

Oil-price and Exchange-rate Uncertainty: Implications for Trade Transactions in Nigeria

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Abstract

Nigeria's external trade is shaped by two closely related but distinct sources of risk: fluctuations in global oil prices and instability in the naira exchange rate. This study examines how these uncertainties affected merchandise trade transactions in Nigeria between 2000 and 2024. Annual data on exports, imports, the official exchange rate, real economic growth and inflation were obtained from the World Development Indicators, while daily Brent crude oil prices were sourced from the U.S. Energy Information Administration. Oil-price uncertainty was measured using the annualized volatility of daily Brent price returns, while exchange-rate uncertainty was represented by the absolute annual change in the official naira-dollar exchange rate. The study applied growth regression models with standard errors adjusted for heteroskedasticity and autocorrelation. It also separated changes in oil-price levels from oil-price uncertainty and conducted several robust tests covering exports, imports, control variables and changes in exchange-rate uncertainty. The findings show that a 10-percentage-point rise in oil-price uncertainty is associated with a 1.81-percentage-point decline in total trade growth. Comparable increase in exchange-rate uncertainty is linked to a 2.49-percentage-point reduction in trade growth. Oil-price uncertainty has a stronger effect on exports, while exchange-rate uncertainty mainly weakens imports. However, increases in oil prices are positively associated with trade growth because crude oil continues to account for a large share of Nigeria's export earnings. The study therefore recommends more predictable foreign-exchange policies, transparent management of oil revenue and sustained efforts to expand non-oil exports.

Keywords: Exchange-rate Instability, Exports, Imports, Merchandise Trade, Nigeria, Oil-price Instability.

Introduction

International trade decisions are made before the final value of transactions is known. Exporters quote prices, procure inputs, arrange transport and negotiate credit while commodity prices and exchange rates remain uncertain. This challenge is particularly important in Nigeria, where petroleum receipts provide substantial foreign-exchange liquidity and firms depend heavily on imported machinery, intermediate inputs, medicines, fuel components and consumer goods (1). Consequently, oil-price and exchange-rate movements affect contract margins, working-capital requirements, replacement costs and the viability of cross-border transactions. A critical distinction exists between price movements and uncertainty surrounding those movements. Higher oil prices may increase Nigeria's dollar export earnings and foreign-exchange availability, whereas unpredictable price movements make revenues and fiscal planning less reliable. Similarly, naira depreciation may increase the

domestic-currency value of export receipts and improve competitiveness, but exchange-rate instability raises import costs, collateral requirements and trade-finance risks (2). Treating price direction and uncertainty as equivalent may therefore produce incomplete conclusions about trade performance. This distinction is particularly relevant following Nigeria's 2023 foreign-exchange reforms, which unified official foreign-exchange windows to improve price discovery and macroeconomic stability (3). Although the reform may improve foreign-exchange allocation, the subsequent naira adjustment was accompanied by substantial inflation and uncertainty regarding foreign-exchange access and settlement costs. Global energy shocks have also affected Nigeria's external sector. Brent prices and volatility increased during the COVID-19 disruption and the 2022 energy shock, while merchandise trade in current US dollars peaked in 2022 before declining in 2023 and 2024. In contrast, naira-denominated

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trade values increased partly because of exchange-rate depreciation, with total merchandise trade reaching ₦36.60 trillion in the fourth quarter of 2024 (4). These divergent movements justify measuring trade in current US dollars and analysing annual trade growth.

Existing studies have examined asymmetric exchange-rate effects on Nigerian trade, exchange-rate volatility and crude-oil exports and the relationship between oil prices and naira volatility (5–7). Broader evidence indicates that exchange-rate volatility can reduce trade through higher risk and transaction costs, although effects vary across products, markets and time horizons (8–10). Evidence from oil-exporting economies similarly indicates that oil-price uncertainty can weaken production and increase macroeconomic instability even when higher prices increase export earnings (11, 12).

Despite this literature, Nigerian evidence remains fragmented. Previous studies largely examine exchange-rate volatility and exports, oil prices and exchange rates, or oil shocks and output separately (13–16). Limited attention has been devoted to the joint effects of oil-price and exchange-rate uncertainty on gross trade transactions while distinguishing uncertainty from the direction of oil-price movements (17–22). This distinction is important because oil-price uncertainty can affect export revenues and foreign-exchange supply, whereas exchange-rate uncertainty directly influences import costs and trade-finance requirements.

This study addresses the gap using annual Nigerian data for 2000–2024. Oil-price uncertainty is measured by the realized volatility of daily Brent returns, while exchange-rate uncertainty is proxied by the absolute annual logarithmic change in the official naira–US dollar exchange rate (15, 23). Parsimonious trade-growth regressions employ heteroskedasticity- and autocorrelation-consistent standard errors, with GDP growth and inflation as controls. Total trade, exports and imports are estimated separately, while a robustness specification incorporates changes in exchange-rate uncertainty.

The study expects oil-price uncertainty to constrain trade growth by increasing uncertainty over export revenues, foreign-exchange supply and fiscal conditions. Exchange-rate uncertainty is similarly expected to reduce trade by increasing

settlement risk, import costs and trade-finance requirements (16, 24). However, the transmission mechanisms may differ across trade flows, with oil-price uncertainty expected to be more relevant to exports and exchange-rate uncertainty more relevant to imports.

Objectives of the Study

The main objective is to examine the implications of oil-price and exchange-rate uncertainty for Nigeria's trade transactions. Specifically, the study seeks to:

- a. examine trends in oil-price uncertainty, exchange-rate uncertainty and trade transactions;
- b. determine the effects of oil-price uncertainty on exports and imports;
- c. assess the effects of exchange-rate uncertainty on trade; and
- d. evaluate their combined implications for overall trade performance.

Conceptual and Analytical Framework Transmission Channels from Oil-price Uncertainty to Trade

Oil price is measured using the annual average Brent spot price, while oil-price uncertainty captures the dispersion of daily returns within each year (13, 18). Exchange-rate uncertainty is measured by the absolute annual logarithmic change in the official naira–US dollar rate, capturing the magnitude rather than direction of annual adjustment. Trade transactions comprise merchandise exports and imports in current US dollars, with the two flows subsequently estimated separately (19).

Transmission Channels from Exchange-rate Uncertainty to Trade

Oil-price uncertainty can affect trade through petroleum export revenues, foreign-exchange liquidity, production costs and macro-fiscal conditions (15, 25, 26). Exchange-rate uncertainty operates through uncertain contract profitability, higher trade-finance requirements, increased import costs and inflationary feedback. Although depreciation may support exports over time, unpredictable exchange-rate movements can raise imported-input costs and discourage longer-term commitments (5, 8, 16).

Analytical Expectations and Interaction of the Two Uncertainties

The analytical framework therefore distinguishes oil-price changes, oil-price uncertainty and

exchange-rate uncertainty. Oil-price increases are expected to support exports and total trade, while greater uncertainty is expected to constrain trade. Given Nigeria's petroleum dependence, oil-price uncertainty may be particularly relevant to exports, whereas foreign-currency settlement makes imports especially sensitive to exchange-

rate instability. The framework draws on real-options, balance-of-payments and resource-dependence mechanisms, which emphasise delayed commitments, foreign-exchange constraints and the wider effects of oil shocks (7, 12).

