Original Research Article

NON-OIL EXPORTS AND EXCHANGE RATE VOLATILITY IN NIGERIA (1981-2021)

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Abstract

The study investigates the impact of non-oil exports on exchange rate volatility in Nigeria using time series data that ranges from 1981 to 2021. The study makes use of an autoregressive distributed lagged model as the model for the data estimation. The collected data were subjected to unit root tests, and they were found to be a mixture of levels and first differences using Philips Perron and Augmented Dickey Fuller tests. The study found that non-oil exports have a negative impact on the exchange rate volatility in Nigeria. This implies that the less volatile the exchange rate becomes, the more interest there is in non-oil exports. The interest rate was found to have had a significant negative relationship with the non-oil exports in Nigeria. The study concluded that the volatility of the exchange rate indicates continued reliance on oil exports, and this is not safe for the economy as the economy becomes more unstable, as in the present case of Nigeria. This study recommends that it is high time Nigeria as a country diversified its economy and focused massive investments into other sectors of the economy like Agriculture, Manufacturing, Mining, art, entertainment, and so on in an effort to increase its non-oil exports and prevent overreliance on crude oil exports as the only source of foreign exchange earnings.

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Keywords: non-oil export, exchange rate volatility, interest rate and oil export.

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1. INTRODUCTION

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Autarky is a utopian dream as no nation can thrive in it; therefore, participation in trade is vital to the growth and development of economies and facilitates their interconnectedness with other nations. The goal of every nation is to improve the lives of its citizens through engagement in the production of goods and services that are tradable with other nations in the world. The economic theory of comparative advantage states that a country produces goods in which it has a comparative advantage over others, sells them to their trade partners and the rest of the world, and then purchases the goods in which it has a lesser comparative advantage from the rest of the world. Nigeria participates in trading activities, with

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trade contributing 34 percent of her GDP as of 2019 (The World Bank, 2022). Trade facilitates the earning of foreign exchange, regardless of the type of exchange rate regime adopted by a country.

In the 1970s, many countries exited the fixed exchange rate regime, which evolved into the experience of volatility, which has been on an upward trend ever since. This challenge has been a major concern for policymakers and researchers all over the world (Hericourt&Poncet, 2013). The exchange rate, as an important macroeconomic indicator, has significant implications for the health of an economy. Therefore, volatility breeds uncertainty and may adversely affect other macrovariables (Broda and Romalis, 2003; Ezike and Amah, 2011; Oaikhenan and Aigheyisi, 2021). Although there is no consensus on the specific cause of volatility, these factors are identified as some of its causes. These factors may be time- or country-specific, and they include the composition of capital and the depth of the financial market as determinants of the degree of fluctuation in the exchange rate. Other factors are trade openness, fiscal deficit, foreign debt, level of foreign reserve, monetary policy stability, exchange rate arrangements, and economic growth (Oaikhenan and Aigheyisi, 2021). Developing and mono-product economies such as Nigeria experience the challenge of fluctuations in exchange rates.

Comment [D6]: Should be written: Hericourt and Poncet, 2013

Over the years, Nigeria as a nation has been dependent on earning foreign exchange from oil revenue. The government, through the Central Bank of Nigeria, in a bid to harness the prospects of the non-oil sector and strengthen the Nigerian currency to prevent foreign exchange volatility, adopted several strategies, like the deregulation of external trade and payments and the adoption of a market-determined exchange rate. In the recent strategy adopted by the Central Bank of Nigeria, the RT200 programme was introduced. This strategy is an initiative aimed at raising $200 billion in foreign exchange earnings from the non-oil sector over a period of 3 to 5 years. The programme is based on five major anchors, and the major anchor of the programme is the Non-Oil Export proceeds repatriation Rebate Scheme. This strategy is expected to facilitate trade while providing incentives for exporters in the non-oil export sector and encouraging the repatriation and sale of export proceeds in the FX market (Banker's Committee, 2022).

