for example, Baron (1976b); and Hooper and Kohlhagen (1978), indicated the same conclusion that exchange rate volatility harms exports.

However, all of those conclusions result from several restrictive assumptions. One obvious criticism of the traditional models is that the exporter's risk exposure is attributed solely to the exchange rate volatility, whereas it may depend on the availability of hedging techniques, diversification possibilities, the existence of imported inputs, and other factors. The rationale

ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

of this assumption is that forward exchange markets are just in infancy or do even not appear in developing economies. In addition, transaction hedging may prove relatively expensive and challenging for some manufacturing firms with a long time between order and delivery. However, this is not the case with advanced countries, in which such markets are well-developed. For risk-averse entrepreneurs who can hedge their contracts, a higher exchange rate volatility would not always deter exports, as noted by Ethier (1973) and Baron (1976a). Furthermore, the companies can minimize exchange rate risk in other ways; multinational cooperation is a good case in point. Being involved in a wide range of trade and financial transactions over numerous countries, it would see an abundance of diverse opportunities to offset the movement of a bilateral exchange rate, such as the variability of other exchange rates or interest rates. Relaxing the assumption of no imported intermediate inputs, Clark (1973) finds that the loss from the depreciation in a foreign currency to the exporter will be partly alleviated by lowering input cost. Likewise, if inventories are possible and firms can allocate their sales between abroad and home markets, a declining effect on export earnings will also be compensated. More generally, from a finance perspective, Makin (1978) argues that a diversified firm holding a portfolio of assets and liabilities determined in various currencies will be able to protect itself from exchange rate risks related to exports and imports. Finally, recent studies suggest that exchange rate volatility does not just embody a risk, but profit opportunities. For instance, as examined by Canzoneri et al. (1984), if a firm can alter its factor inputs to benefit from changes in exchange rate without adjustment costs, a higher volatility may create a greater probability of making profit. Gros (1987) derives a further version of the model with the presence of adjustment costs, in which exporting can be seen as an option depending on capacity, taking advantage of favourable conditions (e.g., high prices) and to minimizing the influence otherwise. The value of the option rises as result of higher variability of the exchange rate, creating a positive effect on exports. Therefore, the effect of volatility remains ambiguous because the dominant direction depends on a case-by-case basis.

The negative association between exchange rate volatility and expected export increases is supported in terms of risk aversion. The uncertainty of the exchange rate seems to not affect a risk-neutral firm's decision. Shading more light on this, De Grauwe (1988) argues that the assumption of risk-averse agents is not adequate to ensure the direction of this link. What is relevant is the degree of risk aversion. An increase in risk, in general, has both a substitution and an income effect that works in opposite directions (Goldstein and Khan 1985). The substitution effect discourages risk-averse agents from exporting because it lowers the expected utility representing the attractiveness of the risky activity, while the income effect urges very risk-averse agents to increase their exports to avoid the possibility of a severe decline in revenues. Taken together, these studies support the notion that even though firms are worse off with an increase in exchange rate risk, their response may be to export more rather than less.

Two Swedish economists, Eli Heckscher and Bertil Ohlin in the early 1900's, building on David Ricardo's theory of comparative advantage propounded the "**factor proportion theory**" which states that countries would produce and export goods that required resources or factors that were in great supply and, therefore, cheaper production factors. In contrast, countries would import goods that required resources that were in short supply, but higher

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

demand. The theory is based on a country's production factors—land, labour, and capital, which provide the funds for investment in plants and equipment. They determined that the cost of any factor or resource was a function of supply and demand. Factors that were in great supply relative to demand would be cheaper; factors in great demand relative to supply would be more expensive. Exports of a capital-abundant country come from capital-intensive industries, and labour-abundant countries import such goods, exporting labour-intensive goods in return. Competitive pressures within the H–O model produce this prediction fairly openly. Free and competitive trade makes factor prices converge along with traded goods prices. The (Factor-price equalization) FPE theorem is the most significant conclusion of the H–O model but also has found the least agreement with the economic evidence. Neither the rental return to capital nor the wage rates seem to consistently converge between trading partners at different levels of development in their home countries.

The purchasing power parity (PPP) theory involves the ratio of two countries' price levels (absolute PPP) or price indices times a base period exchange rate (relative PPP) as the most important variable determining the exchange rate, but it allows both for other explanatory variables and for random influences. The basic rationale for PPP theory is that the value of a currency is determined fundamentally by the amount of goods and services that a unit of the currency can buy in the country of issue. To this end, PPP is regarded as one of the most important theories in explaining the behaviour of exchange rates. The theory explains that the exchange rate between two currencies will adjust to reflect price level changes between two countries. The understanding of exchange rate behaviour is well captured through "real exchange rate". The real exchange rate is driven by some key factors that are subjected to volatility which in turn causes volatility in the real exchange rate and this leads to nominal exchange rate volatility. However, the theory failed to explain this behaviour because it assumed identical goods in any two countries and there are little or no transport costs and trade barriers. In reality, these assumptions cannot hold due to differences in the quality of commodities produced in the two countries. In addition, PPP theory does not account for goods and services whose prices are excluded in the country's measure of price level and non-tradable goods across borders, this leads to the evolution of interest rate parity condition (IRP). The interest rate parity theory explains the relationship among domestic interest rates, interest parity and the expected appreciation of the domestic currency. It also stipulates that the domestic interest rate should equal the foreign interest rate less the expected appreciation of the domestic currency.

2.2 Empirical Literature

An extensive number of empirical investigations has been conducted based on this topic, aimed at testing the relationship that exists between exchange rate volatility on export, which turned out to be that some of the literatures have a view that exchange rate volatility has a negative and significant influence on export while others opposed it. For instance, Urgessa (2024) examined the effects of real effective exchange rate volatility on Ethiopia's export earnings using quarterly data covering 2007 to 2021. The study examined the symmetric and asymmetric effects of exchange rate volatility on the three categories of export earnings. To estimate the

The Seybold REPORT
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

effects, both the linear autoregressive distributed lag and nonlinear ARDL models were employed. The results show that in the long run, there is no asymmetric effect of exchange rate volatility on total and commodity-level export earnings. Yunusa (2020) examined the effect of the volatility of the exchange rate on Nigerian crude oil export to its trading partners. He used the GARCH and the ARDL models on monthly data for the period 2006–2019. The results suggest that exchange rate volatility greatly influences crude oil exports by Nigeria. Javaid (2023) studied exchange rate volatility and exports of Pakistan, under different political regimes using a standard deviation approach in the period 2000–2020 using monthly data. The correlation results show that exchange rate and export were positively associated during 2 regime periods. The study suggests that it is essential for the political governments to adjust implementation solutions, handle the bottlenecks and create an association between exchange rate policy and exports. Bosupeng et al. (2024) used monthly data from 1960 to 2020 to examine the asymmetric effects of exchange rates on the trade balance while accounting for exchange rate volatility. Their study applies a nonlinear bivariate model that allows asymmetric effects and volatility to be examined concurrently. They found that exchange rate volatility reduces the positive effects of an appreciation shock on the trade balance in developed countries in the short and long run. In developing nations, however, exchange rate volatility promotes the positive effects of a depreciation shock on the trade balance, both in the short and long run.

Handoyo et al. (2022) studied Indonesia’s exports to the Organisation of the Islamic Cooperation (OIC) countries. They employed an EGARCH and an ARDL model on monthly data for the period 2007–2019. They found that exchange rate volatility negatively affects the export of some products both in the long run and in the short run. Dada (2021) applied a generalized autoregressive conditional heteroscedasticity, model to study this relationship in sub-Saharan Africa for the period 2005–2017. He found a negative in both the long and short run. Arize et al. (2021) found the presence of negative effects of exchange rate risk on the volume of exports from Thailand. The researcher made use of an ARDL model using data for the period 2000–2019. Irina Tarasenko (2021) found that FOREX volatility hurts exports of manufactured products, machinery, transportation equipment and agricultural raw materials. The author made use of the gravity model for the period 2004–2018 to assess Russia’s trade with its 70 trading partners. Ekanayake and Dissanayake (2022) studied the US’s exports to BRICS. They found that long-run exchange rate volatility hurts exports in all five countries. The researchers made use of quarterly data for the period 1993–2021 and used two approaches to measure exchange rate volatility namely ARDL and Error-cointegration model. Sugiharti et al. (2020) found that exchange rate volatility reduced Indonesia's exports to Japan, India, South Korea and the US, but encouraged exports to China. They employed the GARCH and the ARDL models on data for the period 2006–2018. Kamal et al. (2020) studied the impact of exchange rate volatility on exports in ASEAN-5 countries, including Thailand, Malaysia, Singapore, Indonesia, and the Philippines. The study found that increases in world and domestic output positively affected export volumes, while declines in terms of trade negatively affected them. The study suggests that governments should adopt effective macroeconomic policies to minimize currency volatility, such as a floating exchange rate system and central bank intervention. Nguyen & Do's 2020 study examined the impact of inward foreign

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

investment, imports, and real exchange rate shocks on Vietnam's export performance. Results showed that higher import values boosted short-term export performance but had no long-term impact. Increased foreign investment decreased export performance. Vietnam's export performance converged towards equilibrium by approximately 6.3%, adjusting for import values, foreign investment presence, and real exchange rate fluctuations.

More so, Kumar et al. (2020) studied the impact of currency depreciation on exports in South Asian countries from 1981 to 2017 using a panel ARDL model. They found that depreciation indirectly reduced exports, but not effectively due to factors like inelastic exportable products, limited market diversification, domestic demand constraints, and insufficient regional integration. The study recommends direct addressing of external and internal regional risks. In a related study, Manasseh et al. (2019) investigated the influence of oil price oscillation and exchange rate dynamics on economic performance using the exponential generalized autoregressive conditional heteroscedasticity (EGARCH).