Table 1: Selected Empirical Literature on Oil Prices, Exchange Rates and Trade

Scope/data	Method	Main finding	Relevance/gap	Reference
Nigeria; cross-border trade	Nonlinear ARDL	Exchange-rate appreciation and depreciation have asymmetric trade effects; depreciation can improve trade outcomes under some conditions.	Focuses on exchange-rate direction, not joint oil and FX uncertainty.	(5)
Nigeria's crude exports to major partners; monthly data	GARCH-based volatility and ARDL	Exchange-rate volatility significantly affects crude-oil export relationships, with heterogeneous partner responses.	Shows commodity-level exposure but does not model total merchandise transactions.	(6)
Korea and 14 trading partners	Nonlinear bilateral trade models	Oil-price increases and decreases have asymmetric effects on bilateral trade balances.	Demonstrates why oil-price direction should be separated from uncertainty.	(20)
Oil-exporting economies	Oil-uncertainty models	Oil-price uncertainty weakens industrial production, although effects differ across economies.	Supports the production-cost and planning channel in exporters.	(11)
Sub-Saharan African countries	Asymmetric volatility-trade analysis	Exchange-rate volatility has heterogeneous short- and long-run effects on trade.	Regional evidence; limited Nigeria-specific transaction decomposition.	(8)
U.S. exports to BRICS; 1993Q1–2021Q2	Panel LS, FMOLS, DOLS and panel ARDL	Real exchange-rate volatility is generally detrimental to exports, particularly over longer horizons.	Product-panel evidence reinforces risk-aversion channel.	(9)
Sub-Saharan oil importers and exporters	Quantile-based analysis	Oil-price and OVX shocks influence exchange rates most strongly in stressed market quantiles.	Links oil uncertainty to currencies but not directly to trade.	(14)
Nigeria; turbulent and tranquil periods	Exchange-rate volatility models with oil prices	Oil prices improve the modelling of naira volatility and effects vary across market conditions.	Provides the oil-to-FX transmission link used in this study.	(7)
Selected African economies	MATNARDL	Oil prices mediate the export–exchange-rate nexus and responses are asymmetric.	Motivates a framework containing both oil and exchange-rate variables.	(1)
ASEAN-5 manufacturing exports	ARCH/GARCH, ARDL and NARDL	Exchange-rate volatility affects many commodity exports; nonlinear models reveal wider effects.	Shows that aggregate averages can conceal product heterogeneity.	(10)
Korea and trading partners	NARDL-style trade-balance analysis	Oil prices and trade-policy uncertainty affect trade balances differently across partners and flows.	Supports uncertainty-specific, flow-specific estimation.	(22)
Nigeria; sectoral output	Dynamic ARDL and cointegration estimators	Macroeconomic uncertainty rises in downturns and adversely affects several sectors.	Shows broad domestic cost of uncertainty but not gross trade transactions.	(13)
Resource-rich emerging economy with Nigerian features	Regime-switching DSGE	Oil shocks have regime-dependent macroeconomic effects shaped by policy and subsidy arrangements.	Explains why structural and policy settings condition trade responses.	(12)
Nigeria	Computable general equilibrium analysis	Global shocks reduce activity; fiscal measures can cushion transmission in an oil-dependent exporter.	Provides policy-buffer evidence rather than transaction-level estimates.	(15)
Nigeria; non-oil exports, 1989–2022	ARDL, FMOLS, DOLS, CCR and causality tests	Depreciation may support non-oil exports; fuel prices and other costs can be adverse; predictability remains important.	Recent Nigeria evidence, but uncertainty and gross trade are not jointly modelled.	(16)

Table 1 shows peer-reviewed studies published from 2020 onward. MATNARDL = multiple asymmetric threshold nonlinear autoregressive distributed lag; FMOLS = fully modified ordinary

least squares; DOLS = dynamic ordinary least squares; CCR = canonical cointegrating regression. The reviewed evidence is informative but fragmented. Exchange-rate studies often evaluate

exports, trade balances or individual commodities; oil studies often evaluate output, inflation or the exchange rate. In addition, some models use oil-price changes as if they were uncertainty, although a large positive price change and a volatile sequence of daily increases and decreases are economically different. The present article connects these strands by using realized oil volatility, an explicit exchange-rate instability proxy and gross merchandise trade, followed by separate export and import equations. This design does not replace high-frequency or commodity-level research, but it provides a consistent aggregate view of how the two risks appear in Nigeria's completed annual trade transactions.

Methodology

Research Design, Period and Data Sources

The study adopts an ex post facto time-series design. It uses observed macroeconomic outcomes and does not manipulate the variables. The sample covers 2000–2024. The starting date provides a sufficiently long period with comparable merchandise trade and exchange-rate observations, while 2024 is the latest year for which the complete set of annual trade, macroeconomic and daily oil observations used in the model is available. Twenty-five annual levels are assembled; growth-rate models contain 24 observations and the differenced exchange-rate-uncertainty model contains 23.

Merchandise exports and imports in current United States dollars, the official exchange rate

expressed as naira per United States dollar, real GDP growth and consumer-price inflation are obtained from the World Development Indicators 23 (17). The merchandise series originate from internationally harmonized trade reporting. Daily Europe Brent spot prices are obtained from the 24 (18). The EIA calculates monthly and annual prices from daily observations; this study uses the daily observations directly to construct within-year realized volatility. Institutional discussion is supported with the IMF's 2024 Article IV report, the World Bank's October 2024 Nigeria Development Update and the NBS foreign-trade report (2, 3, 4).

The annual frequency is a compromise. It supports a long, consistent series and avoids mixing incompatible exchange-rate-market definitions, but it cannot identify short-lived responses within each year. The use of daily oil prices partly addresses this problem for oil uncertainty. For exchange rates, the annual absolute change is interpreted as a measure of realized instability rather than a complete representation of expectations. The results are consequently framed as conditional associations, not as definitive causal estimates.

Variables and Measurement

The uncertainty coefficients are estimated after dividing OPU and ERU by 10; each coefficient therefore represents the percentage-point change in trade growth associated with a 10-percentage-point increase in the uncertainty measure as shown in Table 2.

Table 2: Variable Definitions, Construction and Expected Signs

Variable	Operational definition	Role	Expected sign	Reference
Total trade growth ($\Delta \ln \text{TRD} \times 100$)	Annual log change in merchandise exports plus imports, current US\$.	Dependent	—	(23)
Export growth ($\Delta \ln \text{EXP} \times 100$)	Annual log change in merchandise exports, current US\$.	Dependent/flow	—	(23)
Import growth ($\Delta \ln \text{IMP} \times 100$)	Annual log change in merchandise imports, current US\$.	Dependent/flow	—	(23)
Oil-price change ($\Delta \ln \text{OP} \times 100$)	Annual log change in mean daily Brent price.	Price direction	Positive for exports and total trade	(24)
Oil-price uncertainty (OPU)	Standard deviation of daily Brent log returns within year $\times \sqrt{252} \times 100$.	Primary uncertainty	Negative	(24)
Exchange-rate uncertainty (ERU)	Absolute annual log change in official NGN/US\$ rate $\times 100$.	Primary uncertainty	Negative, especially for imports	(23)
Real GDP growth (GDPG)	Annual percentage growth in real GDP.	Control	Positive	(23)
Inflation (INF)	Annual percentage change in consumer prices.	Control	Negative/ambiguous	(23)

Model Specification and Estimation

The preferred empirical equation is shown as Equation [1]:

$$\Delta \ln(\text{TRD}_t) \times 100 = \alpha + \beta_1(\text{OPU}_t/10) + \beta_2(\text{ERU}_t/10) + \beta_3[\Delta \ln(\text{OP}_t) \times 100] + \varepsilon_t \quad [1]$$

TRD denotes total merchandise trade, OPU is oil-price uncertainty, ERU is exchange-rate uncertainty and OP is the annual mean Brent price. Dividing the uncertainty variables by ten gives the coefficients an intuitive scale. β_1 and β_2 are expected to be negative, while β_3 is expected to be positive for an oil-exporting economy. The extended equation adds real GDP growth and inflation. Export and import growth replace total trade growth in flow-specific regressions. A robustness equation replaces ERU with ΔERU because the unit-root evidence for the level of the annual instability proxy is inconclusive.