Therefore, given the background to the study established, it is important to understand how the activities in the non-oil sector influence the exchange rate. The objective of this study is to investigate the impact of non-oil exports on exchange rate volatility in Nigeria. The rest of the study contains four sections, including a literature review, methodology, results and discussions, and a summary, conclusion, and recommendations.

2. LITERATURE REVIEW

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2.1 Theoretical Review

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The supply and demand for foreign currency determine the exchange rate in a free market. When capital flows were restricted, a theory of flow was created to represent international exchange rates at that time (Hallwood& MacDonald, 2000). According to the asset view of exchange rates, the value of an asset is determined by wealth holders who are willing to hold the stock of money in a particular currency and have globally diversified portfolios (Hallwood& MacDonald, 2000). The first elasticity theory is still valid today because the trade account still dominates the balance of payments accounts in some economies, especially those in less developed African nations (Hallwood& MacDonald, 2000).

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The exchange rate of a country's currency is based on its balance of payments, according to the theory of balance of payments. The value of the currency may rise or fall as a result of a favourable or unfavourable balance of payments. As a result, the theory suggests that supply and demand for foreign currency determine the exchange rate (Jhinghan, 2011). It is important to remember that international trade and investments influence both the supply and demand of foreign exchange. Thus, when a domestic good is exported, there is an increase in the supply of foreign exchange because foreigners purchase domestic currency to pay the exporters of the domestic currency.

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When a nation imports something, it creates a need for foreign currency so that it can pay the exporters of the foreign nation in their own currency. This model can include capital flows. For instance, it is

reasonable to assume, ceteris paribus, that higher interest rates in the home country will attract capital inflow. An increase in interest rates causes the exchange rate to appreciate. In contrast, higher foreign interest rates will, ceteris paribus, cause the exchange rate to decline (Hallwood& MacDonald, 2000).

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2.2 Empirical Review

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Also, arrange review in order of latest published to earliest published. i.e. 2021 should be reviewed before 2020, 2019, 2018 and so on.

Lawrence and Mohammed (2015) examined the effect of the exchange rate on non-oil exports using the OLS estimation technique. The results revealed that the growth of non-oil exports in the Nigerian economy is significantly influenced by the effective exchange rate, money supply, credit to the private sector, and economic performance, and that an appreciation in the exchange rate has a detrimental impact on non-oil exports. Therefore, it was recommended that the monetary authority establish policies to promote exchange rate stability and reduce Nigeria's inflationary tendencies.

Akanbi et al. (2017) used the ARCH model and its various extensions (GARCH, TGARCH, and EGARCH), including the Error Correction Model, to examine the impact of exchange rate volatility on non-oil exports. The result of the analysis revealed that exchange rate volatility has a significant negative impact on non-oil export performance in Nigeria. They suggested reducing the overdependence on crude oil as a major export product in Nigeria to protect the economy from various external shocks. It was recommended that the government adopt selective credit control measures to channel credit to other productive sectors of the economy.

Dania and Ogedengbe(2019) employed the Augmented Dickey Fuller (ADF), Johansen co-integration, ARCH, and the ECM to investigate the impact of exchange rate volatility on Nigeria's non-oil export performance and the speed of adjustment using the Error Correction Method (ECM). The results revealed that the exchange rate had a significant, negative, and volatile effect on non-oil exports in Nigeria. Therefore, the authors recommended that exchange rate stability policies that promote poverty alleviation and job creation be implemented.

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Obeng (2017) examined the issue of exchange rate volatility and its effect on non-traditional exports in Ghana using the autoregressive distributed lag (ARDL) cointegration estimation technique. The results

showed that exchange rate volatility negatively affects Ghana's non-traditional exports. They also showed that the harmful effects of exchange rate volatility on non-traditional exports are more severe in the long run than in the short run.

Shawon et al. (2018) investigated the impact of exchange rate variation on the competitiveness of Nigeria's non-oil exports using the Autoregressive Distributive Lag (ARDL) Model. The result of the analysis revealed the presence of a long-run relationship among the variables in the model. It revealed that an increase in exchange rate variation, degree of openness, and bilateral exchange rate could cause a reduction in the volume of non-oil exports in the long run. The GDP also showed a positive impact on the volume of trade, both in the short and long run. Therefore, the authors recommended the implementation of policies that would improve the competitiveness of the country's non-oil exports and lead to an increase in the volume of non-oil exports.

