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An Observational Inquire About Trade Rate Instability and Genuine Net Household Item in Nigeria

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Abstract
Over the years, exchange rate volatility has sparked a lot of controversy among academics and economists, and many empirical studies have been conducted to explain its association with other macroeconomic indicators including real GDP. As a result, this study conducted a thorough empirical assessment to determine the relationship between exchange rate volatility and Nigeria's real GDP. While exchange rate volatility shocks to real GDP are mostly negative and create short-term divergence from equilibrium, the misalignments tend to resolve slowly, with unpleasant repercussions in the near run while economic actors recalibrate their consumption and investment choices. About three quarters of shocks to the real GDP are self-driven, and the remaining one quarter is attributed to variables such as exports, exchange rate volatility and inflation. Extreme levels of volatility are found to be detrimental to economic growth. However, this is only up to a point as growth-enhancing effect can also emanate from innovation, and more efficient resource allocation. The study recommends that the foreign exchange management policies must concern themselves with both foreign sector and domestic balance of the economy. This can be achieved if the government gives more attention on policies that will affect the accounts in balance of payment.

Keywords: real GDP, economic growth, balance of payment

1. Introduction

Around three-quarters of real GDP shocks are caused by the economy itself, with the remaining one-quarter ascribed to factors such as exports, currency rate volatility, and inflation. Economic growth has been shown to be harmed by extreme volatility. However, this is only true to a certain extent, as innovation and better resource allocation can also help to boost growth. Foreign exchange management plans, according to the research, should take into account both the foreign sector and the balance of the

domestic economy. This can be accomplished if the government places a greater emphasis on policies that affect payment account balances.

According to Dornbusch, (2014) and David, Umeh and Ameh, (2016), Bruno and Shin (2018), the success of currency depreciation in promoting trade balance is largely dependent on shifting demand in the right direction and amount, as well as the domestic economy's capacity to meet the additional demand by supplying more goods. Exchange rate variations are likely to affect economic performance in the long run. As a result, it is vital to assess the impact of exchange rate variations on Nigeria's economic growth.

From the immediate post-independence period, when the country maintained a fixed parity with the British pound through the oil boom of the 1970s, to the flotation of the currency in 1986, following the near-collapse of the economy between 1982 and 1985, Nigeria's exchange rate policy has undergone significant changes. The economic and political reasons that govern exchange rate policy had significant effects for the structural evolution of the economy, inflation, the balance of payments, and real income in each of these periods (Aliyu, 2015). Over time, it appears that Nigeria's exchange rate volatility has an impact on the Naira's value. As a result, imports were encouraged, exports were discouraged, and the country became overly reliant on foreign inputs (Insah and Chiaraah, 2013).

The overarching objective of exchange rate management was to address and possibly attain medium and long-term balance of payment goals. As a result, when the Federal Government launched Structural Adjustment Policy (SAP) in 1986, the country transitioned from a peg to a flexible exchange rate regime in which the exchange rate was totally determined by market forces. This was in contrast to the current system of the monetary authority intervening in the foreign exchange market on a regular basis to achieve strategic goals (Omotosho, 2015).

The naira rate is unstable due to the haphazard nature of economic policies and the lack of consistency in exchange rate rules. Despite several government efforts to maintain a steady currency rate, the naira has depreciated from the 1980s to the present, according to Aliyu, (2015) and Benson and Victor, (2012).

The recent economic recession in Nigeria, combined with speculator activities, caused the exchange rate to fall further between 2015 and 2017, and despite positive growth in the fourth quarter of 2017, the exchange rate has seen significant fluctuations, appreciating and depreciating at intervals (Insah and Chiaraah, 2013; Ndambendia and Alhayky 2015). In light of this, the purpose of this research is to conduct an empirical assessment of the idea of exchange rate, exchange rate volatility, and their potential links with Nigeria's real gross domestic product (GDP). The study looks at how important macroeconomic indicators in Nigeria respond to shocks produced by exchange rate volatility.

This study adds to the literature in a variety of ways. First, while analysing the effect of exchange rate on the Nigerian economy, most prior or related research in Nigeria basically adopted the same approach of looking either outside or within. As a result, the responses of both external (exports) and internal (inflation, domestic output) variables to exchange rate fluctuations are considered in this study. Second, to our knowledge, there are few studies in this field that include a complete study like ours, which uses data from 1995 to 2016. (22 years). This session discusses the most recent economic events in Nigeria, such as the recession, rising and declining inflation rates, and how they impacted the country's gross domestic product.