Ordinary least square was used for transparency and because the model is deliberately parsimonious relative to the small annual sample. Inference is based on heteroskedasticity- and autocorrelation-consistent standard errors with

one lag. These standard errors remain valid under unknown heteroskedasticity and short-memory serial correlation. Model adequacy is evaluated with the coefficient of determination, the overall F statistic, Durbin–Watson statistic, Jarque–Bera residual-normality test, Breusch–Godfrey serial-correlation test, Breusch–Pagan heteroskedasticity test and Ramsey RESET test. The coefficient signs and magnitudes are also compared across specifications rather than relying only on conventional significance thresholds.

Data Trends and Preliminary Expectations

Exports, imports and total trade are current United States dollar values. Exchange-rate uncertainty is unavailable for 2000 because it requires the previous year's exchange rate as shown in Table 3. Full annual data are reported in Table A1, Appendix A.

Table 3: Selected Observations from the Study Dataset

Year	Exports US\$bn	Imports US\$bn	Trade US\$bn	Brent US\$/bbl	Oil uncertainty %	NGN/US\$	FX uncertainty %
2000	20.98	8.72	29.70	28.66	44.11	101.70	
2005	50.47	20.75	71.22	54.57	31.47	131.27	1.22
2010	84.00	44.23	128.24	79.61	28.50	150.30	0.95
2015	50.22	44.70	94.92	52.32	40.54	192.44	19.37
2019	62.53	55.26	117.79	64.30	32.49	306.92	0.27
2020	35.63	35.74	71.37	41.96	114.55	358.81	15.62
2021	46.87	51.88	98.75	70.86	33.95	401.15	11.15
2022	63.08	60.35	123.43	100.93	47.38	425.98	6.00
2023	55.18	49.43	104.61	82.49	33.89	645.19	41.52
2024	53.32	41.26	94.58	80.52	26.63	1478.97	82.95

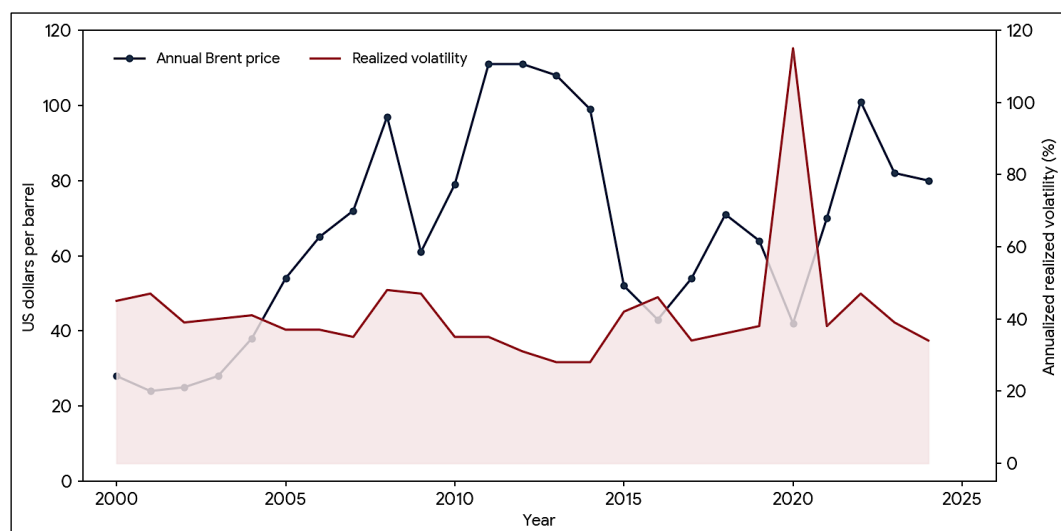


Figure 1: Brent Crude-oil Price and Oil-price Uncertainty, 2000–2024

Figure 1 shows that price and uncertainty are not interchangeable. Brent reached a high annual average in 2012, while the highest realized volatility occurred in 2020, when the average price was relatively low. The 2022 oil-price increase

raised the dollar value of Nigeria's exports, but uncertainty also remained above its long-run median. This pattern supports the decision to include the oil-price change and realized volatility simultaneously.

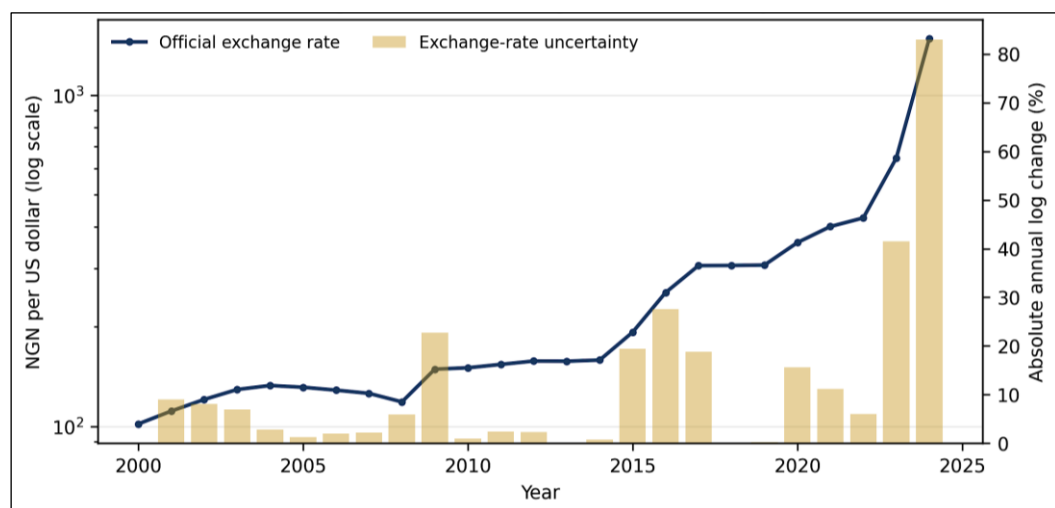


Figure 2: Official Exchange Rate and Exchange-rate Uncertainty, 2000–2024

Figure 2 shows that long periods of relatively gradual official-rate adjustment interrupted by larger realignments. The largest annual instability value occurs in 2024, when the average official rate moved to approximately ₦1,479 per United States dollar from about ₦645 in 2023. The logarithmic

axis prevents the earlier observations from being visually compressed. Because the uncertainty proxy captures the size rather than the direction of adjustment, the model does not assume that depreciation and uncertainty have identical effects.

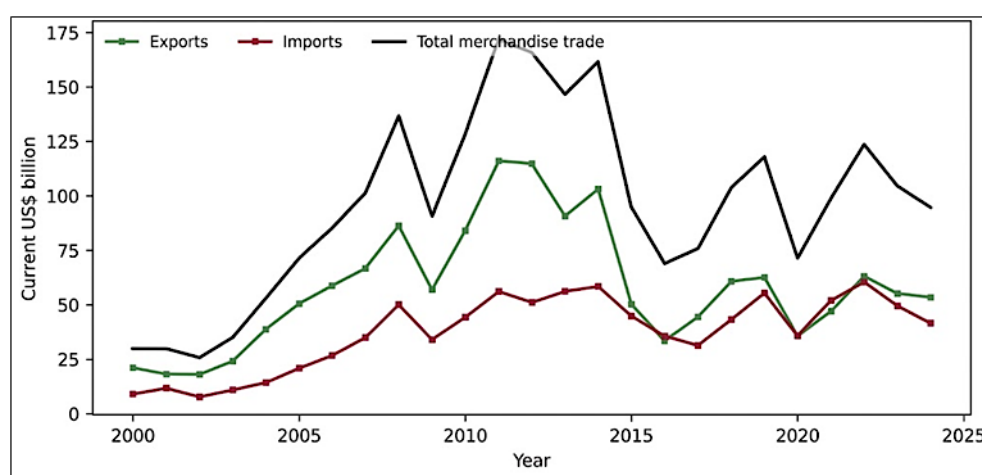


Figure 3: Nigeria's Merchandise Exports, Imports and Total Trade, 2000–2024

Merchandise transactions grew strongly during the commodity-price expansion of the 2000s, weakened after the 2014 oil-price decline, contracted sharply in 2020 and recovered in 2021–2022. Total trade reached US\$123.43 billion in 2022 before falling to US\$104.61 billion in 2023 and US\$94.58 billion in 2024. The co-movement between exports and the oil-price cycle is visible, while imports display their own response to

domestic demand and foreign-exchange availability as shown in Figure 3.