Orji et al. (2021) in their study of the relationship between the exchange rate and non-oil exports in Nigeria using the ARDL model The study revealed that the exchange rate had a positive and significant effect on non-oil exports in Nigeria. Based on their results, they recommended that the Nigerian government provide infrastructure that would improve non-oil exports, cater to the needs of the non-oil export sector more, and persuade the financial institutions in the country to give more loans to the sector.

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Ojomolade et al. (2021) used time series data for a period of 36 years to evaluate the variables influencing the volatility of foreign currency rates and non-oil exports in Nigeria. The study employed the ARCH and GARCH models to examine the presence of exchange rate volatility. According to the findings, non-oil exports are positively correlated with the foreign exchange rate, bank rate, inflation, and foreign exchange volume, while GDP, M2, and government spending have statistically insignificantly negative coefficients. The ARCH (1) and ARDL models show that inflation and currency rates have the biggest impacts on export volatility. The authors recommended that exports of non-oil items be encouraged by the government's recovery exchange rate policy.

Oyelami&Ajeigbe (2021) investigated the industrial-based impact of exchange rate volatility on non-oil sector exports in Nigeria. In their analysis, they found that there was no long-run relationship between the

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exchange rate and non-oil exports using the bound co-integration test. Based on the aforementioned results, they were of the opinion that there existed a negative relationship between exchange rate volatility and non-oil exports in the short run, but the relationship did not extend to the long run. This long-term effect was possible due to an industrial mechanism devised by various companies to cope with exchange rate volatility in the long run. As a result, they advised the country to focus more on agricultural exports, where it had a comparative advantage, because exchange rate volatility had no long-term impact on the sector.

Having reviewed the literature, it is important to state that some studies have investigated issues around exchange rate volatility vis-à-vis other macroeconomic variables, but exchange rate volatility appears in most as an independent variable. However, in our study, it would appear as a dependent or problem variable. The study would therefore investigate the influence of non-oil exports on exchange rate volatility in Nigeria, and to the best of the researchers' knowledge, there may be few or no studies that have addressed this problem. Therefore, this study hopes to fill that knowledge gap.

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A number of studies as reviewed, have addressed the impact of exchange rate volatility on various macroeconomic variables, but non addressed specifically this area…

3. METHODOLOGY

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From the reviewed theoretical and empirical studies, many variables were identified as the major determinants of non-oil exports. To test the underlying hypothesis, the empirical estimation equation is as follows:

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$$EXRvol = f(NEXP) \quad 1$$

$$EXRvol = f(NEXP, INT, FDI, TGE) \quad 2$$

Where;

NEXP – non-oil export Volatility,

INT = Interest rate,

FDI = Foreign direct investment,

TGE = Total Government Expenditure

3.1 Method of Estimation and Diagnostics

This study adopted Autoregressive Distributed Lag (ARDL) because when the data collected on the variables were subjected to unit root tests, they were found to be a mixture of levels and first difference using Philips Perron (PP) and Augmented Dickey Fuller tests (ADF), i.e., I(0) and I(1) combined. The method is also chosen because of the following advantages: First, it is applicable irrespective of whether the variables under investigation are purely I(0), I(1), or mutually integrated. Second, it does not have the problem of endogeneity. Third, it is appropriate for testing cointegration with the small sample data. Lastly, ARDL estimates the long run and short run simultaneously without losing the long run information (Pesaran et al., 2001; Pesaran and Shin, 1999; Narayan, 2005; Shrestha and Chowdhury, 2015). From the empirical model above, the ARDL framework for achieving the objective of investigating the impact of non-oil exports on exchange rate volatility in Nigeria follows equation 3.0 and is stated as follows:

$$\Delta EXRVOL_{t-1} = \varphi_0 + \sum_{i=0}^{p} \varphi_1 \Delta NEXP_{t-1} + \sum_{i=0}^{p} \varphi_2 \Delta ln \quad INT_{t-1} + \sum_{i=0}^{p} \varphi_3 \Delta FDI\ \Delta_{t-1} + \sum_{i=0}^{p} \varphi_4 \Delta ln \quad TGE_{t-1}$$

$$+\omega_4 NEXP_{t-1} + \omega_4 INT_{t-1} + \omega_3 FDI_{t-1} + \omega_2 lnITGE_{t-1} \quad + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

