Exchange Rate Volatility and Inclusive Growth: The Nigerian Experience

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Abstract
This study investigates the influence of exchange rate volatility on inclusive growth in Nigeria, using a Vector Error Correction (VEC) estimation technique. The period of the study is 1981 to 2014. The study shows that volatility in exchange rate has increased the unemployment rate which has made the growth rate in GDP experienced over the years not to be inclusive. The volatility in exchange rate does not promote investment and create room for absorptive capacity in the economy. The results from the variance decomposition show that the total variance in exchange rate volatility is significant.Based on the above revelation, it is recommended that the monetary authority, Central Bank of Nigeria (CBN) should include in its policy objectives the pursuance of weak exchange rate targeting. Fixing exchange rate, at all costs, should be discouraged. This is because the policy of fixing exchange rate without regard for inflation is misguided. The policy of raising interest rates to control inflation without paying attention to what is happening to the exchange rate is counter productive. Nevertheless, flexibility in the exchange rate should be welcomed since it enables a country to cope with macroeconomic shocks arising from policy changes. Monetary authority should avoid unhealthy speculation in the foreign exchange, as well as a rent-seeking behaviour and adopt positive attitudes geared towards ensuring a stable naira exchange rate.

Keywords: *Exchange rate, volatility, inclusive growth*

Introduction

The centrality of exchange rate as one of the major macroeconomic policies derives from the fact that for most countries, the prevailing objective of monetary policy is price stability. Consequently, volatility in the exchange rate is generally counter-productive to the goals of price stability. This explains the political sensitivity of exchange rate regimes in both developing and developed economies. There is a widespread presumption that volatility of the exchange rates of developing countries is one of the main sources of economic instability in the world. The impact of the global economy on emerging countries like Nigeria is driven significantly by swings among the currencies of the major economic powers like United State. In recent years, these swings have been enormous, volatile and frequently unrelated to underlying economic fundamentals (Adeoye & Saibu, 2014).

The swings and instability in exchange rates have prompted monetary authorities in developing countries to intervene on ad hoc and episodic basis, without any clear sense of a sustainable equilibrium. Such exchange rate stability intervention typically comes too late to prevent severe currency misalignment and volatility. These imbalances, in turn, trigger major economic distortions, protectionist trade pressures, and inevitably sharp currency reversals (Adeoye & Saibu, 2014).

The volatility of the exchange rate has further reduced the ability of the Nigerian economy to achieve economic growth, in particular inclusive growth – that provides broadly shared opportunities to accumulate productive assets. Economic growth does not automatically translate into widely shared gains. Therefore, policy choices, especially appropriate exchange rate policy, matter. Despite rapid growth in the time past, abject poverty has persisted due to non-inclusiveness. Inclusiveness depends on the distribution of income and employment creation. Real exchange rate volatility has important effects on production, employment and trade. Thus, it is important to understand its impact on inclusive growth (Adeoye & Shobande, 2015).

Inclusive growth is a buzz-word in policy circles in developed and developing countries, as well as in international institutions. Its importance is increasingly being recognised and highlighted in work plans and strategies of the International Monetary Fund (IMF). G20, European Commission and the UK's Department for International Development for example. However, despite the agreed urgency to achieve inclusive growth, there is surprising little clarity as to what it actually means or entails, with important differences in approach among key institutions and government. The World Bank, Asia Development Bank (ADB) and International Policy Centre for Inclusive Growth (IPC-IG) all have different definitions and understandings of this concept. (Ramos & Ranieri, 2013)

In a report on inclusive growth, the Organisation for Economic Cooperation and Development (OECD) (2012) identifies three problems that even the high levels of growth of the 1990s and the decade of 2000s failed to tackle: poverty, unemployment and inequality(Ramos & Ranieri, 2013). This is highlighted the need to address the quality of growth, in particular to improve its inclusiveness. This inclusive growth debate is gaining traction in a global context of rising inequality accompanied by economic, political and social instability; high levels of unemployment; persisting poverty; increasing impacts of climate change and other forms of environmental stress and a disappointing record of translating economic growth into sustainable human development or well-being.

Some recipes for inclusive growth contain many familiar elements from standard growth strategies such as macroeconomic stability (exchange rate stability inclusive) and economic openness. This is not surprising as some institutions and government see achieving high growth rates as the major contributing factor and prerequisite for achieving inclusive growth (Ramos & Ranieri, 2013)

Thus, it has been established in the literature that there is broad agreement on the basic policies that are important for growth and poverty reduction. However, little is known about the factors that foster inclusive growth. According to Anand et al (2013) rapid pace of growth is unquestionably necessary for substantial poverty but for this growth to be sustainable in the long run, it should be broad-based across sectors and equitable. Therefore, factors such as education, openness, financial depth, unemployment and volatilities in macroeconomic variables have been identified as major determinants of inclusive growth (Barro, 2000; Anand et al, 2013).