We began our research in 1995 to coincide with the liberalisation of the foreign exchange market, which began with the formation of an Autonomous Foreign Exchange Market (AFEM) by Nigeria's central bank (CBN, 2017). Third, the analysis takes into account the current prognosis for both exchange rates

and exchange rate volatility, as well as the effects these factors have on economic growth. This distinguishes the study from others, as most studies focus on either the exchange rate itself or exchange rate volatility. This study uses various econometric tools to determine the effects of these variables on economic growth.

Finally, the study adds to our understanding of how monetary policies, speculative activities, and parallel exchange rate activities affect money demand in an economy with several currencies in circulation, altering the official exchange rate and, by extension, GDP. Essentially, the type and mix of variables, methodology, and data employed distinguishes this study in that it examines the influence of exchange rate volatility on both the domestic and international sectors of the Nigerian economy.

The following is how the rest of this document is set up: The second section contains a review of related studies as well as the study hypotheses. The research approach is presented in the third section. The fourth section examines the empirical findings as well as policy implications. Section five concludes with conclusions and recommendations.

2. Research Context

No country is self-sufficient, and if international trade remains vital to a country's prosperity and existence, so will the exchange rate. As a result, numerous studies have been conducted to assess the impact of exchange rates on a country's economic growth. This component of the study will review important theoretical and empirical literatures. The price of one country's currency in respect to another is known as the exchange rate. It is the minimum amount of units of one currency that can be exchanged for another currency (David, Umeh and Ameh, 2016). According to Nawaz and Ghani (2018) and Aliyu (2015), an increase in imports leads to a decrease in exports, whereas a decrease in exports leads to an increase in exports.

Furthermore, depreciation of the currency causes a shift in consumption from foreign to domestic items. In a similar spirit, Prasad Bal and Narayan Rath (2015), Insah and Chiaraah (2013) concurred that allowing exchange rates to be flexible and competitive helps to integrate the price systems of two distinct countries, hence improving international trade and the countries' balance of payments position. Ndambendia and Alhayky (2015) also believe that developing nations have a greater choice of flexible exchange rate regimes than developed countries.

The tendency for foreign currencies to appreciate or depreciate, affecting the profitability of foreign currency trades, is referred to as exchange rate volatility. The volatility of these rates is defined as the quantity and frequency with which they move. Volatility can occur in any security that rises or falls in value, according to David, Umeh, and Ameh (2016). The phrase is most commonly associated with the stock market, but foreign currencies can also be volatile (Frankel, 2014).

There are a number of strategies to protect against currency rate volatility, but most of them have downsides. One party in a foreign business transaction could convert its money to the foreign currency right away to avoid any potential rate volatility, but this would lock up the funds and prevent them from being used for domestic opportunities. Furthermore, future contracts that lock in exchange rates can reduce volatility, but they also prevent one of the contract's parties from profiting if rates shift in their favour. As a result of the foregoing, one of the purposes of monetary policy in Nigeria is exchange rate stability, and over the years, exchange rate policy has been primarily driven by an obsession with keeping the nominal exchange rate 'stable.'

The nominal exchange rate is used by the public to determine the health of the economy, with a declining rate indicating a deteriorating economy. How to avoid real exchange rate (RER) overvaluation and exchange rate premium through a market-determined nominal exchange rate system, especially where the government, through the central bank, is the principal source of foreign exchange, is a crucial challenge for policymakers (Ndambendia and Alhayky, 2015).

Both monetary and macroeconomic theories provide the theoretical foundation for determining exchange rate behaviour. The integration of commodities and capital markets is a key assumption in monetary theory. The idea backs up Gustav Cassel's claim of the purchasing power parity (PPP) philosophy, which was implemented in 1970 to calculate the exchange rate between two currencies (Jhingan, 2008). The principle of purchasing power parity states that the rate of exchange between two currencies must be equal to the ratio of their entire price levels (Asab, Abdullah, Nawaz, Shakoor & Arshad, 2015).