On the right-hand side, the expression from w_4 to w_1 shows the long-run relationship among the variables, while the notations from $\emptyset_1$ to $\emptyset_4$ with the summation signs corresponds to the short-run dynamics of the variables. While $\emptyset_0$ represents constant and u_t is the error term.

The Arch LM Test

Table 1:The Arch LM Test

H_0: No Arch effect		

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1)Rename 3.4: Empirical Model
2) Clearly and precisely start 3.4 with the analytical foundation and theoretical framework adopted for the study.

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Comment [D27]: Rename: Table 4.1

F-Statistic	1629.655	Prob. F. (0.0000)
Observed R squared	107.543	Prob. Chi-Square (0.0000)

Source: Authors' Computation

After demonstrating the presence of exchange rate volatility between the naira and the dollar, ARCH-type models were calculated, and the results are shown in Table 1. Since the probability is greater than 5%, the ARCH coefficient (0.6082 in the model) is not statistically significant. This suggests that the exchange rate's past volatility is not a major influence on the present exchange rate. The GARCH coefficient (0.5603), which illustrates the GARCH effect, is nonetheless statistically significant. This indicates that earlier news pertaining to volatility has an explanatory influence on present volatility. This is analogous to Adeoye and Atanda's (2011) and Olufayo and Fagite's (2009) results (2001). The sum of the ARCH and GARCH coefficients (0.5399) implies an initial shock followed by a gradual return to the mean.

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4. PRESENTATION AND ANALYSIS OF RESULTS

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4.1 Presentation of Results

Comment [D30]: Rename: Results and Findings

4.1.1 Descriptive Statistics

Table 2: Descriptive Statistics

Comment [D31]: Rename: Table 4.2 and state source below table

	EXRVOL	NEXP	INT	FDI	TGE
Mean	108.4421	3391035.	12.47943	2511.535	2494.001
Maximum	415.7200	17802182	26.90000	8841.062	12164.15
Minimum	0.617708	5069.700	6.000000	189.1648	9.636500
Std. Dev.	110.9597	4661122.	4.077670	2533.051	3190.137
Probability	0.026725	0.000002	0.000077	0.007960	0.000336
Observations	41	41	41	41	41

Table 2 above describes the data on the exchange rate, non-oil exports, interest rates, foreign direct investment, and total government expenditure. The mean, standard deviation, minimum, and maximum

Comment [D32]: Table 4.2

values of the data are shown. The decision rule is that the data is said to be consistent as long as the means and the median values of the data lie within the minimum and maximum values of the data on the variables, as shown in Table 2 above.

4.1.2 Unit Root Tests

Table 3:Unit Root Tests Result

Comment [D33]: Table 4.3

	Augmented Dickey-Fuller (ADF)		**Philips-Perron (PP)**		
Variable	Level	1st difference	Level	1st difference	Remark
EXRVOL	0.9853	-4.2880***	0.587055	-4.2465***	I(1)
NEXP	-0.2055	-4.0197***	-2.9281	-4.23480***	I(1)
INT	1.2507**	-4.9991	1.9593*	-4.98888	I(0)
FDI	-2.2153	-5.2916***	-2.2153	-5.2913***	I(1)
TGE	4.1811***	1.45094	5.6101**	-1.11696	I(0)

Source: Computed by the Authors.