According to the results, a 10% rise in the price of oil eventually results in a 19% increase in REXR. However, as of the time of the study, there is no indication that variations in Nigerian oil prices have generated fluctuations in the foreign exchange rate market because the shock impact between the price of oil and exchange rate dynamics is rather insignificant over the long term, which makes it difficult to explain the causes of exchange rate volatility as shown by the EGARCH finding. The oil price, exchange rate dynamics, and economic performance (as measured by real gross domestic product) were also shown to be positively correlated. Aslan and Akpiliç (2023) examined panel data spanning 58 countries and 48 quarters from 2010Q1 to 2021Q4, to determine the effect of exchange rate and exchange rate volatility on export performance.

According to their study's findings, there is insufficient data to conclude that shocks to exchange rates and their volatility have an impact on overall export volumes. Nonetheless, their research suggests that nations with more accommodating exchange rate policies that rely heavily on imported raw materials to create export goods tend to be more volatile in terms of exchange rates. Using the ARDL model, Rathnayaka and Dunusinghe (2023) looked into the connection between Sri Lankan exports and exchange rate volatility from 2001 to 2019.

According to their research, there is a positive correlation between Sri Lankan export revenue and exchange rate volatility. Kiptarus et al. (2022) and Titus et al. (2022) investigated the effect of ERV on trade performance for exports in Kenya. Kiptarus et al. (2022) only investigated how to measure ERV. Using an error correction model and data from 1966 to 2018, Titus et al. (2022) discovered a significant and positive relationship between foreign ERV and global trade in Kenya.

In addition, related studies also provide diverse insights into the interplay between exchange rates, and other macroeconomic indices. Unah et al. (2022) analyzed the relationship between these variables in Egypt from 1990 to 2020, using FMOLS and DOLS techniques. Their findings revealed a long-run cointegration among FDI, exchange rate, capital expenditure, and economic growth, underscoring the need for pro-growth policies like economic diversification

ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

and institutional strengthening. Similarly, Manasseh et al. (2019) examined the interaction between stock prices and exchange rates using a multivariate VAR-GARCH model with data from 2000 to 2014. Their findings indicated a stable long-term relationship between stock prices and exchange rates, with significant mean spillover from the stock smarket to the exchange market but not vice versa.

Additionally, bidirectional volatility transmission was observed, highlighting implications for international portfolio diversification and risk hedging strategies. Lawal et al. (2020) assessed the effects of oil price and exchange rate long memory on Nigeria's stock market using ARMA models. Their results suggested that stock price movements are influenced by long-term trends in both exchange rates and oil prices, recommending policies to stabilize the exchange rate and enhance Nigeria's position in net oil exports. Lastly, Orugun et al. (2024) investigated inflation, exchange rates, finance, and non-performing loans (NPLs) in low- and middle-income countries from 2000 to 2022 using panel ARDL, FMOLS, and DOLS. Their findings showed that inflation significantly impacts NPLs, while exchange rates and financial measures positively affect NPLs, emphasizing the need for sound macroeconomic policies to mitigate financial instability.

3. METHODOLOGY

3.1. Measurement of Exchange Rate Volatility

Exchange rate volatility denotes the amount of uncertainty or risk about the size of changes in the exchange rate. If the exchange rate can potentially be spread out over a larger range of values in a short period, it is termed to have high volatility. If the exchange rate does not fluctuate dramatically and tends to be steadier, it is termed to have low volatility. Additionally, real and nominal exchange rate volatilities are different for practical purposes. The properties of the method used to estimate volatility have also received lots of attention. Bahmani-Oskooee and Hegerty (2007) emphasize the fact that a dominant approximation for uncertainty has not yet emerged up till now. However, in this paper, the exchange rate volatility is measured by the moving average of the standard deviation of exchange rates, which is typically used by several scholars such as Chowdhury (1993); Arize et al. (2021); Kasman and Kasman (2005) among others. This equation is as follows:

$$VOLt = \left[\frac{1}{m} \sum (ER_{t+i-1} - ER_{t+i-2})^2 \right]^{\frac{}{m}} \quad (1)$$

Where m is the number of periods; and t is time and ER refers to the exchange rate index.

In the work by Bagella et al. (2006), he shows advantages of effective exchange rate volatility comparing with bilateral exchange rate volatility and find that this method performs much better than the bilateral exchange rate volatility measure. An important advantage is that the effective exchange rate reflects more sufficiently the stability of a country which might have low bilateral exchange rate volatility with a leading currency but absorb instability via variability of economic policies of its trade partners.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

3.2. Theoretical Framework

In line with microeconomic theory, the orthodox demand functions are homogenous degree zero in terms of price and income (Deaton and Muellbauer 1980). To evaluate the impact of exchange rate volatility on exports, it states that “the higher the income elasticity of the export demand, the more powerful will exports be as an engine of growth. The traditional export demand function is a log-linear function of the real exchange rate and an activity variable, generally defined as the weighted (by the trade shares) average of the trade partners' GDP. This study thus adds an exchange rate volatility variable to the traditional export demand function comprising consumers’ income (or GDP) and relative price, which has been used in many previous studies such as Salas (1982); Gafar (1995); Matsubayashi and Hamori (2003); Ekanayake et al. (2010). The model is specified as follows:

$$X_t = \beta_0 + \beta_1 RGDPF_t + \beta_2 REER_t + \beta_3 VOL_t + \varepsilon_t \qquad (2)$$

Where X denotes real exports; RGDPF is real foreign income; REER is the real effective exchange rate; and VOL is the exchange rate volatility. In light of the functional form, Khan and Ross (1977) suggest that a log-linear specification is better than a standard linear one on both empirical and theoretical grounds. That is, the former allows the dependent variable to react proportionally to an increase or decrease in the regressors and exhibits interaction between elasticities. Therefore, all variables in Equation (4) are expressed in logarithmic form. In Equation (2) we have the following expectations for the sign of the regression coefficients: According to the gravity theory of international trade, increases in the real GDP of trading partners would be expected to result in greater real exports to those partners, therefore, $\beta_1 > 0$. Due to the relative price effect, the real exchange rate may lead to an increase in the volume of exports, therefore, $\beta_2 > 0$. The relationship between the exchange rate volatility and export volume is ambiguous, thus, it is expected that $\beta_3 > 0$ or $\beta_3 < 0$.

3.3. Nature of Data and definition of variables

This study investigates exchange rate volatility and its impacts on exports in selected G7, Asian and West African countries based on annual time series data that spanned from 1996 to 2022. The exchange rate volatility was measured with indicators such as the real effective exchange rate (REER), real effective exchange rate volatility (REERV), real exchange rate (REXR) and real exchange rate volatility (REXRV) to ensure robust analysis of exchange rate effects on exports. The real effective exchange rate volatility (REERV) and real exchange rate volatility (REXRV) were generated by the standard deviation of the real effective exchange rate and real exchange rate respectively. Furthermore, we employed export competitiveness (EXCPS) to measure exports in the study, while other variables include tariff trade restrictive index (TTRI), trade openness (TOP), export price index (EPI), terms of trade (TOT), tax on export (TOE), balance of payment (BOP), net exports (NEX), real trade balances (RTB), government subsidy (GS), government expenditure (GEXP), interest rate (INTR), inflation rate (INF) are obtained from world bank’s world development indicator (WDI). However, we define the meaning of the acronyms, definitions and repository of each of the model variables to better the reader’s knowledge of the model variables which are presented in Table 1 below.

The Seybold REPORT
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

Table 1: Definition of the model Variables

Acronyms	Definition	Source
EXCPS	Export competitiveness	WDI (2023)
REER	Real effective exchange rate	WDI (2023)
REERV	Real effective exchange rate volatility	Calculated
REXR	Real exchange rate	WDI (2023)
REXRV	Real exchange rate volatility	Calculated
REX	Real exports	WDI (2023)
NEX	Net export	WDI (2023)
RTB	Real trade balances	WDI (2023)
TOP	Trade openness – trade (% of GDP)	WDI (2023)
EPI	Export price index	WDI (2023)
TOT	Terms of trade	WDI (2023)
TOE	Tax on exports	WDI (2023)
BOP	Balance of payment	WDI (2023)
TTRI	Tariff rate restrictive index	WDI (2023)
GS	Government subsidy	WDI (2023)
GEXP	Government expenditure	WDI (2023)
INTR	Interest rate	WDI (2023)
INF	Inflation rate	WDI (2023)

Source: Conceived by the Author.

3.3. Model Specifications

When modelling the relationship between a set of time-series variables, it is important to take into account the stationarity of the data. When detecting a spurious regression problem among these series including a unit root, some methods are suggested to solve this problem. One of the simplest ways is taking the differences of the series and estimating a standard regression model. However, this method results in the loss of information that is meaningful for the level of relationships.

Provided that the first differences of the variables are used, it is impossible to determine a potential long-run relationship in levels. Moving from this point, the co-integration approach associated with error-correction modelling was developed during the late 1980s. In this way, both the short-run and long-run relationship can be analyzed. The co-integration approach developed by Engle and Granger (1987) is suitable for the test based on the expectation of only one co-integrating vector being present.

Further, the approach proposed by Johansen (1988) enables researchers to test the case that there is more than one co-integration vector by using the VAR model in which all the variables are accepted as endogenous. However, the important condition that must be met to perform these standard co-integration tests is that all series should not be stationary at levels and they should be integrated in the same order. To overcome this problem, Pesaran et al. (2001) have developed the bounds test approach.