Few studies have been conducted to explain exchange rate volatility in Nigeria. Even fewer have explored the link between exchange rate volatility and growth. Most studies have concentrated on explaining the domestic rate of inflation, where the nominal exchange rate is presented as one

of the explanatory variables. Others have estimated a money demand equation where the nominal exchange rate is one of the explanatory variables. Thus, of all the studies in this area in Nigeria such as – Olopoenia (1986). Olopoenia (1993). Ajakaiye (1994). Chete (1995). Ayodele (1997). Ogun (1998). Udom (1999). Obaseki (2001). Adewuyi (2003). Adebiyi (2007). Akpokodje (2009). Adeoye and Atanda (2011). Adeoye and Atanda (2012). Adeoye and Saibu(2014) and Adeoye and Shobande (2015). only a few of them, have attempted to link exchange rate volatility with inclusive growth. It is against this background that this study provides answers to the following research questions: How has volatility in exchange rate increased the unemployment rate; and what are the effects of exchange rate volatility on inclusive growth in Nigeria?

Literature Review and Theoretical Issues

Theoretical Issues

The relationship between exchange rate volatility and the growth of the economy has been the subject of much debate both at the theoretical and empirical levels, especially inclusive growth. While the literature is replete with many theories on exchange rate, the most cited are the traditional flow model, the monetary approach, the purchasing power parity and the uncovered interest rate hypothesis. The traditional flow model is based on the principle of the interplay of demand and supply. The forces of the market i.e. demand and supply, determine the rate of exchange. It views exchange rate as the product of the contact between the demand for and supply of foreign exchange. In this model, the exchange rate is in equilibrium when supply equals demand for foreign exchange. The exchange rate adjustments to balance the demand for foreign exchange depends on the demand domestic residents have for domestic goods and assets (Lyon, 1992). The major limitation of the traditional model or the portfolio balance model includes the over-shooting of the exchange rate target and the fact that substitutability between money and financial asset may not be automatic. This led to the development of the monetary approach.

The monetary approach is couched in relative hypothesis. The model stipulates that a situation of falling prices with a given nominal money supply results in exchange rate depreciation. The monetary approach is predicted on the importance of money. It identifies exchange rate as a function of relative shift in money stock and inflation rate as a proxy and domestic output between an economy and a trading partner economy. According to the theory, a fixed exchange rate regime can increase trade and output growth by reducing exchange rate uncertainty and thus the cost of hedging, and also encourage investment by lowering currency premium from interest rates. However, it can also reduce trade and output growth by stopping, delaying or slowing the necessary relative price adjustment process (Obstfeld & Rogoff, 1995).

The Purchasing Power Parity (PPP) is also one of the earliest, and perhaps the most popular theory that assumes that the exchange rate between two currencies would be equal to the relative national price levels. This is a theory which states that exchange rates between currencies are in equilibrium when their purchasing power is the same in each of the countries. This means that the exchange rate between two countries should be equal to the ratio of the countries price level of a fixed basket of goods and services. It assumes the absence of the trade barriers and transactions cost and existence of the Purchasing Power Parity (PPP). When a country's' domestic price level is increasing (i.e. a country experiencing inflation). that country's exchange

rate must be depreciated in order to return to PPP. The basis of PPP is 'the law of one price'. In the absence of transportation and other transactional costs, competitive market will equalize the price of an identical good in two countries when the prices are expressed in the same currency. In its version the Purchasing Power Parity (PPP) doctrine equates the equilibrium exchange rate of the ratio of domestic to foreign price level (Lyon, 1992). The PPP is a long-term approach used in the determination of equilibrium exchange rate. It is often applied as a proxy for the monetary model in exchange rate analysis (CBN, 1998). This theory could be absolute or relative and could be short-term or long-term oriented.

The Uncovered Interest Parity (UIP) is another model of exchange rate determination which appears in literatures and it can be expressed as the capital account equivalent of the purchasing power parity. This forms the central assumption of the capital account monetary model of exchange rate determination, which maintains that exchange rate moves in such a way that the expected rates of return are equalized across countries. This implies that the spot rate and expected value of future exchange rate, in asset market equilibrium is such that investors are indifferent to the currencies in which they hold assets, given the relevant interest rate. The UIP assumes that capital is perfectly mobile across. That is, there are no exchange controls, no transaction cost, and that investors are risk neutral. This implies that assets denominated in different currencies are regarded by investors as perfect substitutes. Hence, the law of one price will hold for assets returns rather than prices of tradable goods. Under this scenario, if the expected changes in the nominal spot exchange rate reflects the expected inflation rate differential in two countries which ensures that real exchange rate remains constant, UIP implies that the real exchange rate will be the same in two countries (Obstfeld & Rogoff, 1995).