The macroeconomic (real) theory is the second theory that supports exchange rate determination. The focus of this phenomena is on the role of macroeconomic fundamentals (variables) in the determination of exchange rate behaviour (Villavicencio and Bara, 2008). The Balassa-Samuelsson doctrine and the balance of payments strategy are two different approaches. In 1964, the Balassa-Samuelson method was introduced. The doctrine is concerned with the balance of tradable and non-tradable industries (Jhingan, 2008). Nurkse, on the other hand, established the balance of payments technique in 1945.

The exchange rate of a country is determined by its balance of payments, according to this view. A positive balance of payments overvalues a country's currency rate, while a negative balance of payments undervalues it (Asab, Abdullah, Nawaz, Shakoor & Arshad, 2015). Thus, in the foreign currency market, demand for and supply of foreign exchange play a significant influence in determining the exchange rate. The demand for foreign exchange is handled by the debit side of the balance of payments, which is due to payments made to foreign countries for goods and services purchased from them, as well as loans and investments received from outside the economy. The supply side of the balance of payments is also influenced by the credit side. It includes payments for products and services traded within the domestic economy, as well as loans and investments. The theory goes on to say that if the debit and credit sides of the account are equal, the balance of payments account is balanced. A favourable balance of payments occurs when the account's credit side outweighs its debit side. However, if the debit side of the account surpasses the credit side, the account will have an unfavourable balance of payments (Jhingan, 2008).

2.1 Exchange Rate, GDP in Nigeria and related hypothesis

Developing countries face issues in their balance of payments as a result of high capital goods import bills and low export receipts, making it harder to stimulate growth through export development. This frequently leads to a trade deficit (Azeez, Kolapo and Ajayi, 2012). According to Ajao and Igbokoyi (2013), during development, the pace of expansion of national output and demand for imports tends to surpass export-based capacity, particularly during the early stages of development when investment increases rapidly and structural changes are significant. It's worth noting that a country's balance of payment concerns can be avoided if a profit management framework for foreign exchange is not articulated.

Asab, Abdullah, Nawaz, Shakoor, and Arshad (2015) suggest that floating foreign exchanges are typically characterised by unanticipated exchange rate volatility, putting both exporters and importers at

a disadvantage. They suggested that, in face of such risk, exporters and importers are eager to engage in international trade. Asher, (2012) examined the impact of exchange rate fluctuation on the Nigeria economic growth for period of 1980 – 2010. The result showed that real exchange rate has a positive effect on the economic growth. In a similar study, Aliyu, (2015) investigated foreign exchange market and economic growth in an emerging petroleum-based economy like Nigeria from 1970-2003. He found that positive relationship exists between exchange rate and economic growth. Obansa, Okoroafor, Aluko and Millicent, (2013) also examined the relationship between exchange rate and economic growth in Nigeria between 1970 and 2010. The result indicated that exchange rate has a strong impact on economic growth.

They came to the conclusion that exchange rate liberalisation is beneficial to the Nigerian economy because it fosters growth. From 1986 through 2010, Azeez, Kolapo, and Ajayi (2012) evaluated the impact of exchange rate volatility on Nigerian macroeconomic performance. They discovered that the exchange rate is related to GDP in a positive way. However, Adewuyi and Akpokodje (2013), using an error correction model, suggested that between 1970 and 2006, trade liberalisation boosted Nigerian industrial growth and stabilised the exchange rate market. According to them, the index of industrial production and real export had a positive and significant link.

The index of industrial production rises by 12.2 percent for every 1% growth in real export. By implication, this suggests that deregulation has a beneficial impact on exports due to exchange rate depreciation. The impact of exchange rate variations on the Nigerian manufacturing industry was also investigated by David, Umeh, and Ameh (2016). They used multiple regression econometric approaches to discover that exchange rate volatility and manufacturing sector performance have a negative association. Azeez, Kolapo, and Ajayi (2012) discovered a similar result, demonstrating that the detrimental impact of real exchange rate fluctuation on economic growth decreases as financial development improves. We postulate without identifying any direction as follows, based on the mixed results of the existing literature stated above.

$H0_1$: Exchange rate volatility will impact economic growth in Nigeria

2.1 Exchange Rate, Export Performance in Nigeria and related hypothesis

Asher (2012) looked at the effect of fluctuating exchange rates on the volume and variability of trade flows. They discovered that exchange rate fluctuation hinders trade volume expansion, lowering its benefits. Omotosho (2016) examined the implications of real exchange rate misalignment and volatility on non-oil export growth in Nigeria, focusing on the effects of real exchange rate misalignment and volatility on non-oil export growth. He used a typical trade theory model of export growth determinants as well as two alternative measures of real exchange misalignment, one of which is deviation from purchasing power parity (PPP) and the other is model-based estimation of equilibrium real exchange rate (ERER).