According to this method, the existence of a co-integration relationship can be investigated between the time series regardless of whether they are I(0) or I(1) (under the circumstance that

ISSN 1533-9211

DOI: 10.5281/zenodo.14890608

the dependent variable is I(1)). This point is the greatest merit of the bounds test over conventional co-integration testing. Moreover, this approach can distinguish dependent and independent variables and is more suitable than another method for dealing with small sample sizes (Ghorbani and Motallebi 2009). In addition, different variables can be assigned different lag lengths as they enter the model.

As reviewed by Bahmani-Oskooee and Hegerty (2007), while common variables in trade models are non-stationary series, most measures of exchange rate volatility are stationary. The ARDL model was chosen as the best model for this study because addresses the issue of collinearity by allowing the lag of the dependent variable in the model with other independent variables and their lags on other models like; polynomial distributed lag (PDL), and Geometric model (Preyer Chette, 2018).

In addition, the model was used because of some desirable statistical plusses over other co-integration techniques which include: Firstly, it can be applied irrespective of whether the individual regressors are integrated of the order I(0) or I(1), regardless of level of stationarity. Secondly, the ARDL model takes the sufficient number of lags to capture the data-generating process from a general to a specific modelling framework (Laurenceson and Chai, 2003).

Thirdly, the ARDL approach yields superior estimates of long-run coefficient, and, the diagnostic tests of the estimated equation are more reliable (Gerrard and Godfrey, 1998, p 235) and (Laurenceson and Chai 1998, p 405). Fourthly, from the ARDL model, one can derive a dynamic error correction model (ECM) through a simple linear transformation process (Banarjee et al, 1994, pp 50-52).

The ECM also helps us to measure the short-run relationship among the model's variables. Finally, the ARDL model is a more appropriate measure in the case of a smaller sample. For the variables incorporated in this study, the ARDL model is specified below bearing in mind that there are some prior studies that used this approach, which includes De Vita and Abbott (2004); Sekantsi (2008); Yin and Hamori (2011); and Alam and Ahmad (2011). To implement the bounds test procedure, Equation (3) is modelled as a conditional ARDL error correction model as follows:

$$\Delta InEXCPS_t = \beta_0 + \sum_{I=1}^{n} \beta_{1i\Delta} InEXCPS_{t-1} + \sum_{I=1}^{n} \beta_{2i\Delta} InEXPV_{1t-1} \sum_{I=1}^{n} \beta_{3i\Delta} InINTR_{2t-1} + \sum_{I=1}^{n} \beta_{4i\Delta} InINF_{3t-1} + \Psi_1 InEXCPS_{t-1} + \Psi_2 InEXPV_{t-1} + \Psi_3 InINTR_{t-1} + \Psi_4 InINF_{t-1} + \varepsilon it \qquad (3)$$

Where Δ = 1st difference of a variable, *In* indicates that the data set is expressed in natural logarithms, β_0 is a constant, β_1------------------ β_4 represents the short-run coefficients (error correction dynamic), Ψ_1 ---------- Ψ_4 represent the long-run relationship, *i* represents the time trend, and, ε_{it} is the white noise error; μ_t is the error term; EXCPS is the export competitiveness; EXPV is the set of explanatory variables which include (real effective exchange rate, real

ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

effective exchange rate volatility, real exchange rate, real exchange rate volatility, real exports, net export, real trade balances, trade openness, export price index, terms of trade, tax on export, balance of trade, tariff trade restrictive index, government subsidy, and government expenditure), while INTR is the interest rate and INF is the inflation rate. The implementation of the ARDL approach involves two stages.

First, the existence of the long-run nexus (cointegration) between variables under investigation is tested by computing the F-statistics for analyzing the significance of the lagged levels of the variables. (Pesaran, Shin, and Smith, 1999) and (Narayan, 2004) have provided two sets of appropriate critical values for different numbers of regressors (variables).

This model contains an intercept, trend or both. One set assumes that all the variables in the ARDL model are of I(0), and another assumes that all the variables are I(1). Secondly, if the cointegration between variables is identified, then one can undertake further analysis of the long-run and short-run (error correction) relationship between the variables. The error correction representation of the series can be specified as follows:

$$\Delta InEXCPS_t = \beta_0 + \sum_{I=1}^{n} \beta_{1i\Delta} InEXCPS_{t-1} + \sum_{I=1}^{n} \beta_{2i\Delta} InEXPV_{1t-1} \sum_{I=1}^{n} \beta_{3i\Delta} InINTR_{2t-1} + \sum_{I=1}^{n} \beta_{4i\Delta} InINF_{3t-1} + +\zeta \mathrm{ECT} + \varepsilon \mathrm{it} \quad (4)$$

Where ς is the speed of adjustment parameter and ECT is the residuals obtained from equation 1 (i.e. the error correction term). The coefficient of the lagged error correction term (ς) is expected to be negative and statistically significant to further confirm the existence of a cointegrating relationship. If the F-statistic lies above the upper-bound critical value for a given significance level, the conclusion is that there is non-spurious long-run level relationship with the dependent variable. If the F-statistic lies below the lower bound critical value, the conclusion is that there is no long-run level relationship with the dependent variable. If it lies between the lower and the upper limits, the result is inconclusive. The general form of the null and alternative hypotheses for the F-statistic test is as follows:

$$H_0: \Psi_1 = \Psi_2 = \Psi_3 = \Psi_4 = 0$$

$$H_0: \Psi_1 \neq \Psi_2 \neq \Psi_3 \neq \Psi_4 \neq 0 \qquad (5)$$

For an additional diagnostic check, the Lagrange Multiplier (LM) test of residual serial correlation was applied, indicating a null hypothesis of “no serial correlation.” The LM follows a χ^2 distribution with one degree of freedom (first-order). Furthermore, Ramsey's RESET test for the misspecification model is proposed with the null hypothesis of “no misspecification.” The RESET is distributed as χ^2 with one degree of freedom. The Jarque-Bera (J-B) test for normality is also applied to test the distribution of residual with the null hypothesis of “residual has a normal distribution.” Finally, the CU and CUQ test is applied for stabilization of the model using CUSUM.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

4. EMPIRICAL FINDINGS AND DISCUSSION

In this section, we employ the ARDL bounds testing approach to test the existence or absence of a long-run relationship between exchange rate volatility and export. Second, since ARDL doesn't determine the direction of causality, we estimate an error correction model (ECM) i.e. the short-run dynamic parameters associated with the long-run estimates. We start by showing descriptive statistics of the variables used in our study. This gives us a good idea of the patterns in the data and the nature of the estimations and diagnostics to be carried out.

4.1. Descriptive Statistics

In empirical studies, descriptive statistics are used to describe the basic features of the data used in the study; because they provide simple summaries about the sample and the measures as well as quantitative descriptions of the variables of the model used in the study. Table 1 shows the summary statistics of the variables used in the study.

Table 1: Summary Descriptive Statistics Results

	EXCPS	REER	REERV	REXR	REXRV	REX	NEX/RTB	TOP	EPI	TOT	TOE	BOP	TTRI	GS	GEXP	INTR	INF
Mean	-2.767	101.4	2.272	661.9	44.81	3.678	-4.523	42.49	648.9	-0.457	-0.538	-2.504	10.36	260.1	27.81	6.453	6.725
Median	-2.938	99.90	2.030	26.39	16.63	1.096	0.801	45.35	377.2	-0.664	-0.718	-2.518	9.075	238.1	15.20	6.391	2.670
Maximum	48.45	296.2	140.3	4086	952.6	94.41	179.3	79.74	9859	2.139	1.990	45.45	80.85	718.7	193.4	130.3	295.3
Minimum	-110.6	47.95	-36.20	0.001	0.000	-0.000	-2870	1.362	21.54	-1.868	-2.445	-65.02	0.150	8.942	0.402	-93.51	-26.10
Std. Dev.	14.83	21.04	6.173	2711.	78.36	7.425	113.3	11.86	4717.	0.877	0.880	10.43	7.284	161.8	31.52	11.18	15.84
Skewness	-0.244	2.671	10.36	8.190	4.898	5.750	-23.37	-0.345	18.96	1.213	1.110	0.232	2.256	0.282	2.321	-0.827	7.823
Kurtosis	7.657	19.95	224.2	91.64	38.99	50.99	563.2	3.400	369.1	3.885	3.872	6.819	14.74	1.837	9.078	32.44	109.8
Jarque-Bera	1096.	1580	2468.	4062	6958	1218	15802	31.96	6776.	333.7	284.7	740.1	7920.	83.54	2927.	43491	5829
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200

Source: Authors' Concept.

The Seybold REPORT
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

From table 1, there is significant variation in Export Competitiveness (EXCPS) ranging from -110.6 to 48.45. In the same vein, Real Effective Exchange Rate (REER) has lots of variations ranging from 47.95 to 296.2. Similarly, Real Effective Exchange Rate Volatility (REERV) has variations ranging from -36.20 to 140.3.

Real Exchange Rate (REXR) has variations ranging from 0.001 to 408. The Real Exchange Rate Volatility (REXRV) has variations ranging from 0.000 to 952.6. Also, Real Export (REX) has significant variation ranging from -0.000 to 94.41. The Net Export over Real Trade Balance (NEX/RTB) has variation ranging from -2870. to 179.4.

In addition Trade Openness (TOP) has lots of variations ranging from 1.362 to 79.74. Export Price Index (EPI) has its range of variations from 21.54 to 985.2. Terms of Trade (TOT) has a lot of variations ranging from -1.868 to 2.139. The Tax on Export (TOE) has variations ranging from -2.445 to 1.990. Similarly, the variations in Balance of Payment (BOP) is ranging from -65.02 to 45.45.