The MDGs were designed not simply to eradicate poverty, but to uphold the principles of human dignity, equality and equity. A prerequisite for the achievement of these goals is that benefits cannot persistently and disproportionately accrue to one or more groups in society. For this reason, it is crucial that growth is inclusive – that it provides broadly shared opportunities to accumulate productive assets like education, that it allows people to utilize these assets in growth-enhancing activities and to benefit from such activities, and that it provides for those that do not benefit directly from growth. Both the Arab Spring and the global 'Occupy' movements point to the importance of equity both as an objective in itself, as well as an important factor to buttress the political legitimacy of economic and development policies (Adeoye & Shobande, 2015).

Economic growth does not automatically translate into widely shared gains. Policy choices matter: abject poverty has persisted despite rapid growth in several economies, while some poorer and slower-growing economies have been remarkably successful in alleviating extreme poverty and social deprivation. The relatively even distribution of income and wealth in several Asian tiger economies and, before them, in the Nordic countries, demonstrates that equality is associated with sustained strong economic performance. By contrast, high levels of inequality in other economies have coincided with volatile economic performance (Adeoye & Shobande, 2015).
Inclusive growth should reduce poverty and inequality and benefit the most marginalized. Therefore, the relationship between growth, inequality and poverty reduction are long contested

and therefore their roles in inclusive growth are equally unsettled. Different institutions have traditionally adopted different positions.

Literature Review

With respect to volatility of exchange rate, literature abounds on its effects, its measurements and existence. In Nigeria, for instance, studies have been conducted to estimate exchange rate volatility (see Yinusa, 2004; Yinusa, 2008; Yinusa & Akinlo, 2008; Olowe, 2009; Ogunleye, 2009; Aliyu, 2009a; Aliyu, 2009b; Akpokodje, 2009; Adeoye & Atanda, 2011; Adeoye & Atanda, 2012; Adeoye & Saibu, 2014 and Adeoye & Shobande, 2015). Most of the studies on exchange rate volatility in Nigeria measure the impacts of exchange rate volatility on trade balance with little attention to other internal macroeconomic variables such as economic growth. However, a few studies have been done in the area of inter-relationship between exchange rate volatility and macroeconomic policies. Among such studies is Adebiyi (2007) which investigates the impact of foreign exchange intervention in the Nigerian foreign exchange market. The study did not explore the relationship between monetary policy shocks and the movement of exchange rate. The study only examined whether foreign exchange intervention is sterilized or not.

Akpokodje (2009) explored the exports and imports effects of exchange rate volatility with specific reference to the non-Communaute Financiere Africaine (non-CFA) countries of Africa from 1986 to 2006. The countries chosen included Ghana, Lesotho, Malawi, Nigeria, Sierra Leone, South Africa, Uganda and Zambia. A GARCH approach was employed to generate on annual basis the real exchange rate volatility series for each country. The study reveals a negative effect of exchange rate volatility on exports and imports in the selected African countries. The adverse effect of exchange rate volatility on exports in the sampled countries, as found in the study, suggests the need for policy interventions that will help to minimize and, where possible, eradicate exchange rate volatility.

Nyahokwe and Ncwadi (2013) analysed the impact of the real exchange rate volatility on unemployment and the dynamic adjustment of unemployment rate following shocks to its determinants using quarterly South African data covering the period 2000 to 2010. This paper supports the cointegration and vector autoregression (VAR) and the GARCH models including analysis with impulse response and variance decomposition analyses to provide robust long run effects and short run dynamic effects on the unemployment rate. The empirical analysis using a variety of specifications, estimation techniques, and robustness tests suggests that exchange rate volatility has a statistically and economically significant impact on employment. The variables that have been found to have a long run relationship with unemployment rate include the real exchange rate, exports, real interest rate and the gross domestic product.

In a related study, Ayinde (2014) examined the impact of exchange rate fluctuation on the performance of manufacturing sector in Nigeria. Testing the hypothesis that high frequency data is important in forecasting volatility, the study employed the use of Generalized Autoregressive Conditional Heteroscedasticity (GARCH) technique coupled with quarterly time series data spanning the period 1986-2012 to investigate the relationship. In line with the theoretical exposition, the results from the study showed that exchange rate has significantly negative relationship on manufacturing performance.

Adeoye and Atanda (2011) examined the consistency, persistency, and severity (degree) of volatility in exchange rate of Nigerian currency (Naira) vis-a-vis the United State dollar using monthly time series data from 1986 to 2008. The standard Purchasing Power Parity (PPP)model was used to analyse the long-run consistency of the naira exchange rate while the time series properties of the data was examined using the ADF and PP approach, the stationary process, and order of the incorporated series. The result indicated the presence of overshooting volatility shocks

In the same vein, Ogunleye (2009) investigated the relationship between exchange rate volatility and Foreign Direct Investments (FDI) inflows in Sub- Saharan Africa, using Nigeria and South Africa as case studies. By endogeneizing exchange rate volatility, the study used a two – stage Least Squares methodology. The study found that in Nigeria, there is a statistically significant relationship between the variables, with exchange rate volatility retarding FDI inflows and FDI inflows increasing exchange rate volatility. The study revealed that, this relationship is however weak for South Africa. The possible reason adduced for this is the sound capital flows management policy of the South African Reserve Bank.