He noted that, regardless of the multiple measures of misalignment used, both real exchange misalignment and volatility harmed Nigerian non-oil export growth. Arize, Osang, and Slottje (2013) consistently showed a significant negative link between exchange rate volatility and exports in poor nations. In another exciting and noteworthy study, Isitua and Neville (2006) addressed crucial concerns or observations on the relationship between exchange rate volatility and export performance in their work, 'evaluation of the influence of exchange rate volatility on macro-economic performance in

Nigeria.' When employing a common measure of exchange rate volatility, they claim that exchange rate swings have a negative and considerable impact on Nigeria's exports.
However, it is important to note that their study focused only on oil exports. Based on the findings of extant studies, we hypothesize as follows:

$H0_2$: There is no significant relationship between exchange rate volatility and exports performance in Nigeria.

3. Methodology

From 1995 to 2016, we gathered data across a 22-year period. They came from the Statistical Bulletin of the Central Bank of Nigeria (2016). The Central Bank of Nigeria liberalised the FOREX market in 1995, as described in the previous section.
The gross domestic product, exchange rate, total export, and inflation rate are used as variables in this study, which follows an econometric research design. To capture exchange rate volatility, the first difference of the exchange rate variable was employed, which necessitated the employment of an econometric model such as the error correction model, which uses first difference operators for both the dependent and independent variables. To exhibit data behaviour during the course of the investigation, descriptive statistics were used.
The Vector Auto Regressive (VAR) model was employed in this study to determine the relationships between the set of k variables used. The Augmented Dickey Fuller (ADF) test for unit root, as well as important tests such Johansen Co-integration, impulse response, and variance decomposition, will be employed. Also devised by Engle and Granger, the error correction mechanism (ECM) reconciles the short-run behaviour of economic variables with their long-run behaviour.
In this model, the first difference operator usually captures the changes in the variables as they transition from short to long term. The Granger Representation Theorem asserts that if two variables, Y and X, are co-integrated, their relationship may be stated as ECM (Gujarati, 2009). A variant of the domestic money demand function will be substituted with a functional-form model that shows the interrelationships of key variables such as exchange rate and GDP, which is the subject of this study.

From equations (3) to (6), we expand the compact model in order to show the interrelationships between the variables. The four-variable VAR model is specified below in its functional form as:

$$Z_t = f\,(GDP, EXR, EXPT, INF) \quad \ldots\ldots\ldots\ldots 1$$

Same VAR model is expressed in its compact form as:

$$Z_t = \sum_{i=1}^{n} \beta_{it}\, Z_{t-1} + \mu_{it} \quad \ldots\ldots\ldots\ldots 2$$

When the compact model above is expanded using the four variables in the study, it will yield series of interrelationships. However, the focus of the study is mainly on exchange rate volatility and the gross domestic product.
Therefore, the model is explicitly represented as:

$$GDP_t = \beta_{11} + \sum \beta_{12}\Delta EXR_{t-1} + \sum \beta_{13}EXPT_{t-1} + \sum \beta_{14}INF_{t-1} + \mu_{1t} \quad \ldots\ldots 3$$

$$EXPT_t = \alpha_{21} + \sum \alpha_{22}GDP_{t-1} + \sum \alpha_{23}\Delta EXR_{t-1} + \sum \alpha_{24}INF_{t-1} + \mu_{2t} \quad \ldots\ldots 4$$

$$INF_t = \pi_{31} + \sum \pi_{32}GDP_{t-1} + \sum \pi_{33}\Delta EXR_{t-1} + \sum \pi_{34}EXPT_{t-1} + \mu_{3t} \quad \ldots\ldots 5$$

$$\Delta EXR_t = \varphi_{41} + \sum \varphi_{42}GDP_{t-1} + \sum \varphi_{43}EXPT_{t-1} + \sum \varphi_{44}INF_{t-1} + \mu_{4t} \quad \ldots\ldots 6$$