The variations in Tariff Trade Restrictive Index (TTRI) is ranging from 0.150 to 80.85. From the table it was also observed that there is a lot of variations in Government Subsidy (GS) ranging from 8.942 to 718.7. In the same vein, there is lots of variations in Government expenditure (GEXP) ranging from 0.402 to 193.4. Also, there is a lot variation in Real Interest Rate (RINTR) ranging from -93.51 to 130.3.

There is a lot of variation in Inflation Rate (INF) from -26.10 to 295.3. Net Export has a lot of variations ranging from -2.645 to 7.000. And Real Trade Balance (RTB) has a lot of variations ranging from -13.26 to 1.801. However, the behavior of the variables in the descriptive analysis, clearly depict that there is no presence of serial correlation in the variables and they are good fit for the model of the study panel autoregressive distributed lag model (PARDL).

4.2. Correlation Test

Correlation analysis is a statistical method used to evaluate the strength of relationship between the variables in a model. In order to test for some unobserved autocorrelations in between the variable, we carried out the correlation tests for models 1-4 as shown below in Table 5 Our target is to check if there is any serial correlation in the variables of the model.

Findings shows that real effective exchange rate (REER), exchange rate volatility (REERV), real exchange rate volatility (REXRV), real export (REX), real trade balances (NEX/RTB), trade openness (TOP), export price index (EPI), terms of trade (TOT), terms of export (TOE), balance of payment, tariff trade restrictive index (TRRI), government subsidy (GS), and government expenditure (GEXP), have negative correlations with export (EXCPS). On the other hand, while real exchange rate (REXR) showed weak correlations with the export competitiveness, interest rate (INTR) and inflation rate (INF) have strong positive correlations with the export competitiveness in selected G7, Asian and African countries.

The Seybold REPORT

ISSN 1533-9211

DOI: 10.5281/zenodo.14890608

Table 2: Correlations Results

Variable	EXCPS	REER	REERV	REXR	REXRV	REX	NEX/RTB	TOP	EPI	TOT	TOE	BOP	TTRI	GS	GEXP	INTR	INF
EXCPS	1.000																
REER	-0.545	1.000															
REERV	-0.012	-0.017	1.000														
REXR	0.065	0.152	-0.013	1.000													
REXRV	-0.057	0.043	0.763	-0.039	1.000												
REX	-0.780	-0.037	-0.006	-0.239	0.182	1.000											
NEX/ RTB	-0.674	-0.040	-0.011	-0.085	0.104	0.516	1.000										
TOP	-0.609	-0.043	0.056	-0.193	0.129	0.739	0.469	1.000									
EPI	-0.547	0.125	-0.049	-0.211	-0.189	-0.112	-0.196	-0.018	1.000								
TOT	-0.744	-0.077	0.702	0.105	0.076	-0.107	-0.2021	-0.073	-0.398	1.000							
TOE	-0.838	0.013	-0.012	-0.108	-0.303	0.214	0.116	0.372	0.068	-0.102	1.000						
BOP	-0.411	0.828	-0.356	-0.216	0.182	0.503	0.285	0.639	0.511	-0.074	0.475	1.000					
TTRI	-0.754	0.013	-0.401	-0.248	0.096	0.527	0.293	0.679	0.054	-0.114	0.517	0.947	1.000				
GS	-0.630	0.850	-0.699	0.619	0.592	-0.427	-0.232	0.469	-0.076	-0.144	0.152	0.500	-0.176	1.000			
GEXP	-0.566	-0.022	-0.475	0.028	-0.057	-0.038	-0.042	-0.043	0.143	-0.042	-0.062	-0.178	-0.113	-0.619	1.000		
INTR	0.843	-0.317	0.045	-0.012	0.052	0.019	0.203	0.263	-0.076	0.156	0.068	0.051	0.028	0.850	0.045	1.000	
INF	0.743	-0.018	0.415	-0.043	0.012	0.023	0.014	0.025	0.326	0.033	-0.746	-0.850	-0.012	0.528	0.024	0.270	1.000

Source: Authors' Concept.

4.3. Unit Root Tests

In the words of Laura Barbieri (2005), Levin, Lin and Chu (2002) test (LLC) is a panel unit root test which provide some new results on panel unit root tests that allows for heterogeneity of individual deterministic effects (constant and/or linear time trend) and heterogeneous serial correlation structure of the error terms assuming homogeneous first order autoregressive parameters (Phillips, 1987; Phillips and Perron, 1988; Phillips and Ouiliaris, 1990).

ISSN 1533-9211

DOI: 10.5281/zenodo.14890608

While IPS test on the other hand allows for residual serial correlation and heterogeneity of the dynamics and error variances across groups. Instead of pooling the data, IPS consider the mean of ADF statistics computed for each cross-section unit in the panel when the error term in a model is serially correlated possibly with different serial correlation patterns across cross-sectional units. The presence of a unit root implies that the time series under investigation is non-stationary; while the absence of a unit root show that the stochastic process is stationary (Iyoha & Ekanem, 2002). LLC and IPS when compared to other panel unit root test like Maddala (1999) and Choi (2001) Fisher's test, (LLC assume homogeneous autoregressive for the variables in the model and IPS compute its test statistic allowing the use of different numbers of lags in the model) which gave us the impetus for their usage in this study.

Table 3: Unit Root Test Results

Var.	LLC	Order of Integration		IPS	Order of Integration	
		Level	Difference		Level	Difference
EXCP	-28.32*** [0.000]		I(1)	-3.930*** [0.000]		I(1)
REER	-6.494*** [0.000]		I(1)	-2.439 [0.007]		I(1)
REERV	-6.111*** [0.000]		I(1)	-8.863*** [0.000]		I(1)
REXR	-3.267*** [0.000]		I(0)	4.299*** [0.000]		I(1)
REXRV	-25.87*** [0.000]		I(1)	-2.104*** [0.017]		I(1)
REX	-31.67*** [0.000]		I(1)	-251.3*** [0.000]	I(0)	
NEX/RTB	-49.13*** [0.000]		I(1)	-2.365 [0.009]		I(1)
TOP	-26.45*** [0.000]		I(1)	-2.234 [0.012]		I(1)
EPI	-16.14*** [0.000]		I(1)	-12.45*** [0.000]		I(0)
TOT	-63.83*** [0.000]		I(1)	-3.874*** [0.000]		I(1)
TOE	-27.43*** [0.000]		I(1)	-4.110*** [0.000]		I(1)
BOP	-6.834*** [0.000]		I(1)	-3.085*** [0.000]		I(1)
TTRI	-10.60*** [0.000]		I(1)	-3.304*** [0.005]		I(1)
GS	-3.316*** [0.005]		I(1)	-3.250*** [0.006]		I(1)
GEXP	-23.10*** [0.000]		I(1)	-4.539*** [0.000]		I(1)
RINTR	-19.29*** [0.000]		I(1)	-5.056*** [0.000]		I(1)
INF	-11.24*** [0.000]	I(0)		-4.675*** [0.000]		I(1)

Source: Authors' Concept. *** represent 1% level of significance respectively.

As shown table 3, the LLC and IPS tests for each variable show that the null hypothesis (there is unit root) could be rejected in 1% level of significance apart from REER, REXRV, NEX/RTB, TOP, TOE and RTB of LLC and IPS order I(0). Since the variables are stationary

The Seybold Report

ISSN 1533-9211

DOI: 10.5281/zenodo.14890608

and integrated at I(0) or I(1), it fore tales that we ride on with the study since there is not presence of unit root.

4.4. Diagnostic Tests

To satisfy the assumptions classical linear model (CLM), we carried out a Normality test, Heteroscedasticity test, Ramsey reset specification test, and serial correlation test for models 1-4 to diagnose if the variables of the model are well specified, no presence of autocorrelation, the variables are homoscedastic, and the error terms are normally distributed. The results are shown below in table 4.

Table 4: ARDL Model Diagnostic Tests

Model 1	
LM Test Statistic	**Prob.***
(A): Normality: $X^2(I) = 82332.31$	0.7583
(B): Serial Correlation: $X^2(I) = 0.317832$	0.7278
(C) Functional Form: $X^2(I) = 0.090311$	0.5736
(D) Heteroscedasticity: X^2 (I) = 1.070034	0.2077
Model 2	
LM Test Statistic	**Prob.***
(A): Normality: $X^2(I) = 115788.8$	0.0000
(B): Serial Correlation: $X^2(I) = 0.253627$	0.7760
(C) Functional Form: $X^2(I) = 0.005793$	0.0043
(D) Heteroscedasticity: X^2 (I) = 0.945082	0.7548
Model 3	
LM Test Statistic	**Prob.***
(A): Normality: $X^2(I) = 87984.16$	0.0000
(B): Serial Correlation: $X^2(I) = 0.0064138$	0.9379
(C) Functional Form: $X^2(I) = 0.052074$	0.0182
(D) Heteroscedasticity: X^2 (I) = 0.667658	0.9997
Model 4	
LM Test Statistic	**Prob.***
(A): Normality: $X^2(I) = 87322.54$	0.0000
(B): Serial Correlation: $X^2(I) = 0.103296$	0.9019
(C) Functional Form: $X^2(I) = 0.061829$	0.0108
(D) Heteroscedasticity: X^2 (I) = 0.769121	0.9992

Source: Authors' Concept.