Aliyu (2009a) employed the standard deviation measure of exchange rate volatility, based on quarterly observation, to assess the impact of exchange rate volatility on non-oil export flows in Nigeria between 1986 and 2006. Empirical result revealed that exchange rate volatility decreased non-oil exports in Nigeria.

In another study, Aliyu (2009b) examined the impact of oil price shock and exchange rate volatility on economic growth in Nigeria, and measuring exchange rate volatility as the consumer price index based real exchange rate approach. But he failed to examine the degree and persistency of exchange rate volatility using standardized econometric.

Adewuyi (2003) examines only the dynamics of trade and exchange rate policies and their impacts on macroeconomic adjustments and economic performance in Nigeria. The author applies both probity regression analysis and the ordinary least square estimation technique to show how trade policy reforms and devaluation or variations of exchange rate are complementary policies for balance of payments adjustment. The empirical results from the study show that there exist some relationships between trade policy and exchange rate policy dynamics.

As earlier mentioned, it is clear from the above review that most of the studies on exchange rate volatility in Nigeria measure the impacts of exchange rate volatility on trade balance with little attention to other internal macroeconomic variables such as economic growth, in particular, inclusive growth. This is the focus of this study.

Methodology

The Model

Following Aliyu (2009b) and Nyahokwe and Ncwadi (2013). the maximum likelihood estimator for cointegration analysis developed by Johansen and Juselius (1990) was applied. The VEC model of order p (VAR (p)) is constructed as presented in the following equation.

$$\Delta yt = \Phi 0 + \Sigma \Gamma i \, \Delta yt\text{-}i + \Pi yt\text{-}1 + \varepsilon t \qquad 1$$

where *yt* is a (4×1) vector of the log of real GDP (lrgdp). the log of exchange rate volatility (lexch). log of interest rate(lint) and the log of unemployment rate (luemp). *Φ0* is the (4×1) intercept vector and *εt* is a vector white noise process. *Γi* denotes a (4×4) matrix of coefficients and contains information regarding the short-run relationships among the variables. The matrix *Π* conveys the long-run information contained in the data. If the rank of *Π* is *r*, where $r \leq n - 1$, then *Π* can be decomposed into two *n*x*r* matrices *α* and *β* such that $\Pi = \alpha\beta'$ and *β* is the matrix of cointegrating vectors; the elements of *α* are known as the adjustment parameters in the vector error correction model. The Johansen-Juselius procedure is based on the maximum likelihood estimation in a VAR model, and calculates two statistics – the trace statistic and the maximum Eigenvalue – in order to test for the presence of *r* cointegrating vectors. The maximum Eigenvalue statistic also tests for *r* cointegrating vectors against the hypothesis of *r+1* cointegrating vectors. The model is presented as:

$$lrgdpt = \alpha 0 + \beta_1 \text{lexch} + \beta_2 \text{lint} + \beta_3 \text{luemp} + \varepsilon t \qquad 2$$

Where, lrgdp is the log of real GDP growth rate, lexch is exchange rate volatility variable computed using standard deviation of exchange rate series over the years, lint is the log of interest rate and luemp is the log of unemployment rate.

Estimation Techniques and Sources of Data

Following Aliyu (2009b) and Nyahokwe and Ncwadi (2013). vector error correction (VECM) was applied. Economically speaking, cointegration of two variables indicates a long-term or equilibrium relationship between them, given by their stationary linear combination (called the cointegrating equation). The Engle–Granger test is a procedure that involves an OLS estimation of a pre-specified cointegrating regression between the variables. This was followed by a unit root test performed on the regression residuals previously identified.The scope of analysis spans 1981 to 2014.

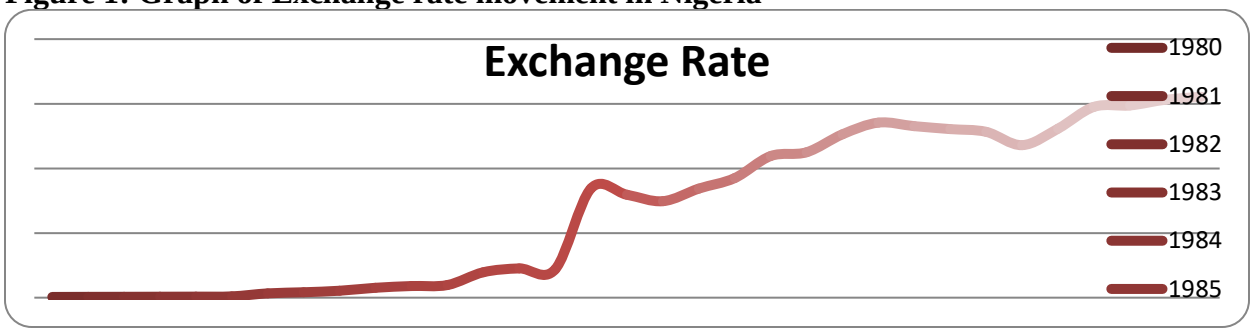
The series for exchange rate, interest rate, unemployment rate and real GDP are sourced from CBN Statistical Bulletin, 2014 edition.