The error correction model is specified using the initial difference of the dependent and independent variables, as well as one period lag of the error term as one of its independent variables, according to Gujarati (2009). Because, while the levels of the independent variables may be strongly correlated, there is no reason to assume that their differences will be highly linked, this first difference regression model generally decreases the severity of multicolinearity. The first difference operator also allows us to investigate variables in their growth form rather than their level (or ordinary) form. As a result, the short-term Error Correction Model (ECM) is defined as follows:

$$\Delta GDP_t = \beta_0 + \beta_1 \Delta EXR_t + \beta_2 \Delta EXPT_t + \beta_3 \Delta INF_t + \beta_4 \mu_{t-1} \quad \ldots\ldots\ldots\ldots\ldots\ldots 7$$

Under this ECM estimation, the variables will be logged to make up for the extremes in differences between the variables' data.

Where;

GDP= Gross Domestic Product
EXPT= Total Exports (Oil and Non-oil)
INF= Inflation Rate
EXR= Exchange Rate
Δ = First difference operator
μ_{t-1} = The ECM operator
$\mu_{1t}, \mu_{2t}, \mu_{3t}, \mu_{4t}, \mu_{5t}$= random disturbances.

4. Empirical results

We present and analyse our results in this section. Table 1 presents the statistics summary of our study.

Table 1: Descriptive Statistic

	RGDP	EXR	EXPT	INF
Mean	41290.34	135.2092	6766.225	13.36242
Median	38735.23	130.1250	7285.608	11.85646
Maximum	69023.93	305.0000	15262.01	46.50000
Minimum	20353.20	74.62500	751.8567	0.223606
Std. Dev.	17345.91	49.17524	5164.000	8.744392
Skewness	0.290164	1.815622	0.329366	2.516965
Kurtosis	1.626749	7.574326	1.748388	10.69342
Jarque-Bera	2.037382	31.26786	1.833757	77.48509
Probability	0.361067	0.000000	0.399765	0.000000
Sum	908387.4	2974.603	148856.9	293.973

				3
Sum Sq. Dev.	6.32E+09	50782.28	5.60E+08	1605.752
Observations	22	22	22	22

Source: Author's Computation

Our results are given in Nigerian Naira in the descriptive statistics. The average exchange rate from 1995 to 2016 was N135.2, with a standard deviation of 49.18, indicating that the variable was volatile. The real GDP has a mean of 41290.34 and a standard deviation of 17345.91, which is quite high. The graph of variables (in the appendix section) demonstrates that real GDP has risen steadily over time, whereas the exchange rate has fluctuated over the same time period.

When we look at the standard deviations of exports and inflation in relation to their respective means, we can see that both variables have fluctuated over time. Their graphs help to clarify this (see appendix I).

Following that, we look at the correlation matrix between the variables to gain a first impression of the link between the variables in this study.

Table 2: Pearson Correlation

	RGDP	**EXR**	**EXPT**	**INF**
RGDP	1.000000			
EXR	0.813525	1.000000		
EXPT	0.897299	0.563147	1.000000	
INF	-0.256769	-0.060713	-0.288450	1.000000

Source: Author's Computation

The correlation coefficients between the variables are shown in Table 2. A brief examination reveals that all of the variables, with the exception of the inflation rate, have a positive association with one another. Exports and Real GDP have the strongest positive link, with a correlation coefficient of 0.8973. The link between real GDP and exchange rate is then discussed. These two strong correlations reveal that real GDP and both the exchange rate and exports have an initial priory expectation. This result can be held for the time being, but because correlation analysis is so basic, more tests are required to reach more definitive conclusions. Furthermore, inflation has a negative link with the other variables, the strongest of which is the -0.2885 coefficient between inflation and exports.

At the 5% level, all of the coefficients are statistically significant. Starting with the test for stationarity below, a more empirical test of the variables will be conducted.