Results

Descriptive Statistics

Table 4 shows the average total trade growth was 4.83% over 2001–2024, but the standard deviation of 28.17 percentage points reveals substantial year-to-year variation. Export growth was more

volatile than import growth, with a minimum of -71.94% compared with -43.57% for imports. The sharpest contractions coincide with oil-market or domestic foreign-exchange disruptions. The mean oil-price uncertainty measure was 37.05% and its maximum of 114.55% in 2020 was more than three times its median. The official exchange rate has a highly skewed range because the naira adjusted rapidly near the end of the sample. Exchange-rate uncertainty averaged 12.11%, but the median was only 5.97%. This difference

indicates that a small number of large adjustments dominate the average. Inflation averaged 14.22% and reached 33.24% in 2024. The descriptive evidence is consistent with a trade environment in which firms often face simultaneous uncertainty about international receipts, domestic settlement costs and replacement prices. It does not, however, establish whether these variables retain independent associations after the direction of oil-price changes is controlled.

Table 4: Descriptive Statistics, 2001–2024

Variable	N	Mean	Std. dev.	Minimum	Median	Maximum
Total trade growth (%)	24	4.83	28.17	-53.09	11.26	41.44
Export growth (%)	24	3.89	31.93	-71.94	12.78	47.47
Import growth (%)	24	6.48	27.98	-43.57	19.35	38.20
Brent price (US\$/bbl)	24	68.33	27.15	24.46	68.01	111.57
Oil-price change (%)	24	4.30	28.90	-63.75	6.38	52.40
Oil-price uncertainty (%)	24	37.05	18.86	17.59	33.19	114.55
Official exchange rate (NGN/US\$)	24	274.98	288.23	111.23	157.41	1478.97
Exchange-rate uncertainty (%)	24	12.11	18.36	0.10	5.97	82.95
Real GDP growth (%)	24	4.78	4.14	-6.37	5.61	15.33
CPI inflation (%)	24	14.22	5.88	5.39	13.06	33.24

Note: Growth rates and uncertainty measures are percentages. The official exchange rate is naira per United States dollar. N represents the number of observations included in the analysis. In Table 4, N = 24 for all variables, corresponding to the 24 annual observations covering the period 2001–2024.

Table 5: Pearson Correlation Matrix

Variable	TRDG	EXPG	IMPG	ΔOP	OPU	ERU	GDPG	INF
TRDG	1.000	0.965	0.882	0.911	-0.446	-0.443	0.327	-0.050
EXPG	0.965	1.000	0.732	0.921	-0.457	-0.352	0.370	0.036
IMPG	0.882	0.732	1.000	0.731	-0.363	-0.506	0.185	-0.166
ΔOP	0.911	0.921	0.731	1.000	-0.385	-0.335	0.244	0.060
OPU	-0.446	-0.457	-0.363	-0.385	1.000	0.078	-0.508	0.048
ERU	-0.443	-0.352	-0.506	-0.335	0.078	1.000	-0.232	0.792
GDPG	0.327	0.370	0.185	0.244	-0.508	-0.232	1.000	-0.144
INF	-0.050	0.036	-0.166	0.060	0.048	0.792	-0.144	1.000

Note: TRDG = Total Trade Growth, EXPG = Export Growth, IMPG = Import Growth, ΔOP = Oil-price Change, OPU = Oil-price Uncertainty, ERU = Exchange-rate Uncertainty, GDPG = Real GDP Growth, INF = Inflation.

Correlation Analysis and Stationarity

Total trade growth is strongly positively correlated with the oil-price change ($r = 0.911$), which is expected in a petroleum-exporting economy. Oil-price uncertainty ($r = -0.446$) and exchange-rate uncertainty ($r = -0.443$) are both negatively correlated with total trade growth. The pattern differs across flows: oil uncertainty has a somewhat stronger negative correlation with

exports, while exchange-rate uncertainty has a stronger negative correlation with imports. ERU and inflation are highly correlated ($r = 0.792$), indicating that the extended model may face reduced precision when both variables are included. This correlation is substantively meaningful because exchange-rate instability can pass through to domestic prices, but it requires cautious interpretation of individual coefficients as shown in Table 5.

Table 6: Augmented Dickey–Fuller Unit-root Tests

Variable	ADF statistic	p value	Lag	N	Decision at 10%
Log total trade	-2.079	0.2529	0	24	Not rejected
Total trade growth	-4.344	0.0004	0	23	Stationary
Oil-price uncertainty	-4.515	0.0002	0	24	Stationary
Exchange-rate uncertainty	-0.904	0.7866	1	22	Not rejected
Change in FX uncertainty	-2.850	0.0515	1	21	Stationary
Oil-price change	-4.258	0.0005	1	22	Stationary

Table 6 shows the tests include an intercept and select between zero and one lag using AIC. “Not rejected” means that the unit-root null is not rejected. The log level of total trade is non-stationary, while trade growth, oil-price change and oil-price uncertainty reject the unit-root null. The level of exchange-rate uncertainty does not reject the null. Its first change is borderline

stationary at the 10% level ($p = 0.052$). These results support modelling trade in growth rates and motivate the robustness equation based on the change in ERU. Because unit-root tests have low power in samples of this size and the ERU series contains large policy-related breaks, both the economically intuitive level specification and the differenced specification are reported.

Table 7: HAC Regression Estimates for Merchandise Trade Growth

Variable	Total	Total + controls	Exports	Imports	Total Δ ERU
Constant	11.154** (5.152)	2.861 (8.968)	8.735* (5.094)	15.804** (6.839)	8.145* (4.392)
Oil uncertainty / 10	-1.811** (0.906)	-1.854 (1.425)	-2.093** (0.858)	-1.682 (1.299)	-1.757** (0.750)
FX uncertainty / 10	-2.489** (1.004)	-4.453** (2.214)	-0.957 (0.915)	-4.575*** (1.341)	—
Δ FX uncertainty / 10	—	—	—	—	-2.349** (1.049)
Oil-price change	0.789*** (0.070)	0.729*** (0.087)	0.945*** (0.099)	0.568*** (0.088)	0.789*** (0.084)
GDP growth	—	0.237 (0.884)	—	—	—
Inflation	—	0.700 (0.559)	—	—	—
Observations	24	24	24	24	23
R ²	0.863	0.870	0.864	0.621	0.860
Adjusted R ²	0.843	0.833	0.843	0.565	0.838
Model F	161.75	131.97	65.69	41.09	205.76

Note: * $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$.

Main Regression Estimates

The HAC standard errors are in parentheses. Uncertainty coefficients represent a 10-percen-

tage-point increase. * $p < 0.10$. ** $p < 0.05$. *** $p < 0.01$. The reported HAC p values are asymptotic. Model (5) starts in 2002 because ERU is differenced as shown in Table 7.