Presentation of Results and Discussions

Trends of Macroeconomic Variables

The trends of the macroeconomic variables that go into the model are captured in Figures 1 to 4. A cursory look at the graphs clearly shows some level of volatility and fluctuations in the macroeconomic variables, especially interest and exchange rates.

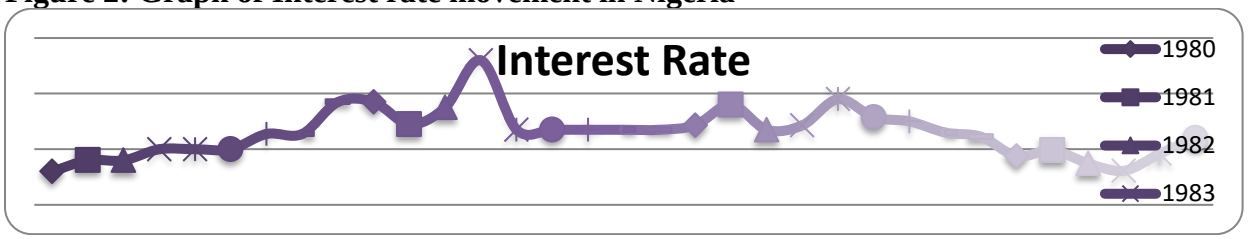
Figure 1: Graph of Exchange rate movement in Nigeria



Source: Author's Computation

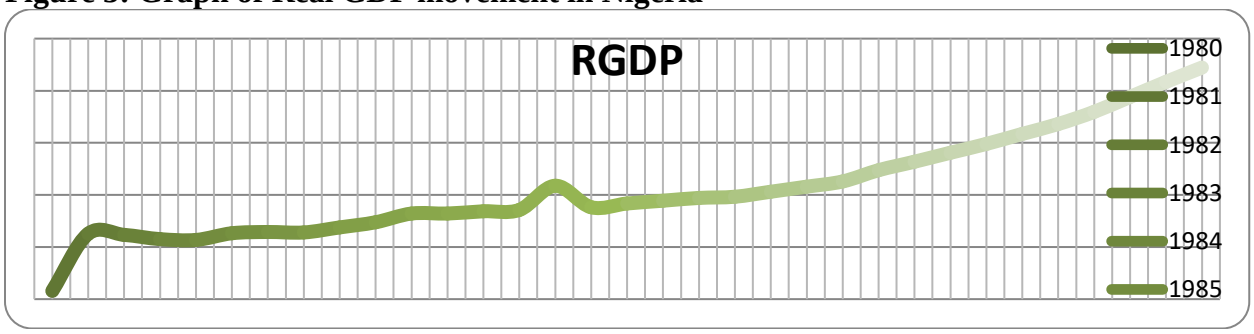
The Exchange rate, as shown in figure 1, is very volatile over the years and appears to be detrimental to growth. The swing was very intense since year 2000 which is also a reflection of failure in macroeconomic policies. The same trend was recorded in other macroeconomic variables like unemployment rate which soared over the years, as reflected in figure 4.