Table 3: Unit Root Test (Augmented Dickey-Fuller Test)

Null Hypothesis: The Variable has a unit root (Not Stationary)

Alternative Hypothesis: The Variable has no unit root (Stationary)

	ADF TEST STATISTIC	**95% Critical Value**	**ADF (1st diff)**	**95% Critical Value**	**ADF (2nd diff)**	**95% Critical Value**	**Order of integration**	Remarks

RGDP	-1.015865	-3.029970	-1.267371	-3.029970	-7.880918	-3.029970	I(2)	Stationary
EXR	1.366988	-3.020686	1.055866	-3.020686	-1.536073	-3.029970	N/A	Non-Stationary
EXPT	-1.127462	-3.012363	-3.283967	-3.02069	N/A	N/A	I(1)	Stationary
INF	-4.843693	-3.040391	-3.548460	-3.05217	N/A	N/A	I(0)	Stationary

Table 3 indicates that after the second difference, order I, the findings of the Augmented Dickey-Fuller test show that real GDP is stable (2). The ADF test statistic is now higher than the crucial value of 95 percent. If the ADF test statistic (both in level and first difference) is more than the 95 percent critical threshold, the exchange rate is non-stationary as none. This could be related to the fact that it is quite volatile. After the first difference, exports remain unchanged, but inflation is unchanged at both the level and the first difference.

The ECM model was calculated using equation (7) from the previous section, and the results are shown in the table below:

Table 3: ECM Model (1995– 2016)

	Dependent Variable – Real Gross Domestic Product		
Variables	**Co-efficient**	**t-statistic**	**p-value**
Intercept	6.124853*** (0.452578)	13.53326	0.0000
LEXR	0.262347** (0.145603)	2.530839	0.0222
LEXPT	0.315838*** (0.025657)	7.744084	0.0000
LINF	-0.014470 (0.010149)	-0.563959	0.5806
ECM	0.0000117 (0.00000761)	1.533722	0.1446
F-stat. (5, 429) = 85.52305		R-squared = 0.955319	
Prob (F-stat.) = 0.000000		Adj. R-squared = 0.944148	
Total Panel Observations = 22		Durbin-Watson stat = 1.685515	

Standard errors in parenthesis.

Significance levels: *<0.10, **<0.05, ***<0.01.

Because the exchange rate and exports both have a positive impact on real GDP and are statistically significant at 5% and 1% levels of significance, the short and long-term error correction models estimated in the table above are consistent with macroeconomic theories. Inflation, which is a persistent rise in the prices of goods and services, has a negative influence on real gross domestic product because it makes things like cost of production more expensive in the economy and, as a result, lowers national output.

The model has a strong explanatory power due to its high R-squared value of 0.9553, which suggests that exchange rate, exports, and inflation can explain 95.53 percent of the fluctuations in real gross domestic product, while the remaining 4.47 percent is left unaccounted for. The error correction term is positive (0.00117 percent), but it is very little in both size and magnitude, which could be attributed to the presence of some substantial structural fractures as a result of the FOREX market operations in Nigeria. The non-stationarity of the exchange rate variable could potentially play a significant role.

Through the steps outlined below, we thoroughly reviewed our results to ensure that they were correct. The Johansen (1992) methodology of co-integrating variables with a linear trend is computed and displayed in the table below to determine if the variables will have a long-term convergence.

Johansen Co-integration Test

Table 4: Johansen's Co-integration Test

Series: **RGDP EXR EXPT INF**				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.919248	81.81514	47.85613	0.0000
At most 1 *	0.685752	31.48778	29.79707	0.0316
At most 2	0.293913	8.336338	15.49471	0.4301
At most 3	0.066487	1.376011	3.841466	0.2408
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**

None *	0.919248	50.32736	27.58434	0.0000
At most 1 *	0.685752	23.15145	21.13162	0.0256
At most 2	0.293913	6.960326	14.26460	0.4938
At most 3	0.066487	1.376011	3.841466	0.2408
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

This co-integration is predicated on the null hypothesis that there is no co-integrating equation, and both tests (Trace test and Max-eigenvalue test) reveal that the null hypothesis "there is no co-integrating equation" is rejected at the 5% level, as shown in table 4. At the 5% significance level, the Trace and Max-eigenvalue tests show that there are two co-integrating equations, meaning that the variables are in a long-term equilibrium relationship. Essentially, these equations illustrate the nature of the long-run relationship between the variables and tell us if there is a stable relationship between them in the long run.

We also consider the Generalized Impulse Response Function; the significance of this is that, because it is known that the variables will eventually converge in the long run, short-term disturbances caused by policies that impact these variables should be investigated as well. As a result, the study takes into account impulsive responses as well as variance decomposition. We will, however, focus on real GDP responses to shocks from exchange rate volatility, exports, and inflation.

Impulse Responses

The Impulse Response function is used to determine how variables interact. This is because it traces the response of the VAR system's dependent variable to the error term's shocks. In other words, it shows how an exogenous shock or innovation in one variable affects all or part of the other variables.