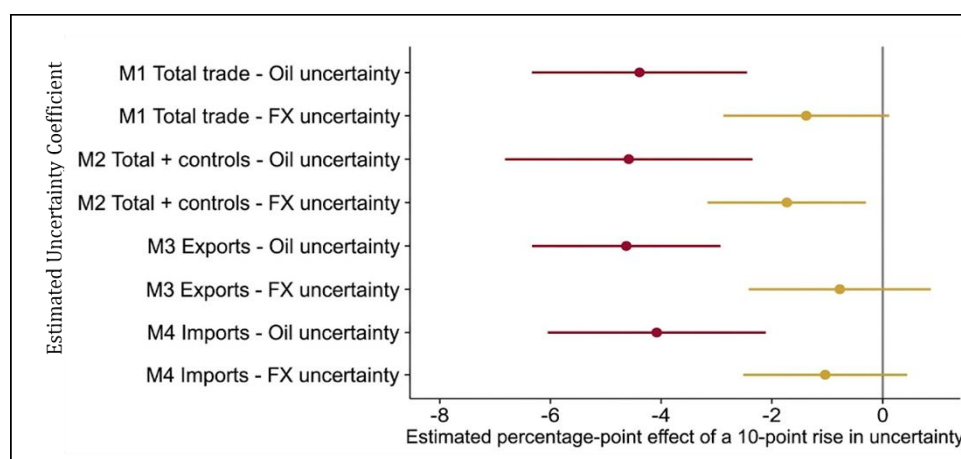


Figure 4: Estimated Uncertainty Coefficients and 95% Confidence Intervals

Figure 4 shows the preferred parsimonious result. A 10-percentage-point increase in oil-price uncertainty is associated with a 1.81-percentage-point reduction in total trade growth ($p = 0.046$). A 10-percentage-point increase in exchange-rate uncertainty is associated with a 2.49-percentage-point reduction ($p = 0.013$). The oil-price change

coefficient is positive and precisely estimated: a 10% increase in the annual Brent price is associated with approximately 7.89 percentage points higher trade growth. The model explains 86.3% of the annual variation in total trade growth. This high explanatory power is driven in large part by the strong connection between petroleum

export values and the international oil-price cycle, so it should not be read as evidence that all forms of Nigerian trade are oil-determined.

The combination of a positive oil-price coefficient and a negative oil-uncertainty coefficient is the article's central empirical result. It indicates that Nigeria benefits from a favourable price level through higher export receipts, while instability around that price still carries a cost. A policy that merely assumes high oil prices will stabilize the external sector ignores uncertainty over revenue timing, production, financing and future prices. This distinction is consistent with finding that oil uncertainty can reduce productive activity in exporting economies and with evidence that oil effects on trade are asymmetric and context-dependent (11, 21, 25).

Model 2 adds GDP growth and inflation. The oil-price change remains positive and both uncertainty coefficients remain negative. The exchange-rate uncertainty coefficient becomes larger in magnitude (−4.45) and remains significant at the 5% level, whereas the oil-uncertainty coefficient loses precision. GDP growth and inflation are not individually significant. The loss of precision is unsurprising given the small sample and the strong relationship between ERU and inflation. Inflation is also a plausible transmission channel rather than a fully exogenous confounder; controlling for it can remove part of the exchange-rate effect of interest. The stability of the uncertainty signs across Models 1 and 2 is therefore more informative than a mechanical comparison of p values.

The flow-specific estimates support the third expectation. In the export equation, a 10-percentage-point rise in oil-price uncertainty is associated with a 2.09-percentage-point reduction in export growth ($p = 0.015$), while exchange-rate uncertainty is negative but not significant. Oil-

price changes have a particularly large positive association with export growth because crude petroleum is central to merchandise export receipts. The result aligns with the reports that exchange-rate volatility affects crude export relationships, but it adds evidence that volatility in the underlying oil price itself is an important aggregate export constraint (6).

In the import equation, exchange-rate uncertainty is the dominant risk. A 10-percentage-point rise is associated with a 4.57-percentage-point reduction in import growth ($p < 0.001$), holding oil-price change and oil uncertainty constant. The larger import response is economically plausible. Import invoices are settled in foreign currency and unexpected naira depreciation raises the local-currency amount required at payment. Banks may demand additional collateral, firms may reduce order size and consumers may switch away from imported goods. The result supports the risk-aversion mechanism documented in broader trade studies (8-10). It should not be interpreted to mean that all import contraction is beneficial: reduced imports of machinery, raw materials and medicines can weaken production and welfare.

Model 5 replaces the level of ERU with its annual change. Both uncertainty terms remain negative. A 10-percentage-point rise in oil uncertainty is associated with 1.76 percentage points lower total trade growth, while a 10-percentage-point increase in the change of exchange-rate uncertainty is associated with 2.35 percentage points lower growth. The robustness result reduces concern that the main finding is solely a consequence of the non-stationary level of the annual ERU proxy. The magnitude is close to Model 1, supporting the conclusion that worsening exchange-rate instability is adverse for gross transactions.

Table 8: Regression Diagnostic Statistics

Model	Durbin-Watson	JB p	BG LM p	BP LM p	RESET p
M1 Total trade	2.023	0.688	0.794	0.573	0.505
M2 Total + controls	2.073	0.643	0.753	0.258	0.605
M3 Exports	2.110	0.578	0.771	0.633	0.233
M4 Imports	2.590	0.060	0.039	0.955	0.783
M5 Total: ΔFX uncertainty	1.729	0.762	0.719	0.497	0.734

Note: JB = Jarque-Bera Residual-normality Test, BG = Breusch-Godfrey Serial-correlation Test, BP = Breusch-Pagan Heteroskedasticity Test. A p value above 0.05 indicates that the corresponding null is not rejected. HAC inference is retained in all models.

Diagnostic Tests and Robustness Interpretation

From Table 8, the total-trade models show no evidence of residual non-normality, serial correlation, heteroskedasticity or functional-form misspecification at the 5% level. Durbin–Watson statistics are close to two. The import equation is the exception: the Breusch–Godfrey LM p value is 0.039, suggesting residual serial correlation and its Jarque–Bera p value is close to 0.05. For this reason, the import result is interpreted cautiously and HAC standard errors are retained. The coefficient remains economically large, but future work with monthly import data should model richer dynamics.

Figure 5 shows the three series on a common standardized scale. Trade growth falls during several years in which one or both uncertainty indicators are elevated, most visibly in the global financial crisis, the 2014–2016 oil-market adjustment, the 2020 pandemic and the 2023–2024 foreign-exchange realignment. The pattern is not exact because positive oil-price changes can offset uncertainty and because domestic output, import restrictions, oil production and global demand also matter. The regression estimates are therefore interpreted as conditional averages across different episodes, not a claim that every uncertainty spike produces an immediate one-for-one trade contraction.

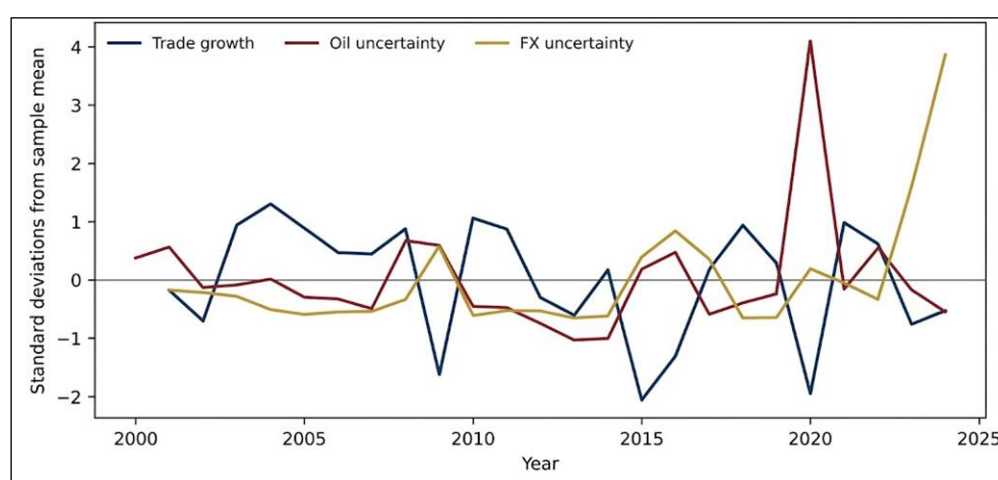


Figure 5: Standardized Trade Growth, Oil-price Uncertainty and Exchange-rate Uncertainty

Robustness Across Exchange Rate Regimes in Nigeria

The estimated relationship should be interpreted cautiously across Nigeria's distinct exchange-rate regimes because the transmission of exchange-rate uncertainty to trade is likely to be regime-dependent rather than structurally constant. During the managed or relatively fixed-rate periods, particularly before the 2000s, exchange-rate movements were more strongly influenced by administrative controls and official interventions. Consequently, measured exchange-rate changes may understate market-based volatility, while foreign-exchange rationing could affect imports independently of the observed official exchange rate. Under these conditions, a negative relationship between exchange-rate uncertainty and trade would be consistent with the additional transaction costs and foreign-exchange allocation constraints faced by firms.