Figure 2: Graph of Interest rate movement in Nigeria



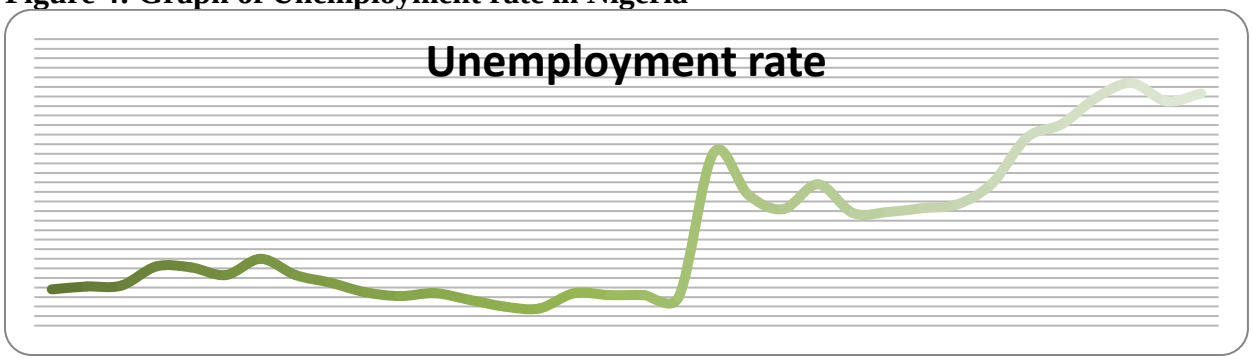
Source: Author's Computation

Figure 3: Graph of Real GDP movement in Nigeria



Source: Author's Computation

Figure 4: Graph of Unemployment rate in Nigeria



Source: Author's Computation

Unit Root Test Results

Since the data set employed is a time series data, the unit root properties of the data were examined. This is to ascertain the stationarity or otherwise level of the data set before proceeding to the estimations of the models. It is a common practice in an empirical analysis like this for time series data to demonstrate signs of non-stationarity, especially when both the mean and the variance of macroeconomic variables trend moves upwards over time or following consistent average pattern.

Table1: Unit Root Test

Variable	Intercept	Order of Integration
EXR	-5.377029*(0) [-2.957110]	1
INT	-5.971242*(1) [-2.960411]	1
UEMR	-6.809714*(0) [-2.957110]	1
RGDP	-5.448673*(0) [-2.957110]	1

Source: Author's Computation

Table 1 above shows the unit root test results conducted on the model variables. The table clearly indicates that the variables are not mean-reverting. These were confirmed with Augmented Dickey Fuller and the Phillip-Perron techniques of test of stationarity of our choice of variables. These data are not stationary at level and any regression coefficients from OLS would be spurious and inconsistent. We proceed to differencing the data.

Cointegration Test Results

The Trace statistics indicates that there are two cointegrating equations at 5% significance level. Hence, long-run equilibrium relationship exists between the variables (Table 2a). The Maximum-eigen value test also confirms that there is one cointegrating equation existing at the 5% significance level (Table 2b). This implies that we have to employ the VECM model to estimate our regression.

Table 2a: Cointegration Result (Trace Statistic)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.744847	75.99093	47.85613	0.0000
At most 1 *	0.476904	32.28242	29.79707	0.0254
At most 2	0.298400	11.54673	15.49471	0.1800
At most 3	0.006422	0.206177	3.841466	0.6498

Source: Author's Computation

Table2b: Cointegration Result (Maximum Eigen Statistic)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.744847	43.70851	27.58434	0.0002
At most 1	0.476904	20.73568	21.13162	0.0567
At most 2	0.298400	11.34056	14.26460	0.1380
At most 3	0.006422	0.206177	3.841466	0.6498

Source: Author's Computation

VEC Model Results

Table 3 below presents the VEC model results which examined the effect of exchange rate fluctuation, interest rate, unemployment rate on GDP growth. The lag selection for the model was based on Akaike information criterion. The results revealed that the effect of these variables on GDP growth rate is significant. All the variables in the model exerted negative and significant effects on the GDP growth rate. Thus, there is a clear indication that the high level of exchange rate volatility and unemployment rate in the economy have made it difficult for an inclusive growth to be achieved.

It is important to note that the effectiveness of domestic monetary policy in stabilizing exchange rate volatility in the long-run is central to ensuring the stability of exchange rate over time and guaranteeing an inclusive growth in the economy. It sufficed to also note that evidence from the above results implies that any growth experienced in the economy that does not trickle down to provide employment opportunities is not inclusive. This is the type of growth experienced in Nigeria over the years.

Table 3: VEC Model Results Dependent Variable: Δ(LRGDP)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
Δ(LRGDP(-1))	0.001835	0.029986	0.061199	0.9518
Δ(LRGDP(-2))	0.052424	0.038162	1.373725	0.1840
Δ (LEXR(-1))	-0.048057	0.041977	-1.144827	0.2652
Δ (LEXR(-2))	0.140470	0.043599	3.221888	0.0041
Δ (LINT(-1))	-0.461158	0.162037	-2.846009	0.0097
Δ (LINT(-2))	-0.327581	0.176111	-1.860081	0.0769
Δ (LUEMR(-1))	-0.104149	0.040186	-2.591685	0.0170
Δ (LUEMR(-2))	-0.009946	0.026447	-0.376072	0.7106
Constant	0.074981	0.015876	4.722903	0.0001
ECM term	-0.028860	0.008985	-3.212044	0.0042
R-squared	0.656348	Mean dependent var		0.046823
Adjusted R-squared	0.509069	S.D. dependent var		0.066757