A cursory look at Table 4, it indicates that the models passes all the post estimation tests. In particular, the Breusch-Godfrey Serial Correlation LM test reveals the absence of serial correlation among the variables, as the F-statistic for models 1-4 which include (0.317, 0.253, 0.006 and 0.103) and the P-values 0.727, 0.776, 0.937 and 0.901 was not statistically significant. The White Heteroscedasticity tests also reported a statistically insignificant since the F-statistics 1.070034, 0.9450, 0.667 and 0.769 with P-values 0.207, 0.754, 0.997 and 0.992 thus indicating the absence of heteroskedasticity among the error terms. The Ramsey-RESET stability test for the correct functional form of the model shows that the model was correctly specified since the F-statistics 0.090, 0.005, 0.052 and 0.061 and P-values 0.000, 0.004, 0.018

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

and 0.010 are statistically significant. Finally, based on the Jarque-Bera normality test, the study found evidence that the series in the model are normally distributed, as evidential from the F-statistics (82.31, 1157, 8798 and 8732) and P-values (0.000, 0.000, 0.000 and 0.000) was statistically significant. The outcome of the Lagrange multiplier test of residual serial correlation, Ramsey's RESET test for specification, Jarque Bera normality test and Heteroscedasticity test as presented in Table 4 for model 1 – 4, signposts the models used in the study passed all the tests and this implies that it has a correct functional form, its residuals are serially uncorrelated, normally distributed and homoscedastic.

4.5. Pedroni Cointegration Test

Pedroni (1999) extends the procedure of residual-based panel cointegration tests which he introduced in his write up Pedroni (1995). He proposes several residual-based null of no cointegration, in panel cointegration test statistics. Two within-dimension-based (panel-ρ and panel-t) and two between dimension-based (group-ρ and group-t) panel cointegration statistics of Pedroni (1999). Panel-ρ statistic is an extension of the non-parametric Phillips-Perron ρ-statistic, and parametric panel-t statistic is an extension of the ADF t-statistic. Between-dimension-based statistics are just the group mean approach extensions of the within-dimension-based ones. Group-ρ statistic is chosen, because Gutierrez (2002) has found out that this test statistic has the best power among the test statistics of Pedroni (1999), Larsson et al. (2001) and Kao (1999). Group-t statistic is considered, because the data generating process is appropriate for parametric ADF-type tests. And the within-dimension versions of these statistics are considered in order to be able to compare. However, when compared to Fisher-type test (Johansen cointegration test), Kao cointegration test etc., Pedroni cointegration test proposes several tests for cointegration that allow for heterogeneous intercepts and trend coefficients across cross-sections unlike others. In table 6 below, we present the results of Pedroni cointegration tests for models 1-4.

Table 6: Pedroni Cointegration Test Results

Test	Panel-v statistic	Panel rho-statistic	Panel PP-statistic	Panel ADF-statistic	Group rho-statistic	Group PP-statistic	Group ADF-statistic
Model 1	-3.375 (0.000)	5.488 (0.000)	-4.154 (0.000)	-3.5405 (0.000)	7.826351 (0.000)	-4.764524 (0.000)	-3.235124 (0.000)
Model 2	1.248272 (0.106)	2.075453 (0.981)	-5.666614 (0.000)	-6.030664 (0.000)	4.230121 (0.000)	-8.430865 (0.000)	-6.086789 (0.000)
Model 3	-3.330468 (0.996)	5.627077 (0.000)	-3.535274 (0.000)	10.68871 (0.000)	7.644873 (0.000)	-4.172545 (0.000)	12.44435 (0.000)
Model 4	0.248289 (0.402)	-4.612951 (0.000)	-7.823276 (0.000)	-4.566392 (0.000)	-0.967238 (0.166)	-6.866816 (0.000)	-2.545708 (0.000)

Source: Authors' Concept

From table 6, the seven tests for pedroni residual cointegration, virtually all the tests are significant at 1% level of significance except Group rho statistic in model 1, Panel v-Statistic in model 2, Panel v-statistic in model 3 and Panel v-Statistic in model 4. Thus, this suggests a long run relationship within the variables as well as between the panel and group.

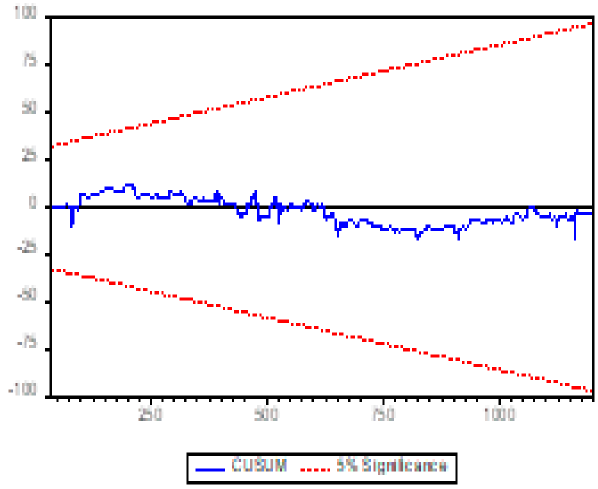
ISSN 1533-9211

DOI: 10.5281/zenodo.14890608

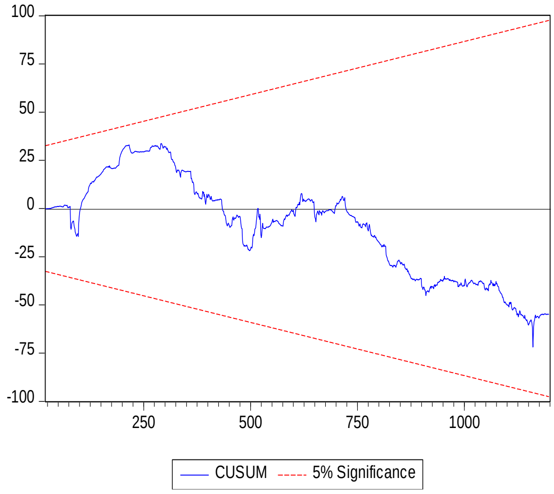
4.6. Stability Tests

The stability of the long-run coefficient was tested by the short-run dynamics using the cumulative sums of recursive residuals (CUSUM) tests to assess parameter stability (Pesaran and Pesaran, 1997). Figures 5 plot the results for CUSUM test. The results indicate the absence of any instability of the coefficients because the plot of the CUSUM statistics falls inside the critical bands of the 5% confidence interval of parameter stability as shown in Figures 1 with EXCPS as the dependent variable.

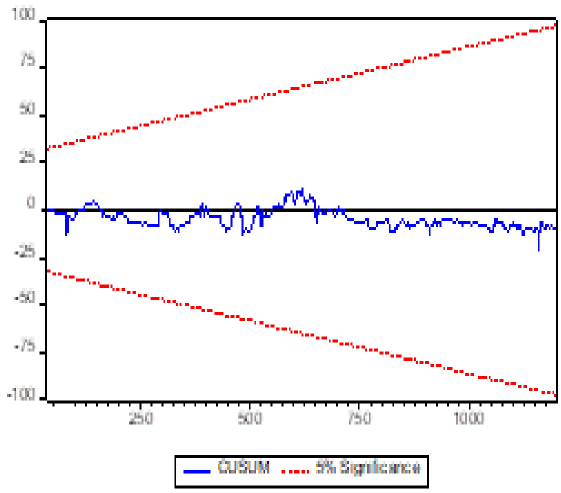
Figure 5: CUSUM Stability Test for Models 1 – 4



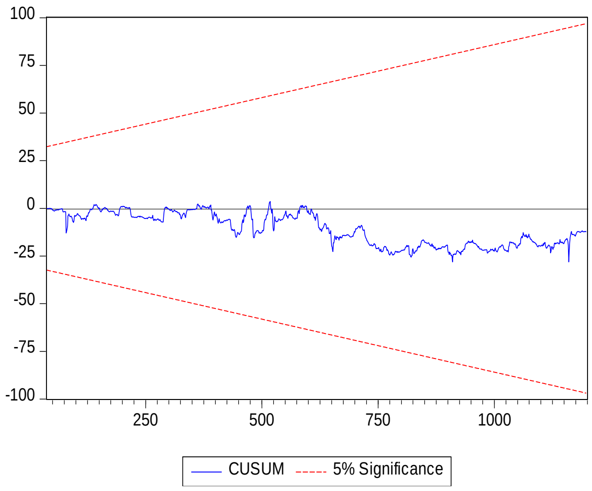
Model 1



Model 2



Model 3



model 4

Source: Conceptualized by the Author

ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

4.7. Hausman Test

In panel data analysis, the Hausman test helps to choose between fixed effects model and random effects model. We employed Hausman test to compare the fixed effects and random effects 'within' the estimator in models 1 – 4. Since 0.0012 < 0.05, 0.0141 < 0.05, 0.0015< 0.05, and 0.0099< 0.05 in models 1-4, we reject the null hypothesis and conclude that fixed effects are independent of the explanatory variables for models 1, 2, 3 and 4 respectively. From the empirical result, the fixed effects model is the most appropriate for this study because it provides a more efficient estimator than the random effects estimator.

4.8. ARDL Bounds Test for Long-Run

The ARDL bounds test, developed by Pesaran et al. (2001), is used to determine the presence of a long-run relationship among variables in a model. This test assumes that the underlying variables are either purely I(0), purely I(1), or a combination of both, but not I(2). The rule of thumb dictates that the computed F-statistic should be compared against the lower and upper bound critical values at different significance levels. If the F-statistic exceeds the upper bound I(1) value, there is strong evidence of a long-run relationship, while if it falls below the lower bound I(0) value, no cointegration exists. If the F-statistic lies between these two bounds, the result is inconclusive. For Model 1, the estimated F-statistic of 179.59 is significantly higher than the upper bound I(1) values at all significance levels, confirming a long-run relationship. Similarly, Model 2, with an F-statistic of 18.91, exceeds the 1% critical value of 3.79, indicating cointegration. Model 3 and Model 4 also show F-statistics (18.47 and 16.58, respectively) that surpass the 1% upper bound values (4.05 and 3.91), supporting the presence of long-run relationships. These findings suggest that in all models, exchange rate volatility and exports exhibit strong long-term linkages, validating the suitability of ARDL for estimating these relationships. Similar results have been found in prior studies on exchange rate fluctuations and trade performance in developing economies (Narayan, 2005; Bahmani-Oskooee & Hegerty, 2010), reinforcing the robustness of the bounds testing approach.