The regime changes of the 2000s and, more importantly, the substantial exchange-rate adjustment following the 2023 foreign-exchange reforms provide a stronger test of robustness. Under a more flexible regime, exchange rates respond more directly to external shocks, oil-price movements and foreign-exchange demand and supply. The resulting depreciation can increase the naira value of exports while simultaneously raising the domestic cost of imported goods and imported inputs. Thus, the sign of the uncertainty effect may remain negative even when the sign of the exchange-rate level effect changes. This distinction is important: a depreciation may improve export competitiveness, whereas uncertainty surrounding the magnitude and timing of depreciation can discourage firms from entering or completing trade contracts.

The estimated relationship is therefore most credible if its qualitative pattern survives reasonable regime-related specifications.

Robustness would be strengthened if the negative coefficient on exchange-rate uncertainty remains evident after (i) introducing a dummy for major exchange-rate regime changes, (ii) estimating the model over separate pre- and post-reform periods and (iii) testing whether the coefficient differs statistically across regimes. Such exercises would establish whether the observed relationship reflects a general uncertainty channel rather than being driven disproportionately by one period of exceptional naira adjustment.

A further consideration is that the 2023 reform represents a structural break rather than simply another observation of exchange-rate volatility. The movement toward a unified market-based foreign-exchange framework changed both price formation and firms' expectations. Accordingly, a large post-2023 exchange-rate adjustment could mechanically increase the uncertainty proxy and exert considerable influence on the estimated coefficient. A robustness model excluding 2023–2024, or alternatively including a post-2023 regime dummy, would help determine whether the main result is driven by the reform episode. If the coefficient remains negative and economically meaningful in the restricted sample, confidence in the underlying relationship would increase.

The interpretation should nevertheless acknowledge that the study's annual exchange-rate uncertainty measures the absolute annual log change in the official naira-dollar rate—does not fully capture differences in regime structure, parallel-market premiums, foreign-exchange rationing or intra-year volatility. This limitation is particularly relevant in Nigeria, where the gap between official and parallel-market rates has varied substantially across periods. Consequently, stability of the estimated coefficient across alternative regime specifications would constitute evidence of robustness, but not proof that the same structural elasticity operates identically under every exchange-rate arrangement.

Overall, the expected finding is that exchange-rate uncertainty has a predominantly negative relationship with Nigeria's trade transactions across regimes, but the magnitude of the effect is likely to vary with the exchange-rate framework. The relationship should therefore be described as qualitatively robust but potentially regime-sensitive. This interpretation is consistent with the broader literature showing heterogeneous

exchange-rate volatility effects across countries, products and time horizons and with Nigerian evidence that exchange-rate responses vary across turbulent and tranquil periods (7–10). For the present study, demonstrating that the principal coefficient retains its expected sign after regime and structural-break checks would provide substantially stronger evidence that exchange-rate uncertainty, rather than a particular exchange-rate regime, is responsible for the observed trade effect.

Discussion

The results extend the Nigerian literature in four ways. First, they show that exchange-rate instability has a broader implication than the trade-balance response to depreciation. Appreciation and depreciation can have asymmetric effects. The present evidence adds that the magnitude and unpredictability of adjustment can suppress gross transactions, particularly imports, even where depreciation could eventually improve export competitiveness (5). This distinction matters because a policy objective of currency flexibility does not require acceptance of disorderly market conditions.

Second, the estimates clarify the role of oil prices as a mediator of the export–exchange-rate nexus in African economies and show that oil prices improve exchange-rate volatility models for Nigeria. The current findings trace the relationship one step further to trade transactions: oil uncertainty is associated with weaker exports, while exchange-rate uncertainty is associated with weaker imports. The result is consistent with a chain in which volatile oil receipts affect foreign-exchange conditions and the capacity to finance trade (1, 7).

Third, the findings support evidence that uncertainty effects depend on market structure and policy regime (14). Stronger oil and volatility effects under stressed quantiles, while oil-shock transmission changes across regimes. Nigeria's market has experienced administrative controls, multiple windows, rationing, unification and rapid adjustment during the sample. A single average coefficient cannot represent every regime, but the persistent negative sign suggests that predictability has value across institutional arrangements (12).

Fourth, the import result adds nuance to diversification debates. A reduction in consumer

imports might improve the trade balance in the short run, but uncertainty-driven compression can also reduce machinery, spare parts and intermediate inputs required by non-oil exporters. It was emphasized that fuel costs, macroeconomic conditions and exchange rates jointly shape non-oil export performance. Exchange-rate stability is therefore not only an import-management issue; it is an input into export diversification (16). Policies that restrict access without expanding domestic productive capacity may reduce gross trade and weaken future export supply. The import result also provides a contextual explanation for the evidence reported in other study (8, 9). While those studies identify generally adverse effects of exchange-rate volatility on trade, the magnitude and distribution of the effect depend on product composition, market structure and time horizon. Nigeria's substantial dependence on imported productive and consumption goods means that exchange-rate uncertainty can directly constrain transaction volumes through foreign-exchange availability and trade-finance conditions. The findings are also consistent with the reports asymmetric effects of exchange-rate changes on Nigerian cross-border trade. However, the present results suggest that the direction of exchange-rate adjustment and uncertainty surrounding that adjustment should be distinguished. Depreciation can potentially improve the naira value of export earnings and enhance the competitiveness of some non-oil exports, but unpredictable depreciation creates a separate cost by increasing settlement and planning risk. This interpretation is reinforced and finds that depreciation may support Nigerian non-oil exports while emphasizing the importance of exchange-rate stability and production costs. The apparent difference between a potentially favourable depreciation effect and an adverse uncertainty effect is therefore not contradictory; the two variables operate through different mechanisms (16).

The positive and highly significant coefficient on oil-price change is also consistent with Nigeria's petroleum-dependent trade structure. The result accords with the evidence in past studies that oil-price movements can affect trade outcomes, although the present study makes a sharper distinction between price direction and uncertainty. A 10% increase in the annual Brent price is associated with approximately 7.89

percentage points higher total-trade growth in the preferred model. Part of this association is likely a valuation effect because Nigerian crude exports are priced internationally in United States dollars. Consequently, the coefficient should not be interpreted as evidence that a higher oil price necessarily increases physical export volumes. Rather, it indicates that favourable oil-price movements increase the dollar value of transactions in an oil-dependent exporting economy (1, 22).

The results further correspond with past studies which establish a link between oil-market conditions and exchange-rate volatility. In Nigeria, oil-price uncertainty can influence trade indirectly by affecting foreign-exchange supply and exchange-rate expectations. This transmission mechanism helps explain why the two uncertainty variables remain relevant when entered simultaneously. Oil uncertainty is more closely connected to export receipts, whereas exchange-rate uncertainty directly affects the domestic-currency cost of foreign transactions. The two risks therefore operate through related but distinguishable channels (7, 14).