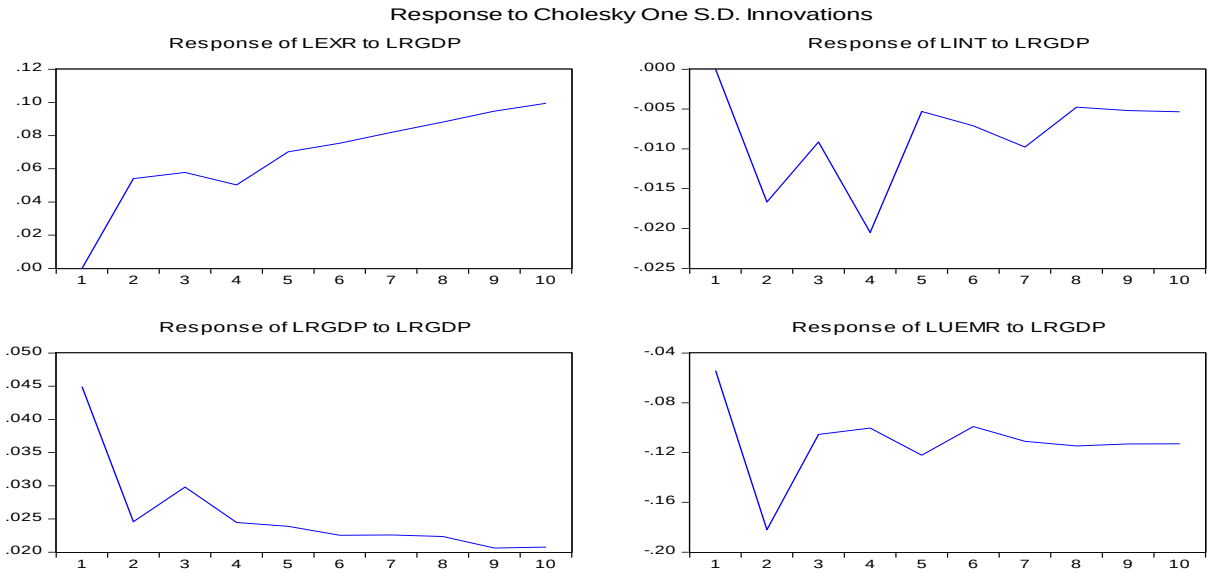
S.E. of regression	0.046774	Akaike info criterion		-3.031273
Sum squared resid	0.045944	Schwarz criterion		-2.568696
Log likelihood	56.98472	Hannan-Quinn criter.		-2.880484
F-statistic	4.456488	Durbin-Watson stat		2.401302
Prob(F-statistic)	0.002287			

Source: Author's Computation

Impulse Response of GDP Growth Rate

The purpose of this sub-section is to determine the mechanism through which changes in GDP growth rate respond to interest rate, unemployment rate and exchange rate shocks as a result of innovation distortion. Therefore, an Impulse Response Function (IRF) is generated from the VEC model to trace the response. The response of other variables to changes in GDP growth rate is capture in Figure 5 below. The impulse response analysis of GDP growth rate to shocks from interest rate and exchange rate shows that they exert very strong and positive effects on GDP growth rate. On the other hand, a negative response was recorded in the case of unemployment. This further corroborates our earlier submission that the behaviour of those macroeconomic variables does not give room for an inclusive growth in the economy.

Figure 5: Impulse Response Analysis of other variables to RGDP



Forecast Error Variance Decomposition Analysis

This sub-section is complementary to the previous sub-section which analyses the impulse response function. The impulse reaction functions trace the effects of a shock from one endogenous variable on to other variables in the model. However, the variance decomposition separates the variation in an endogenous variable into the component shocks of the model. Thus, the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the model.

The result of variance decomposition of GDP growth rate, exchange rate, interest rate and unemployment rate to individual innovation shocks in the model is presented in Tables 4a to 4d.

From the table, the total variance in exchange rate is completely accounted for by changes in previous exchange rate volatility shock. Shocks from other variables are less than 10 per cent, especially in the first 5 periods. Thereafter, shocks from the interest rate formed a greater proportion of the total variation in exchange rate. The observed result is not surprising since both variables are policy variables. Therefore, changes in the interest rate are bound to have effects on the behaviour of exchange rate in the economy.

With respect to interest rate, over 80 percent of the total variation is accounted for by changes in the previous level of interest rates. It appears clearly that other variables, such as GDP growth rate and unemployment rate, have little or no effect on the behaviour of the interest rate. However, exchange rate changes have negligible impact on the behaviour of interest rate. The results on Table 4c is highly revealing. It clearly shows whether the growth experienced over the years in Nigeria is inclusive or not. It further shows the possible macroeconomic variables that are likely responsible for the non-inclusiveness of the growth.

It is clearly shown on the table that exchange rate and interest rate shocks formed the greater proportion of the total variation in GDP growth rate. This implies that the volatility in exchange rate as well as the behaviour of the interest rate determines the growth pattern in the economy. One can infer from the result that fluctuation and instability in the exchange rate over the years is responsible for the non-inclusion of the GDP growth rate. In fact, this premise is strongly supported by the result in Table 4d. The result shows that the growth experienced by the economy over the years could not trickle down to reduce the unemployment rate and poverty in the economy. This is due to high volatility in the major macroeconomic variables in the economy such as the exchange rate and interest rate.