Table 5 Impulse Response of RGDP

Response of RGDP:				
Period	RGDP	EXRV	EXPT	INF
1	837.3094	0.000000	0.000000	0.000000
	(132.390)	(0.00000)	(0.00000)	(0.00000)
2	1479.180	257.4170	359.3557	93.38711
	(327.304)	(288.637)	(274.169)	(181.136)
3	1951.371	445.6313	1669.454	-16.12799
	(687.728)	(735.169)	(559.549)	(272.735)
4	2026.841	616.9217	2508.278	-197.4922
	(1207.36)	(1338.82)	(1370.13)	(491.900)
5	1698.443	1170.398	1624.853	-301.7532

	(1833.73)	(1976.16)	(3190.94)	(565.037)
6	958.2809	2155.494	-971.7134	-245.5259
	(2612.14)	(2473.06)	(6041.67)	(475.448)
7	-104.4737	3094.552	-4512.147	-111.1253
	(3363.16)	(2808.73)	(9310.04)	(645.650)
8	-1197.793	3418.297	-7981.437	80.93035
	(3812.19)	(3507.45)	(10983.5)	(1273.90)
9	-1750.327	2766.384	-9974.471	317.8514
	(4720.56)	(5878.53)	(10426.2)	(1868.47)
10	-1138.879	1051.363	-8756.057	537.6819

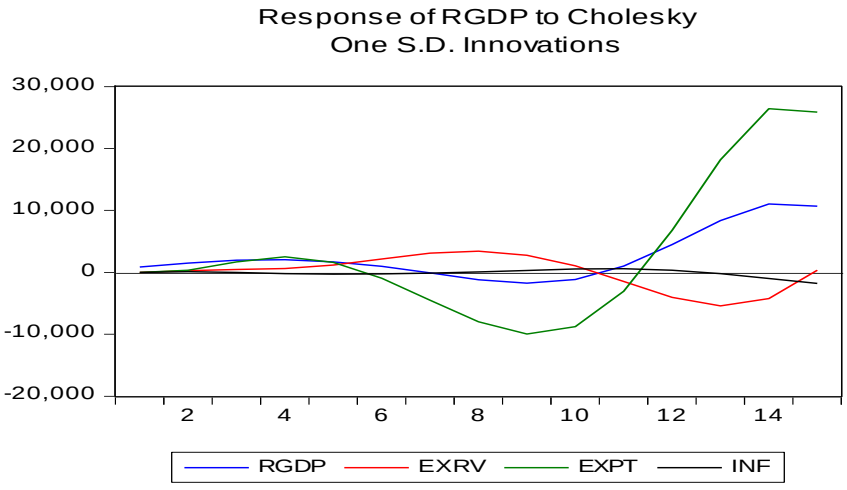
Source: Author's Computation ( ) – *Standard Error*

Table 5 displays the impulse response function for Real GDP, which includes "own shocks" as well as exchange rate, export, and inflation rate shocks. Past values of RGDP have a beneficial effect on the current value of real GDP in the short and medium term, up to the 6th time horizon, as can be seen by its response to its own shocks. However, as observed from the 7th to the 10th time frames, the association fluctuated in the long run. From the first to the tenth periods, there was a positive link in the reaction of RGDP to EXR shocks.

In terms of real GDP's response to export shocks, it was positive between the first and fifth time periods, but negative from the sixth to the tenth, whereas inflation only had positive shocks on real GDP in the first two time periods and negative shocks from the third to the tenth time periods. Because the impulse response in the VAR system traces the response of the dependent variable to shocks across time, this simply means that negative shocks reduced real GDP while positive shocks or impulses increased real GDP.

To put it another way, the impulse response explicitly analyses impacts in certain time periods and how the dependent variable will respond to these impacts, which are the result of various economic policies in play at the moment.

Fig *1*: Impulse Response Graph



The relationship between exchange rate volatility and real GDP is quite obvious from the graphical representation of the above impulse function; between the 1st and 5th time periods, when exchange rate volatility was low, RGDP was high, while between the 6th and 10th time periods, when exchange rate volatility was high, real GDP was low. From the 10th to the 15th time periods, exchange rate volatility fell into the negative territory, while real GDP increased. As a result, the lesser the exchange rate volatility, the higher the gross domestic product. As a result, in order for economic growth to occur, the exchange rate must be as stable as feasible.