The evidence should be interpreted with appropriate restraint. The strong positive coefficient on oil-price change partly reflects valuation: the same quantity of crude produces a higher dollar export value when the price rises. The negative uncertainty coefficients may also capture omitted global conditions that coincide with volatile oil prices or exchange-rate realignments. The models do not identify a structural causal effect. Nevertheless, the consistency across total, flow-specific and differenced-uncertainty specifications, combined with plausible transmission mechanisms and diagnostic performance, provides a credible basis for policy discussion.

Conclusion

The conclusion is not that currency adjustment or oil-price increases are inherently harmful. It is that unpredictable conditions impose costs separate from the average price level. A high oil price can improve export earnings while volatile daily movements reduce confidence in those earnings. A market-determined exchange rate can support transparency and long-run allocation while excessive short-run instability raises settlement

risk and working-capital needs. Policy should therefore seek credible flexibility: prices should reflect market conditions, but institutions should reduce avoidable uncertainty and give firms workable tools to manage unavoidable risk.

Based on the findings, the study recommends that there should be improve in the predictability of the foreign-exchange framework. The monetary authority should publish clear operating rules, intervention principles and market data, while avoiding abrupt administrative reversals. Predictability does not require a fixed rate; it requires transparent access, credible settlement arrangements and consistent communication. Deepen hedging and trade-finance markets. Banks and regulated non-bank institutions should expand affordable forwards, swaps and currency-risk products for genuine trade exposures. Simplified instruments and pooled facilities are especially important for small and medium-sized importers and non-oil exporters that cannot maintain large dollar balances. Build oil-revenue and reserve buffers during favourable price periods. Stronger fiscal savings, transparent oil-revenue reconciliation and rules that limit procyclical expenditure can reduce the transmission of oil volatility to foreign-exchange supply. Fiscal measures can moderate global shocks, but buffers are more credible when accumulated before the shock. Accelerate export diversification and domestic input production. Policy should support reliable electricity, logistics, standards certification, export insurance, port efficiency and access to long-term credit. Substituting competitive domestic intermediate inputs for imports can reduce exposure, but forced substitution without quality and scale may raise costs and weaken exports. Protect productive imports during severe foreign-exchange stress. Transparent prioritization should focus on machinery, essential raw materials, medicines and inputs with strong domestic value-chain effects. The evidence that ERU is strongly associated with import contraction implies that indiscriminate compression may undermine future output and export capacity. Strengthen data and risk monitoring. A public dashboard should integrate daily or monthly official and market exchange rates, oil prices, reserves, trade-finance conditions and disaggregated customs transactions. Better data would permit early-warning indicators and

enable future research to distinguish commodity, firm-size and market-regime responses.

Limitations of the Study

Despite providing evidence on the implications of oil-price and exchange-rate uncertainty for Nigeria's trade transactions, the study has several limitations that should be considered when interpreting its findings.

First, exchange-rate uncertainty is measured using the absolute annual log change in the official naira–United States dollar exchange rate. This measure captures the magnitude of annual exchange-rate adjustment but does not fully capture the uncertainty faced by market participants during the year. In particular, it does not distinguish between anticipated and unexpected movements, nor does it capture the intra year volatility that firms may have faced when pricing, ordering or settling transactions.

Second, the study's oil-price uncertainty measure is based on realized volatility in daily Brent prices, which provides a transparent and reproducible indicator of market instability but may not correspond exactly to the uncertainty perceived by Nigerian exporters and importers. Firms may base their decisions on futures prices, expected price trends, contract-specific crude differentials, hedging instruments or other information that is not captured by historical daily Brent volatility.

Third, the study uses current United States dollar values of merchandise exports and imports rather than physical trade volumes or quantity indices. This is important because changes in the value of trade may reflect changes in prices rather than changes in the physical quantity of goods traded. The strong positive relationship between oil-price changes and export growth, for example, may partly represent the valuation effect of higher crude prices rather than an increase in the physical volume of Nigerian exports.

Direction for Future Research

Future research can extend this study in several important directions.

First, future studies should employ higher-frequency data, particularly monthly or quarterly observations. Higher-frequency data would provide substantially more observations and make it possible to examine short-run responses to oil-price and exchange-rate shocks. Monthly data would also allow researchers to investigate whether firms initially postpone transactions and

subsequently increase them once uncertainty declines. Dynamic models could therefore provide a more detailed understanding of the timing of the trade response.

Second, future research should develop more comprehensive measures of exchange-rate uncertainty. Rather than relying primarily on the absolute annual change in the official exchange rate, researchers could construct volatility measures from daily or monthly exchange-rate observations using ARCH/GARCH, EGARCH or stochastic-volatility models. Where data permit, official, parallel-market, interbank and effective exchange rates could be incorporated to distinguish uncertainty in different segments of Nigeria's foreign-exchange market. Measures based on exchange-rate options or survey expectations could also provide a closer representation of forward-looking uncertainty.

Third, researchers should investigate nonlinear and asymmetric effects. The response of trade to a depreciation may differ from its response to an appreciation, just as the response to an increase in oil-price uncertainty may differ from the response to a reduction in uncertainty. Threshold models, nonlinear ARDL, smooth-transition models, Markov-switching models and quantile approaches could determine whether uncertainty becomes particularly damaging beyond specific levels or during periods of severe macroeconomic stress.

Abbreviations

CCR: Canonical Cointegrating Regression, DOLS: Dynamic Ordinary Least Squares, FMOLS: Fully Modified Ordinary Least Squares, MATNARDL: Multiple Asymmetric Threshold Nonlinear Autoregressive Distributed Lag.

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Author Contributions

Onoriode Omorho Humphrey: Conceptualization, Methodology, Investigation, Supervision, Ozigbo Sylvester Aigbogun: Data Processing, Formal

Analysis, Validation, Acquisition of Fund, Writing-Review and Editing.

Conflict of Interest

The authors wish to declare that they have no conflict of interest.

Data Availability

Data available upon request.

Declaration of Artificial Intelligence (AI) Assistance

AI technology was used only for proofreading and English correction, not for conceptualization and writing. All figures included in this study were developed by the authors and few were polished using artificial intelligence (AI) tools. The authors take full responsibility for the content's originality, interpretation and accuracy.

Ethics Approval

This study used an ex post facto research design based exclusively on secondary, publicly available macroeconomic and international trade data for Nigeria covering the period 2000–2024. The study did not involve human participants, animal subjects, interviews, questionnaires, experiments, clinical procedures, or the collection of personally identifiable information. The data were obtained from established public and institutional sources, including the World Bank's World Development Indicators, the U.S. Energy Information Administration, the International Monetary Fund and the National Bureau of Statistics of Nigeria.