Table 7: ARDL Bound Test for Cointegration

Model	Number of Regressors	Sample Size	Estimated F Test Value	Critical Values Bounds					
	k	n	F-statistic	10%		5%		1%	
				I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Model 1	9	1200	179.59129	1.63	3.77	1.86	3.05	2.37	3.68
Model 2	8	1200	18.912838	1.66	2.79	1.91	3.11	2.45	3.79
Model 3	6	1200	18.475226	1.75	2.87	2.32	3.59	2.66	4.05
Model 4	7	1200	16.586737	1.70	2.83	2.22	3.49	2.54	3.91

Source: Authors' Concept

4.9. Exchange Rate Volatility and Export Estimated - ARDL Model

The relationship between the exchange rate volatility and exports were measured in this section. The results emphasize the complex interplay between exchange rate dynamics, trade policies, and macroeconomic factors in determining export competitiveness. The findings align with empirical evidence from the G7, Asian, and West African economies, highlighting the importance of stable exchange rates, prudent trade policies, and macroeconomic stability in enhancing export performance. In Model 1, real effective exchange rate volatility (REERV) negatively impacts export competitiveness (EXCPS), with a coefficient of -0.083 (p = 0.000). This aligns with evidence from West African economies, where unstable exchange rates, such as those experienced in Nigeria and Ghana, have discouraged export growth by increasing uncertainty and reducing exporters' profit margins (Bleaney & Greenaway, 2001). Similarly, in the G7, the persistent volatility of the British pound post-Brexit has constrained UK exports by making long-term contracts riskier. Real exchange rate volatility (REXRV), however, has a positive impact (0.052, p = 0.000), suggesting that controlled fluctuations in exchange rates can enhance competitiveness, as seen in Japan, where moderate depreciation of the yen has boosted exports in the automotive and electronics industries (Ito & Chinn, 2007). Trade policy variables, such as trade openness (TOP, -0.559, p = 0.001) and tariff trade restrictive index (TTRI, -0.059, p = 0.000), negatively affect exports, highlighting how restrictive trade policies harm competitiveness.

This is evident in West African economies that rely on high tariff regimes, reducing their global market reach. Terms of trade (TOT, 1.951, p = 0.000) and the export price index (EPI, 0.002, p = 0.000) positively influence exports, consistent with East Asian economies where improved terms of trade have significantly enhanced export performance. Government subsidy (GS, -0.854, p = 0.000) and government expenditure (GEXP, -0.035, p = 0.001) negatively impact exports, reflecting inefficiencies in public spending, often observed in Nigeria and Ghana, where subsidies distort market efficiency rather than fostering competitiveness. Model 2 incorporates real effective exchange rate (REER, 0.085, p = 0.000) and real exchange rate (REXR, 0.247, p = 0.000), showing that currency appreciation enhances export performance, contradicting traditional economic theory. This phenomenon can be seen in high-tech export-driven economies like Germany and Japan, where strong currencies have not deterred export growth due to value-added production (Krugman, 1991). However, real effective exchange rate volatility (REERV, -0.151, p = 0.005) again exhibits a destabilizing effect, reinforcing the adverse impact of currency fluctuations on trade. Inflation (INF, 0.073, p = 0.001) has a positive effect on exports, suggesting that inflationary environments may not necessarily hinder competitiveness when relative price adjustments favor local producers.

However, in West African countries such as Ghana and Senegal, inflation often erodes export competitiveness by increasing production costs. Interest rate (INTR, -0.082, p = 0.000) negatively impacts exports, as seen in the G7, where rising interest rates in the U.S. have strengthened the dollar and reduced the competitiveness of American exports (Obstfeld & Rogoff, 1995). Terms of exports (TOE, 1.185, p = 0.006) and balance of payment (BOP, 0.934, p = 0.000) improve export performance, supporting the argument that a favorable balance of trade strengthens export potential, particularly in Asia, where China’s trade surplus has been a key driver of growth. Model 3 introduces interaction effects, revealing that REERVBOP (0.877, p = 0.013) enhances exports, suggesting that economies with strong trade balances are less vulnerable to exchange rate fluctuations. However, REXRVBOP (-6.925, p = 0.035) shows that real exchange rate volatility combined with balance of payment fluctuations negatively impacts exports, which is evident in West Africa, where erratic exchange rate movements and

The Seybold Report

ISSN 1533-9211

DOI: 10.5281/zenodo.14890608

persistent trade deficits constrain export growth (Aziakpono, 2006). The interaction between REERV and terms of trade (0.014, p = 0.034) supports the argument that stable exchange rates amplify the benefits of favorable terms of trade, a key factor in Asian economies that have successfully managed their currencies. Conversely, REXRVTOT (-0.780, p = 0.016) suggests that excessive currency volatility offsets the gains from improved terms of trade, as observed in commodity-dependent economies like Nigeria, where oil price fluctuations and exchange rate instability undermine export competitiveness. REERVNEX (0.021, p = 0.000) suggests that controlled exchange rate volatility can benefit net exports, while REXRV*NEX/RTB (-8.996, p = 0.000) highlights the risks of excessive real exchange rate volatility. Model 4 further explores the interaction of macroeconomic and policy variables. The negative interaction between TOE and BOP (-0.097, p = 0.006) suggests that trade openness alone does not guarantee an improved balance of payments unless accompanied by strong external demand, a concern for many West African economies. The negative TOE*TOT (-1.710, p = 0.000) indicates that excessive trade openness might erode the benefits of favourable terms of trade, a scenario experienced in economies like Nigeria and Ghana, where unregulated trade liberalization has led to market saturation with imports rather than export expansion. TOENEX (0.153, p = 0.000) supports the idea that trade openness benefits net exports in competitive markets, aligning with the success of Asian economies such as Vietnam and South Korea, which have leveraged trade liberalization to enhance export-led growth.

The negative EPIBOP (-3.445, p = 0.046) shows that poor balance of payment conditions weakens the effectiveness of export price stability, which is an issue in many developing economies. However, EPI*NEX (0.767, p = 0.000) confirms that maintaining a stable export price index supports net exports, a factor that has helped China sustain its global export dominance. The interaction between REERV and trade openness (REERVTOP, -0.684, p = 0.009) suggests that excessive exchange rate volatility undermines the benefits of trade openness, particularly in regions like West Africa, where weak currency management exacerbates trade instability. Lastly, the positive impact of inflation on trade openness (INF*TOP, 0.023, p = 0.000) suggests that inflation-driven price adjustments can sometimes improve competitiveness, as seen in Japan's strategic use of monetary policies to stimulate exports (Ito & Chinn, 2007).

Table 9: Estimated ARDL Results

Variable	Model 1	Model 2	Model 3	Model 4
	Dependent Variable: EXCPS			
REERV	-0.083*** (0.000)			
REXRV	0.052*** (0.000)			
TTRI	-0.059 (0.000)			
TOP	-0.559*** (0.001)			
NEX/RTB	-0.083** (0.015)			
TOT	1.951***			

ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

	(0.000)			
EPI	0.002*** (0.000)			
GS	-0.854*** (0.000)			
GEXP	-0.035*** (0.001)			
REER		0.085*** (0.000)		
REXR		0.247*** (0.000)		
REERV		-0.151*** (0.005)		
REXRV		0.016*** (0.000)		
INF		0.073*** (0.001)		
INTR		-0.082*** (0.000)		
TOE		1.185*** (0.006)		
BOP		0.934*** (0.000)		
REERV*BOP			0.877** (0.013)	
REXRV*BOP			-6.925** (0.035)	
REERV*TOT			0.014** (0.034)	
REXRV*TOT			-0.780** (0.016)	
REERV*NEX			0.021*** (0.000)	
REXRV*NEX/RTB			-8.996*** (0.000)	
TOE*BOP				-0.097*** (0.006)
TOE*TOT				-1.710*** (0.000)
TOE*NEX				0.153*** (0.000)
EPI*BOP				-3.445** (0.046)
EPI*NEX				0.767*** (0.000)
REERV*TOP				-0.684*** (0.009)
INF*TOP				0.023*** (0.000)
Cointeq01	-5.034*** (0.000)	-3.134*** (0.008)	-10.24*** (0.000)	-4.826*** (0.000)
Constatnt	0.710	-1.404	0.056	-1.916
Hausman Test	10.15 (0.001)	19.14 (0.014)	10.15 (0.001)	9.805 (0.009)

Source: Authors' Concept. ***&** represent 1% & 5% level of significance respectively.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

4.10. Estimated ARDL Results across G7, Asian, and West African Countries

G7 Countries

In Model 1, exchange rate volatility (REERV) and real exchange rate volatility (REXRV) exhibit significant positive effects, indicating that fluctuations in exchange rates influence trade balances and competitiveness. The negative impact of net exports and real trade balances (NEX/RTB) suggests that trade imbalances persist in these economies.