Forecast Error Variance Decomposition

Table 4-7 Variance Decomposition of RGDP

Period	S.E.	RGDP	EXRV	EXPT	INF
1	837.3094	100.0000	0.000000	0.000000	0.000000
2	1758.744	93.40093	2.142245	4.174876	0.281948
3	3144.353	67.73481	2.678790	29.49556	0.090840
4	4550.395	52.18268	3.117165	44.46842	0.231741
5	5262.303	49.43588	7.277506	42.78452	0.502095
6	5853.273	42.63766	19.44330	37.33726	0.581780
7	8013.725	22.76389	25.28455	51.62196	0.329604
8	11876.41	11.38159	19.79625	68.66745	0.154713
9	15854.24	7.605633	14.15332	78.11404	0.127011
10	18185.62	6.172749	11.09127	82.55204	0.183950

Source: Author's Computation

The fraction of forecast error variation in real GDP owing to its own innovations, as well as the innovations of exchange rate volatility, exports, and inflation rate, is shown in Table 4.7. Past RGDP shocks on RGDP were consistent over the time range (10 periods), ranging from 93.4 percent in the second period to 6.2 percent in the tenth. Surprisingly, the contributions attributable to export shocks

increased during this time period, while those related to inflation remained negligible. Because real GDP is calculated using constant prices, this is consistent with macroeconomic theories.

Discussion and Policy Implication of Findings

According to the Pearson correlation coefficient, the exchange rate and exports have a positive link with real GDP, whereas the inflation rate, like the exchange rate and exports, has a negative relationship with real GDP. As a result, the relevant monetary authorities must ensure that inflation remains low enough to stimulate investment, while the government should develop or offer incentives to boost local export production. Similarly, the error correction model verifies the associations revealed by these variables, as exchange rate and exports have a positive and large impact on real GDP, which is consistent with Benson and Victor (2012) and David et al (2016).

The exchange rate refers to the naira's value against the dollar; a positive connection indicates that it is cheaper for an investor to buy naira with the dollar, which will promote foreign direct investment and domestic output, resulting in economic growth.

The error correction model also reveals that the rate of inflation has a negative influence on real GDP, as seen by the impulse response graph. The negative association between exchange rate volatility and real GDP is another result that can be derived from the impulse response graph. These findings support monetary economic theories that suggest that high or rising inflation, as well as exchange rate volatility, are harmful to economic growth (Aliyu, 2015).
Therefore; the monetary authorities must keep a close eye on such indices

5. Conclusions and recommendations

The exchange rate has gradually but steadily declined as a result of the country's heavy reliance on oil earnings, which has fluctuated in recent years. The situation was exacerbated by the volatility of both the exchange rate and the FOREX market. This shows that competent management of Nigeria's foreign policy is required in order to reach a reasonable level of export. The primary goal of this research was to examine the influence of exchange rate volatility on Nigerian economic growth. Finally, given the importance of the relationship between GDP, exports, inflation, and exchange rates, there is a considerable likelihood that these factors interact both in the short and long run.
That is, short or long-run shocks from the variables' particular impacts, which have a positive or negative impact on GDP. As a result of these findings, the government should concentrate and invest extensively in non-oil areas of the economy in order to enhance domestic output, encourage exports, and attract foreign currency inflows, hence reducing exchange rate volatility.
Our paper provides the following possibly useful insights on what has to be done in Nigeria to stabilise exchange rate volatility and its effects on macroeconomic variables. First, policymakers in charge of foreign exchange management must consider both the foreign sector and the home economy's balance of payments.
This can be accomplished if the government focuses greater emphasis on policies that affect the balance of payment accounts. Second, the manufacturing sector should be boosted by the government through subsidies and other incentives, as well as by improving technological and infrastructural development, in

order to boost the sector's contribution both domestically (via GDP and employment) and internationally (via exports) (via exports and inflow of foreign exchange).

Third, the government, through the central bank, should carefully control current exchange rate regimes and policies in order to mitigate any negative effects that exchange rate volatility may have on both exports and imports. Finally, the Central Bank of Nigeria should use its supervisory and disciplinary powers to rein in and punish some commercial banks and parallel market operators whose unethical practises have caused significant swings in the FOREX market. The perpetrators should be subjected to more severe repercussions.

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