The findings from this study is in line with the findings of Nyahokwe and Ncwadi (2013) that analysed the impact of the real exchange rate volatility on unemployment and the dynamic adjustment of unemployment rate for South Africa. The results from the study showed that there have been long run relationships with unemployment rate including the real exchange rate, exports, real interest rate and the gross domestic product.

Table 4a: Variance Decomposition of Exchange Rate in Nigeria

Period	S.E.	LEXR	LINT	LRGDP	LUEMR
1	0.331176	100.0000	0.000000	0.000000	0.000000
2	0.488946	94.17473	3.998112	1.224208	0.602949
3	0.581392	91.99238	5.712229	1.853624	0.441766
4	0.668001	89.65981	8.003091	1.970723	0.366372
5	0.756805	85.04367	12.18408	2.395725	0.376522
6	0.834226	80.80412	15.78254	2.789592	0.623746
7	0.914788	76.45527	19.51094	3.122228	0.911563
8	0.999096	71.92366	23.41973	3.394842	1.261771
9	1.081949	67.64651	27.04718	3.661461	1.644853
10	1.165348	63.76945	30.31095	3.883809	2.035797

Source: Author's Computation

Table 4b: Variance Decomposition of Interest Rate in Nigeria

Period	S.E.	LEXR	LINT	LRGDP	LUEMR
1	0.245167	12.90526	87.09474	0.000000	0.000000
2	0.324560	7.929318	91.55625	0.264243	0.250190
3	0.369836	9.760930	89.49580	0.264495	0.478778
4	0.428422	15.38777	83.61661	0.426276	0.569343
5	0.477644	15.48804	83.49905	0.355272	0.657636
6	0.512079	15.15614	83.91281	0.328378	0.602675
7	0.550070	15.16947	83.97676	0.316133	0.537639
8	0.590004	14.80921	84.43379	0.281315	0.475692
9	0.625219	14.42886	84.88918	0.257422	0.424547
10	0.660542	14.26106	85.11999	0.237160	0.381794

Source: Author's Computation

Table 4c: Variance Decomposition of Real GDP in Nigeria

Period	S.E.	LEXR	LINT	LRGDP	LUEMR
1	0.046774	4.138054	3.614783	92.24716	0.000000
2	0.064201	3.055360	24.90967	63.63305	8.401913
3	0.075322	12.95133	18.98292	61.89205	6.173698
4	0.082334	17.63578	16.19487	60.63182	5.537522
5	0.091631	22.27350	17.31448	55.74697	4.665053
6	0.102808	29.25910	17.51285	49.09374	4.134305
7	0.111614	31.27702	19.04775	45.74626	3.928974
8	0.120464	31.43647	22.03849	42.71536	3.809676
9	0.129446	31.98035	24.75381	39.52880	3.737032
10	0.138096	32.24671	26.93309	36.98923	3.830977

Source: Author's Computation

Table 4d: Variance Decomposition of Unemployment Rate in Nigeria

Period	S.E.	LEXR	LINT	LRGDP	LUEMR
1	0.248022	1.120460	0.135186	4.772289	93.97206
2	0.458058	25.20822	0.414411	17.18653	57.19084
3	0.577858	18.63515	1.989045	14.12737	65.24843
4	0.679471	13.59779	10.97865	12.39845	63.02512
5	0.752732	11.29874	13.90379	12.73175	62.06572
6	0.804604	9.888903	14.00321	12.66084	63.44705
7	0.857716	8.730957	15.39818	12.81551	63.05535
8	0.911482	7.818231	16.06743	12.93279	63.18155
9	0.961940	7.132808	16.32985	12.99346	63.54388
10	1.012219	6.476398	16.93651	12.97852	63.60858

Source: Author's Computation

Conclusion and Policy Recommendations

The study has clearly shown that volatility in exchange rate has increased the unemployment rate which makes the growth rate in GDP experienced over the years not to be inclusive. The volatility in exchange rate does not promote investment and creates room for absorptive capacity in the economy. The results from the variance decomposition show that the total variance in exchange rate volatility is significant.

Based on the above findings, it is recommended that monetary authority (CBN) should include in its policy objectives the pursuance of weak exchange rate targeting. Fixing exchange rate at all costs should be discouraged at all cost. This is because fixing exchange rate without giving due attention to inflation is misguided. Similarly, raising interest rates to control inflation without any regard to what is happening to the exchange rate will not achieve the purpose. Some flexibility in the exchange rate should be welcomed since it enables a country to cope with macroeconomic shocks arising from policy changes. Monetary authority should avoid unhealthy speculation in the foreign exchange, as well as rent-seeking behaviour. Rather, this body should adopt positive attitudes geared towards ensuring a stable Naira exchange rate.

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