The above test is a test for the stationarity of the data. The null hypothesis is that there is no unit root, as this implies that the data is stationary. Note: asterics '*, '**', and ***'show significance at 1%, 5%, and 10% levels of significance, respectively. We reject the null hypothesis if the tabulated value is greater than the critical value at a chosen level of significance, which is 5% as applied to this study. The result

shows that some variables are stationary at the first difference, while some other variables are stationary at levels. They are stationary because both the ADF and the PP calculated statistics are all less than the critical values of the ADF and Phillips-Perron. The fact that the data are stationary implies they are good enough to be used for estimation. The mixture of statistics at both the first difference and at levels implies that the Autoregressive Distributed lag Model is suitable as an estimation technique in this study.

4.1.3 Causality Tests

Table 4: Pairwise Granger Causality Tests

Comment [D34]: Table 4.4, and state source below

Sample: 1981 2021

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
EXRVOL does not Granger Cause NEXP	39	11.1203	0.0002
NEXP does not Granger Cause EXRVOL		6.12988	0.0053
INT does not Granger Cause NEXP	39	0.05304	0.9484
NEXP does not Granger Cause INT		0.24142	0.7869
INT does not Granger Cause EXRVOL	39	0.56873	0.5715
EXRVOL does not Granger Cause INT		0.90341	0.4147

4.1.4 Bounds Test

Table 5: Bounds Test

Comment [D35]: Table 4.5 and state source below

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)

			Asymptotic: n=1000	
F-statistic	8.504070	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
Actual Sample Size	40		Finite Sample: n=40	
		10%	2.427	3.395
		5%	2.893	4
		1%	3.967	5.455

Table 5 above shows that the calculated F-statistics are greater than the critical values of the upper bounds at all levels of significance: 10%, 5%, 2.5%, and 1%. The result therefore shows we have six vectors that are co-integrating, which means a long-run relationship exists among all the variables over the period of this study, i.e., 1981–2021.

Comment [D36]: Table 4.5

4.1.5 VAR Lag Order Selection

Table 6: VAR Lag Order Selection Criteria

Comment [D37]: Table 4.6 and state source below

Endogenous variables: NEXP EXRVOL INT FDI TGE

Exogenous variables: C

Sample: 1981 2021

Included observations: 38

Lag	LogL	LR	FPE	AIC	SC	HQ
0	10.94039	NA	5.03e-07	-0.312652	-0.097180	-0.235989

1	148.7596	232.1166	1.35e-09*	-6.250508	-4.957677*	-5.790528*
2	165.3824	23.62176	2.25e-09	-5.809599	-3.439408	-4.966303
3	201.4505	41.76306*	1.52e-09	-6.392130*	-2.944580	-5.165518

The test above shows that the lag criteria of 1 using SC or 3 using AIC are suitable for the estimation of the ARDL model in this study.

4.1.6 Long run Results

Table 7: Long run Results

Comment [D38]: Table 4.7 and state source below

ARDL Long Run Form and Bounds Test

Dependent Variable: EXRVOL

Selected Model: ARDL (1, 1, 0, 0, 0)

Levels Equation

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NEXP	-0.64	0.08	-7.24	0.00***
INT	-0.25	0.10	-2.44	0.02***
FDI	-0.44	0.12	-3.46	0.00***
TGE	0.21	0.13	1.53	0.13
C	2.52	0.41	6.12	0.00***

R-squared	0.998	Mean dependent var	1.601
Adjusted R-squared	0.989	S.D. dependent var	0.839
S.E. of regression	0.086	Akaike info criterion	-1.907
Sum squared resid	0.224	Schwarz criterion	-1.520
Log likelihood	47.05	Hannan-Quinn criter.	-1.762
F-statistic	470.2965	Durbin-Watson stat	2.109689

Prob(F-statistic)	0.000000

The result in Table 7 above shows that exchange rate volatility (EXRVOL) has a significant negative relationship with non-oil exports (NEXP) in Nigeria. The relationship is statistically significant at the 1% level, as it further shows that a 1% increase in non-oil exports will lead to a 0.64% reduction in exchange rate volatility. This implies that the higher the volume of non-exports, the lower the volatility of the exchange rate. When the volume of non-oil exports increases, the demand for naira will increase, as this implies that the value of naira will appreciate against the US dollar and other foreign currencies. While interest rates show a significant negative relationship with the exchange rate volatility in Nigeria, foreign direct investment also shows a negative relationship with the exchange rate volatility in Nigeria. The total government expenditure has been shown not to have a significant relationship with the exchange rate volatility in Nigeria.