Trade openness (TOP) and terms of trade (TOT) significantly improve trade outcomes, supporting the notion that liberalized trade policies foster economic growth. Government expenditure (GEXP) and subsidies (GS) positively contribute to economic stability, aligning with the fiscal expansion strategies seen in countries like the U.S. and Germany. In Model 2, the positive effect of REERV and the negative effect of REXRV suggest that currency stability is crucial for maintaining economic resilience. The negative coefficient of the tariff trade restrictive index (TTRI) implies that higher tariffs hinder trade, a relevant observation in ongoing trade disputes between the U.S. and China. The inclusion of the environmental policy index (EPI) positively influences trade outcomes, aligning with Europe's push for green trade policies. Model 3 highlights the role of exchange rate interactions, particularly the REERVBOP interaction term, which has a significant negative coefficient, suggesting that exchange rate volatility worsens trade balances.

The positive impact of TOENEX implies that improved terms of export enhance trade competitiveness, as evidenced in Canada's trade policies. Model 4 shows that government interventions through government expenditure (GEXP) and subsidies (GS) continue to play a crucial role in stabilizing the economy. The error correction term (COINTEQ01) indicates long-run equilibrium adjustments, albeit at a slower rate compared to Asian economies.

Asian Countries

Model 1 reveals that real effective exchange rate (REER) and real exchange rate (REXR) have significant positive effects, indicating that currency appreciation benefits trade competitiveness in these economies. The strong positive impact of terms of trade (TOT) aligns with the rapid export growth of China and South Korea. Trade openness (TOP) has a negative effect, suggesting that excessive openness without strategic trade policies might harm economic stability, as observed in Indonesia's experience with trade liberalization. In Model 2, the significant impact of exchange rate variables suggests that managing exchange rate volatility is crucial for trade stability.

The positive effect of real trade balances (NEX/RTB) implies that surplus economies, like Japan, benefit from stable trade flows. Government expenditure (GEXP) and subsidies (GS) continue to support economic performance, consistent with China's industrial policy. Model 3 shows that exchange rate volatility negatively affects trade when interacting with terms of trade (REERVTOT), a scenario observed in India's trade disruptions due to currency fluctuations. The positive coefficient of EPIBOP suggests that improved environmental policies enhance trade balances, aligning with South Korea's green trade initiatives.

The Seybold REPORT
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

Model 4 underscores the importance of interest rates (INTR), which show a highly significant positive coefficient, implying that financial policies significantly impact trade flows. The positive effect of INF*TOP suggests that moderate inflation alongside trade liberalization supports export performance, aligning with China's strategic inflation targeting. The error correction term (COINTEQ01) suggests a relatively faster adjustment to long-run equilibrium compared to G7 economies.

West African Countries

Model 1 highlights the challenges of currency stability, as the negative impact of the real exchange rate (REXR) suggests that depreciation hinders trade competitiveness. Exchange rate volatility (REERV) has mixed effects, indicating that currency fluctuations pose risks for trade balances, as observed in Nigeria and Ghana. The strong positive impact of terms of trade (TOT) reflects the heavy reliance on commodity exports in the region. In Model 2, trade openness (TOP) has a positive impact, suggesting that policies aimed at liberalizing trade, such as ECOWAS agreements, have yielded positive results. Government subsidies (GS) and expenditure (GEXP) contribute to economic stability, aligning with regional government intervention strategies. However, the negative coefficient of balance of payments (BOP) suggests persistent trade deficits, a common issue in the region. Model 3 indicates that exchange rate volatility interacts with trade variables to influence economic outcomes. The strong positive effect of REERV*NEX implies that exchange rate volatility combined with trade imbalances exacerbates economic instability, as seen in Nigeria's oil-export dependency.

The negative coefficient of REERV*TOT suggests that fluctuations in terms of trade worsen trade balances, a scenario evident in Ghana's gold exports. Model 4 highlights inflation (INF) as a key factor, with a significant positive effect, suggesting that rising inflation erodes trade competitiveness. The interaction between inflation and trade openness (INF*TOP) indicates that inflationary pressures must be managed alongside liberalization efforts to ensure stable trade growth.

The error correction term (COINTEQ01) suggests a slower adjustment to equilibrium, reflecting structural challenges in the region's trade policies. Across all three regions, exchange rate volatility plays a crucial role in determining export outcomes, with varying effects depending on economic structure. G7 countries show resilience through government interventions and policy stability, while Asian economies benefit from strategic policies and financial management.

West African economies, however, struggle with currency instability and inflation, which undermine export competitiveness. These findings highlight the importance of tailored policy approaches to enhance economic stability and trade performance in different economic contexts.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

Table 10: Estimated ARDL Results

Variable	G-7 Countries				Asian Countries				West African Countries			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
REER		-0.179*** (0.000)				0.095*** (0.000)				0.019** (0.001)		
REERV	0.112*** (0.000)	0.234*** (0.000)			0.125*** (0.000)	0.083*** (0.000)			0.249*** (0.003)	-0.083*** (0.003)		
REXR		0.053*** (0.000)				0.303*** (0.001)				-0.348*** (0.008)		
REXRV	0.735*** (0.006)	-0.032*** (0.000)			-0.964** (0.011)	0.038*** (0.000)			0.040*** (0.000)	-0.031*** (0.000)		
NEX/RTB	-5.28** (0.012)				0.030*** (0.001)				0.446*** (0.000)			
TOP	0.876*** (0.000)				-0.903** (0.046)				0.026*** (0.000)			
EPI	0.652** (0.019)				0.134*** (0.003)				0.709*** (0.000)			
TOT	1.473*** (0.000)				0.254*** (0.000)				3.579*** (0.000)			
TOE		-0.126** (0.011)				0.354*** (0.000)				-0.483*** (0.000)		
BOP		-0.638*** (0.000)				-0.041*** (0.008)				-0.327*** (0.000)		
TTRI	-1.115*** (0.006)				0.072*** (0.000)				0.308** (0.013)			
GS	0.090*** (0.001)				0.789*** (0.000)				0.038*** (0.000)			
GEXP	0.357*** (0.006)				0.042*** (0.000)				0.446*** (0.000)			
RINTR		0.035*** (0.001)				10.18*** (0.000)				-4.601*** (0.000)		
INF		-0.575 (0.017)				-0.034 (0.029)				0.938*** (0.000)		

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

REERV*BOP			-0.048** (0.000)				0.023** (0.015)				0.195*** (0.000)	
REXR*BOP			0.205*** (0.000)				0.422*** (0.001)				0.413*** (0.000)	
REERV*TOT			0.072** (0.026)				0.195*** (0.000)				-1.892** (0.019)	
REXRV*TOT			0.255*** (0.000)				0.255*** (0.000)				-2.712*** (0.007)	
REERV*NEX			0.256*** (0.000)				0.076*** (0.001)				3.496*** (0.002)	
REXR*NEX/ RTB			-0.123*** (0.001)				-0.379*** (0.000)				0.018 (0.043)	
TOE*BOP				1.194*** (0.000)				0.671*** (0.000)				0.066*** (0.001)
TOE*TOT				3.165*** (0.000)				-3.240** (0.000)				1.261 *** (0.000)
TOE*NEX				5.200*** (0.000)				1.848*** (0.001)				2.043*** (0.000)
EPI*BOP				0.322*** (0.000)				0.584*** (0.003)				0.106*** (0.002)
EPI*NEX				0.070*** (0.000)				0.056*** (0.000)				0.299*** (0.000)
REERV*TOP				9.385*** (0.008)				0.007*** (0.003)				0.281*** (0.000)
INF*TOP				0.959*** (0.000)				0.112*** (0.000)				0.224*** (0.000)
COINTEQ01	-0.014** (0.019)	-0.638** (0.023)	-2.058** (0.044)	-0.011** (0.015)	-0.411*** (0.000)	-0.245*** (0.001)	-0.410*** (0.000)	-0.099** (0.021)	-0.332** (0.024)	-0.246*** (0.031)	-0.053*** (0.059)	-0.121 ** (0.012)
Constant	--	1.3216	-0.903	--	1.302	-1.541	1.349	--	-1.937	--	-0.979	-2.330
Hausman Test	51.35 (0.000)				50.48 (0.000)				40.62 (0.004)			

Source: Authors' Concept. ***&** represent 1% & 5% level of significance respectively.

The Seybold REPORT

ISSN 1533-9211

DOI: 10.5281/zenodo.14890608

5. CONCLUSION AND POLICY IMPLICATIONS

Conclusively, the findings from the ARDL analysis highlight the significant impact of exchange rate volatility (REERV and REXRV) on export performance across the G7, Asian, and West African countries. In the G7 economies, exchange rate volatility exhibits a mixed influence on exports, with some positive effects observed, likely due to strong financial systems that mitigate risks. However, negative effects in some models suggest that excessive volatility can create uncertainty, reducing trade competitiveness. For Asian countries, exchange rate fluctuations appear to have a more pronounced positive impact on exports. This could be attributed to their ability to leverage currency depreciation to boost price competitiveness in global markets, particularly in manufacturing and technology-intensive industries. However, the interaction between volatility and trade openness (TOP) suggests that excessive fluctuations can sometimes disrupt trade flows, requiring targeted interventions. In West African economies, exchange rate volatility negatively affects exports in most cases, emphasizing the structural weaknesses and lack of shock-absorbing mechanisms in these economies. This volatility often leads to increased transaction costs, reduced investor confidence, and higher inflationary pressures, which collectively hinder export growth. The significant role of trade openness (TOP) and terms of trade (TOT) in influencing exports in the region underscores the need for broader economic reforms to enhance trade competitiveness.