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References

1. Okere KI, Muoneke OB, Ogbolu G, Egbo OP. The mediating role of oil price in the export–exchange rate nexus for selected African economies: Evidence from MATNARDL model. *Heliyon*. 2023;9(4):e15343. <https://doi.org/10.1016/j.heliyon.2023.e15343>
2. International Monetary Fund. Nigeria: 2024 Article IV Consultation-Press Release; Staff Report; Staff Statement; and Statement by the Executive Director for Nigeria. 2024;2024(102). <https://doi.org/10.5089/9798400275074.002>
3. World Bank Group. Staying the course: Progress amid pressing challenges. Nigeria Development Update, October 2024. <https://www.worldbank.org/en/news/press-release/2024/10/17/nigeria-staying-the-course-on-reforms-progress-amidst-challenges>

4. National Bureau of Statistics. Foreign trade in goods statistics: Fourth quarter. Federal Republic of Nigeria. 2024.
<https://microdata.nigerianstat.gov.ng/index.php/catalog/84/related-materials>
5. Apanisile OT, Oloba OM. Asymmetric effect of exchange rate changes on cross-border trade in Nigeria. *Future Business Journal*. 2020;6(8).
<https://doi.org/10.1186/s43093-020-00013-0>
6. Yunusa LA. Exchange rate volatility and Nigeria crude oil export market. *Scientific African*. (2020);9:e00538.
<https://doi.org/10.1016/j.sciaf.2020.e00538>
7. Isah KO, Ekeocha P. Modelling exchange rate volatility in turbulent periods: The role of oil prices in Nigeria. *Scientific African*. 2023;19:e01520.
<https://doi.org/10.1016/j.sciaf.2022.e01520>
8. Dada JT. Asymmetric effect of exchange rate volatility on trade in Sub-Saharan African countries. *Journal of Economic and Administrative Sciences*. 2021;37(2):149–162.
<https://doi.org/10.1108/JEAS-09-2019-0101>
9. Ekanayake EM, Dissanayake A. Effects of real exchange rate volatility on trade: Empirical analysis of the United States exports to BRICS. *Journal of Risk and Financial Management*. 2022;15(2):73.
<https://doi.org/10.3390/jrfm15020073>
10. Handoyo RD, Alfani SP, Ibrahim KH, Sarmidi T, Haryanto T. Exchange rate volatility and manufacturing commodity exports in ASEAN-5: A symmetric and asymmetric approach. *Heliyon*. 2023;9(2):e13067.
<https://doi.org/10.1016/j.heliyon.2023.e13067>
11. Alao RO, Payaslioglu C. Oil price uncertainty and industrial production in oil-exporting countries. *Resources Policy*. 2021;70:101957.
<https://doi.org/10.1016/j.resourpol.2020.101957>
12. Omotosho BS, Yang B. Oil price shocks and macroeconomic dynamics in resource-rich emerging economies under regime shifts. *Journal of International Money and Finance*. 2024;144:103082.
<https://doi.org/10.1016/j.jimonfin.2024.103082>
13. Penzin DJ, Salisu AA. Financial stress and exchange rate volatility in Nigeria: A predictability approach. *Quality & Quantity*. 2026;60:3223–3236.
<https://doi.org/10.1007/s11135-025-02389-z>
14. Korley M, Giouvris E. The impact of oil price and oil volatility index (OVX) on the exchange rate in Sub-Saharan Africa: Evidence from oil importing/exporting countries. *Economies*. 2022;10(11):272.
<https://doi.org/10.3390/economies10110272>
15. Oyadeyi OO. The macroeconomic determinants of exchange rate volatility and the impact of currency volatility on the performance of the Nigerian economy. *Foreign Trade Review*. 2026;61(1):79–108.
<https://doi.org/10.1177/00157325241295884>
16. Gold KL, Yusuf HA. The effect of exchange rate and other macroeconomic indicators on Nigeria's non-oil exports performance. *SN Business & Economics*. 2025;5(113).
<https://doi.org/10.1007/s43546-025-00886-9>
17. Gimba JT, Omale D, Anaba MI. Exploring the relationship between trade openness and economic growth in Nigeria: The moderating effect of exchange rate volatility. *Development and Sustainability in Economics and Finance*. 2025;6:100041.
<https://doi.org/10.1016/j.dsef.2025.100041>
18. Oyadeyi OO. Macroeconomic uncertainty and sectoral output in Nigeria. *Economies*. 2024;12(11):304.
<https://doi.org/10.3390/economies12110304>
19. Olu JJ, Okowa E, Nteegah A. Oil price and exchange rate volatility: Implication on trade transactions in Nigeria. *International Journal of Research and Scientific Innovation*. 2025;12(4):1273–1286.
<https://doi.org/10.51244/IJRSI.2025.12040106>
20. Okorie DI, Lin B. Global shocks and fiscal stimulus: A tale of an oil-dependent-exporting country. *Financial Innovation*. 2024;10(26).
<https://doi.org/10.1186/s40854-023-00527-w>
21. Lal M, Kumar S, Pandey DK, Rai VK, Lim WM. Exchange rate volatility and international trade. *Journal of Business Research*. 2024;167:114156.
<https://doi.org/10.1016/j.jbusres.2023.114156>
22. Baek J. Oil prices, world trade policy uncertainty and the trade balance: The case of Korea. *Commodities*. 2023;2(3):188–200.
<https://doi.org/10.3390/commodities2030012>
23. World Bank. World Development Indicators [Data set]. 2026.
<https://databank.worldbank.org/source/world-development-indicators>
24. U.S. Energy Information Administration. Europe Brent spot price FOB [Data set]. 2026.
https://www.eia.gov/dnav/pet/PET_PRI_SPT_S1_A.htm
25. Baek J. An asymmetric approach to the oil prices–trade balance nexus: New evidence from bilateral trade between Korea and her 14 trading partners. *Economic Analysis and Policy*. 2020;68:199–209.
<https://doi.org/10.1016/j.eap.2020.09.013>
26. Olubiyi EA, Dauda M. Bilateral real exchange rate volatility and trade: The Nigerian case. *Iranian Economic Review*. 2024;28(3):991–1021.
<https://doi.org/10.22059/ier.2024.349723.1007557>

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Appendix A

Constructed Annual Dataset

Table A1: Annual Data Used for the Empirical Analysis, 2000–2024

Year	Exports US\$bn	Imports US\$bn	Trade US\$bn	Trade growth %	Brent US\$/bbl	Oil uncertainty %	NGN/US\$	FX uncertainty %
2000	20.98	8.72	29.70		28.66	44.11	101.70	
2001	18.05	11.59	29.63	-0.22	24.46	47.62	111.23	8.96
2002	17.98	7.55	25.52	-14.93	24.99	34.52	120.58	8.07
2003	24.03	10.85	34.88	31.25	28.85	35.43	129.22	6.92
2004	38.63	14.16	52.80	41.44	38.26	37.32	132.89	2.80
2005	50.47	20.75	71.22	29.94	54.57	31.47	131.27	1.22
2006	58.73	26.52	85.25	17.98	65.16	30.86	128.65	2.02
2007	66.61	34.83	101.44	17.39	72.44	27.76	125.81	2.24
2008	86.27	49.95	136.22	29.49	96.94	49.59	118.57	5.93
2009	56.74	33.91	90.65	-40.73	61.74	48.29	148.88	22.77
2010	84.00	44.23	128.24	34.69	79.61	28.50	150.30	0.95
2011	116.00	56.00	172.00	29.36	111.26	28.12	153.86	2.34
2012	114.70	51.00	165.70	-3.73	111.57	22.93	157.50	2.34
2013	90.56	56.00	146.56	-12.28	108.56	17.59	157.31	0.12
2014	103.10	58.30	161.40	9.65	98.97	18.15	158.55	0.79
2015	50.22	44.70	94.92	-53.09	52.32	40.54	192.44	19.37
2016	33.30	35.53	68.83	-32.13	43.64	45.96	253.49	27.55
2017	44.47	31.27	75.74	9.56	54.12	25.97	305.79	18.76
2018	60.55	43.01	103.55	31.28	71.33	29.58	306.08	0.10
2019	62.53	55.26	117.79	12.88	64.30	32.49	306.92	0.27
2020	35.63	35.74	71.37	-50.10	41.96	114.55	358.81	15.62
2021	46.87	51.88	98.75	32.47	70.86	33.95	401.15	11.15
2022	63.08	60.35	123.43	22.30	100.93	47.38	425.98	6.00
2023	55.18	49.43	104.61	-16.54	82.49	33.89	645.19	41.52
2024	53.32	41.26	94.58	-10.08	80.52	26.63	1478.97	82.95

Note: Oil-price uncertainty is annualized realized volatility of daily Brent log returns. Exchange-rate uncertainty is the absolute annual log change in the official NGN/US\$ rate. Sources: World Bank (2026) and U.S. Energy Information Administration (2026); author's calculations.