Comment [D39]: Table 4.7

The result of the R-square shows that 99% of the change that has taken place in the dependent variable is being explained by the change in the independent variables.

4.1.8 Correlation Test

Table 8: Correlation Test

Comment [D40]: Table 4.8

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.475113	Prob. F(2,29)	0.1018
Obs*R-squared	5.832333	Prob. Chi-Square	0.0541

Source: Eviews, Authors' Computation

Comment [D41]: E-views what? 12 or 9.5

In order to avoid a spurious regression and to establish the fitness of the data for estimation, tests such as this are carried out. The non-significance of the result shows that the null hypothesis of no serial

correlation is accepted. The need for the test is to ensure the data used for the study are reliable enough to make economic projections.

4.1.9 Stability Test

The non-significance of the result shows that the null hypothesis of no serial correlation is accepted. The need for the test is to ensure the data used for the study are reliable enough to make economic projections, as it is concluded that the model is stable within a 5% level of significance.

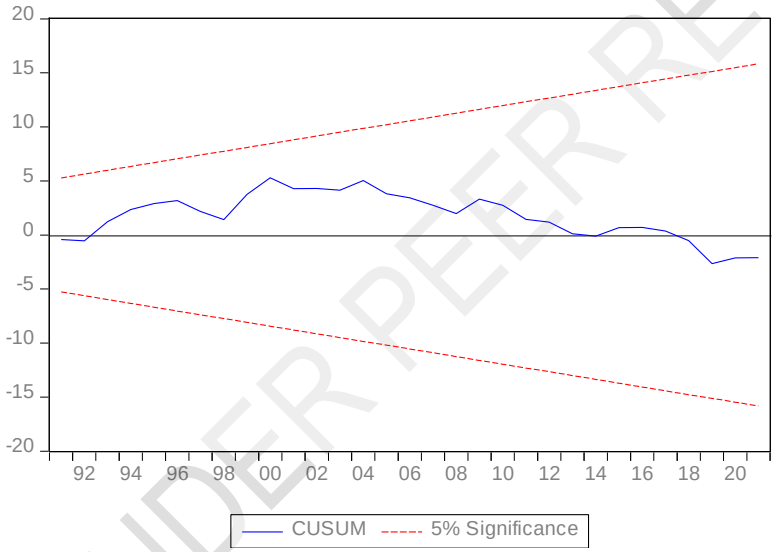

Figure 1: Stability Test

Source: Eviews, Authors' Computation

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5. Summary, Conclusion, and Recommendations

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1)Author(s) should have Discussion of Results (4.2) before conclusion
2) This should simply be named: Conclusion

The study investigates the impact of non-oil exports on exchange rate volatility in Nigeria using time series data that ranges from 1981 to 2021. The study makes use of an autoregressive distributed lagged model as the model for the data estimation. The study found that non-oil exports have a negative impact on the exchange rate volatility in Nigeria. The more non-oil exports, the higher the production level. This shows that the less volatile the exchange rate becomes, the more interest there is in non-oil exports. Interest was found to have had a significant negative relationship with non-oil exports in Nigeria. When interest rates increase, foreign investors will be attracted, and non-oil exports will increase following an increase in foreign direct investment.

It can be concluded that the volatility of the exchange rate indicates that continued reliance on oil exports is not safe for the economy as the economy becomes more unstable, as in the present case of Nigeria.

This study recommends that it is high time Nigeria as a country diversified its economy and focused massive investments into other sectors of the economy like Agriculture, Manufacturing, Mining, art, entertainment, and so on in an effort to increase its non-oil exports and prevent overreliance on crude oil exports as the only source of foreign exchange earnings. When we diversify the economy, we produce more products, become less reliant on imports, and the exchange rate becomes more stable as a result.

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