G7 countries should continue employing monetary policies that ensure exchange rate stability while allowing flexibility for external adjustments. Asian economies should focus on managed float systems that leverage depreciation for export competitiveness without excessive volatility. West African nations should strengthen regional currency arrangements, such as the West African Monetary Zone (WAMZ), to reduce exchange rate fluctuations. The results also indicate that institutional quality plays a moderating role in mitigating exchange rate risks. Governments, especially in West Africa, should implement policies to improve financial markets, promote transparency in currency interventions, and enhance institutional governance to stabilize foreign exchange markets. Asian countries should continue expanding high-value exports to reduce dependence on exchange rate fluctuations for competitiveness. West African economies must diversify away from commodity dependence by investing in value-added manufacturing and agricultural processing industries. G7 countries should further integrate advanced digital trade solutions to maintain export growth amidst currency fluctuations.

Policies that enhance trade openness (TOP) and improve terms of trade (TOT) are essential in reducing the negative effects of volatility. For instance, Asian economies should leverage regional trade agreements such as RCEP to cushion against external shocks, while West African countries should enhance intra-African trade under the AfCFTA framework to reduce reliance on volatile external markets. Exporting firms, particularly in West Africa, should be encouraged to adopt hedging mechanisms such as forward contracts and currency swaps to mitigate risks associated with exchange rate fluctuations. Governments should also provide export credit facilities and insurance schemes to protect businesses from forex volatility risks. Moreover, the significant impact of inflation (INF) and interest rates (RINTR) on exports suggests that macroeconomic stability is crucial. G7 economies should maintain interest rate policies that support competitive exports, Asian economies should manage inflation to avoid eroding currency advantages, and West African countries should focus on reducing inflation through improved monetary policies and fiscal discipline. Exchange rate volatility amplifies the challenges posed by poor infrastructure, particularly in West Africa. Governments must invest in modern transport networks, logistics, and digital infrastructure to lower trade costs and improve export competitiveness, reducing reliance on currency advantages. Implementing these policies would help the selected countries mitigate the negative effects of exchange rate volatility on exports while leveraging positive aspects to enhance trade performance and economic growth.

Reference

1) Arize, A., Ogunc, A., Kalu, E.U. & Malindretos, J. (2021), "New evidence on exchange-rate volatility and export flows in Thailand: nonlinearity and asymmetric ARDL investigation", The International Trade Journal, Vol. 35 No. 2, pp. 194-218, doi: 10.1080/08853908.2020.1799886.

2) Aslan, C., & Akpiliç, F. (2023). Do the export reactions to exchange rate and exchange rate volatility differ depending on technology intensity? New evidence from the panel SVAR analysis. Empirical Economics, https://doi.org/10.1007/s00181-023-02497-5

3) Bahmani-Oskooee, M. and Gelan, A. (2018). Exchange-rate Volatility and International Trade Performance: Evidence from 12 African Countries. Economic Analysis and Policy, 58, 14-21.

4) Bahmani-Oskooee, Mohsen, and Scott. W. Hegerty. (2007). Exchange rate volatility and trade flows: A review article. Journal of Economic Studies 34: 211–55.

5) Bagella, Michele, LeonardoBecchetti, and Iftekhar Hasan (2006): A framework to measure advantages of flexibility vs. costs of volatility. Journal of Banking 30: 1149–69.

6) Bosupeng, M., Naranpanawa, A. and Su, J. (2024), "Does exchange rate volatility affect the impact of appreciation and depreciation on the trade balance? A nonlinear bivariate approach", Economic Modelling, Vol. 130, 106592, doi: 10.1016/j.econmod.2023.106592.

7) Clark, P.B. (1973), Uncertainty, exchange risk, and the level of international trade, Western Economic Journal, 11, p.302-313

8) Dada, J. (2021), "Asymmetric effect of exchange rate volatility on trade in Sub-Saharan African countries", Journal of Economic and Administrative Sciences, Vol. 37 No. 2, pp. 149-162, doi: 10.1108/JEAS-09-2019-0101.

9) Ekanayake, E. and Dissanayake, A. (2022), "Effects of real exchange rate volatility on trade: empirical analysis of the United States exports to BRICS", Journal of Risk and Financial Management, Vol. 15 No. 2, 73, doi: 10.3390/jrfm15020073.

10) Ethier, W. (1973). International Trade and the Forward Exchange Market. The American Economic Review, 63(3), 494-503.

11) Handoyo, R., Sari, A.D.P., Ibrahim, K.H. and Sarmidi, T. (2022), "The volatility of rupiah exchange rate impact on main commodity exports to the OIC member states", Economies, Vol. 10 No. 4, pp. 1-18, doi: 10.3390/economies10040078, available at: https://www.mdpi.com/2227-7099/10/4/78

12) Hooper, P. and Kohlhagen, S. W. (1978). The Effect of Exchange Rate Uncertainty on the Prices and Volume of International Trade. Journal of International Economics, 8, 483-511.

DOI: 10.5281/zenodo.14890608

13) Javaid, S.H. (2023), "Exchange rate volatility and exports of Pakistan", MPRA Paper No. 117426, available at: https://mpra.ub.uni-muenchen.de/117426/

14) Kamal P. Upadhyaya, Dharmendra Dhakal, and Franklin G. Mixon (2020). Exchange Rate Volatility and Exports: Some New Estimates from the Asean-5, the Journal of Developing Areas, 10.

15) Kasman, A., & Kasman, S. (2005). Exchange Rate Uncertainty in Turkey and its Impact on Export Volume. METU Studies in Development, 32(1), 41.

16) Kiptarus, N. S., Chepng'eno, W., & Saina, E. K. (2022). Exchange rate volatility and its effect on trade export performance in Kenya. Economic Research, 6(3), 91–107.

17) Lawal, A. I., Dahunsi, S. O., Babajide, A. A., Asaleye, A. J., Iseolorunkanmi, J. O., Inegbedion, H., Manasseh, C. O., & Lawal-Adedoyin, B. B. (2020). Examining the effects of oil price long memory and exchange rate long memory on stock market behavior in Nigeria. *International Journal of Energy Economics and Policy, 10*(4), 430–436. Available at http://www.econjournals.com

18) Manasseh CO, Ogbuabor JE, Abada FC, Okoro EU, Egele AJ, & Onwumere JU. (2019). Analysis of Oil Price Oscillations, Exchange Rate Dynamics and Economic Performance. International Journal of Energy Economics and Policy, 2019, 9(1), 95-106.

19) Manasseh, C. O., Chukwu, N. O., Abada, F. C., Ogbuabor, J. E., Lawal, A. I., & Alio, F. C. (2019). Interactions between stock prices and exchange rates: An application of multivariate VAR-GARCH model. *Cogent Economics & Finance*, *7*(1). https://doi.org/10.1080/23322039.2019.1681573

20) Orugun, F. I., Manasseh, C. O., Onwumere, J. U. J., Yaro, I. B., John, E. I., & Olorutumba, O. (2024). Linkages between inflation, exchange rates, finance, and nonperforming loans: Evidence from lowand middle-income countries. Seybold Report Journal, 19(05), 55–75. DOI: https://doi.org/10.5281/zenodo.13294030

21) Pesaran, M. H. and Shin, Y. (1998). An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis. In Econometrics and Economic Theory in the 20th Century. The Ragnar Frisch Centennial Symposium, ed. S. Strøm, chap. 11, 371–413. Cambridge: Cambridge University Press.

22) Pesaran, M.H., Shin, Y. and Smith, R.J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. Journal of Applied Econometrics, 16, 289–326.

23) Pesaran, Mohammad Hashem, Yongcheol Shin, and Richard J. Smith. 2001. Bounds Testing Approaches to the Analysis of Level Relationships. Journal of Applied Econometrics 16: 289–326.

24) Phillips, P. C. B. and Perron P. (1988). Testing For a Unit Root in Time Series Regression. Biometrika, 75: 335–346

25) Ramsey, J. B. (1969). Tests for Specification Errors in Classical Linear Least Squares Regression Analysis. Journal of the Royal Statistical Society, Series B., 31(2), 350–371

26) Rathnayaka, I. W., & Dunusinghe, D. D. P. M. (2023). The impact of exchange rate volatility on export earnings: Evidence from Sri Lanka. Colombo Journal of Multi-Disciplinary Research, 7(1–2), 62–83. https://doi.org/10.4038/cjmr.v7i1-2.70

27) Sugiharti, L., Esquivias, M. and Setyorani, B. (2020), "The impact of exchange rate volatility on Indonesia's top exports to the five main export markets", Heliyon, Vol. 6 No. 1, 03141, doi: 10.1016/j.heliyon.2019.e03141.

28) Tarasenko, I. (2021), "The impact of exchange rate volatility on trade: the evidence from Russia", Russian Journal of Economics, Vol. 7 No. 3, pp. 213-232, doi: 10.32609/j.ruje.7.57933.

ISSN 1533-9211
DOI: 10.5281/zenodo.14890608

29) Titus, O. M., Wagala, A., & Muriithi, D. K. (2022). Foreign exchange rate volatility and its effect on international trade in Kenya. European Journal of Humanities and Social Sciences, 2(4), 47–56. https://doi.org/10.24018/ejsocial.2022.2.4.182

30) Unah, I. O., Manasseh, C. O., & Nwonye, G. N. (2022). Nexus between foreign direct investment, exchange rate, capital expenditure, and economic growth in Egypt. *Journal of Xi'an Shiyou University, Natural Science Edition, 18*(3), 161–177. Available at http://xisdxjxsu.asia.

31) Urgessa, O. (2024), "Effects of real effective exchange rate volatility on export earnings in Ethiopia: symmetric and asymmetric effect analysis", Heliyon, Vol. 10 No. 1, e23529, doi: 10.1016/j.heliyon.2023.e23529.

32) Yunusa, A. (2020), "Exchange rate volatility and Nigeria crude oil export market", Scientific African, Vol. 9, 00538, doi: 10.1016/j.sciaf.2020.e00538.