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An Analysis of the Impact of Exchange Rate Policy on Macroeconomic Performances in Nigeria (1986 -2015)

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Abstract

This paper investigates the causal relationship between exchange rate and a number of macroeconomic variables such as gross domestic product growth rate, inflation rate, Savings, Interest rate, Investment and unemployment in Nigerian post Structural Adjustment Programme (SAP). Annual time series data from 1986 -2015 were used as the research sample period. The data were sourced from the National Bureau of Statistics and Central Bank of Nigeria (CBN). The ADF unit root test was applied to check the stationarity of the variables. The Johansen cointegration test, equation estimation and Granger causality tests were applied. Johansen cointegration result shows that there exists a long-run equilibrium relationship among the variables under consideration. The Granger causality test between the dependent and independent variables shows a unidirectional causality from exchange rate to gross domestic product growth rate, inflation rate, Trade, Interest rate, Investment and BOP. On the whole, the paper has provided empirical evidence that there is a causal relationship between exchange rate and some macroeconomic indicators in Nigerian post SAP period. These indicators on the other hand impact on the determination of exchange rate. Certain policy implications arise from these findings. It demonstrates the need for monetary authorities to learn from past exchange rate management and come up with a monetary policy framework that would ensure stability in the existing exchange rate policy.

Keywords: Post SAP, Exchange rate, Trade, Economic growth, Real income, Prices

INTRODUCTION

By way of simple definition, Exchange rate is the domestic price of foreign currency. It can be simply viewed as the price of a local currency in relation to other currencies. In Nigeria, the term foreign exchange has become a household expression due to the activities of the street hawkers of this very essential commodity. Foreign exchange is a financial asset usually denominated in foreign asset earned through exports of goods and services as well as inflows of foreign investments, external grants and loans. The quantum of foreign exchange available at any point in time constitutes foreign exchange resources. The Exchange rate is usually determined in principle by the interplay of supply and demand in a free market environment. In practice, however, no currency is allowed to float freely by the monetary authorities.

Exchange rate plays an increasingly significant role in any economy as it directly affects domestic price level, profitability of traded goods and services, allocation of resources and investment decision. The stability of the exchange rate is today a formidable bedrock of all economic activities. Since the adoption of the Structural Adjustment Programme (SAP) in 1986, Nigeria has moved to various types of floating regimes of exchange rate from the fixed/pegged regimes between 1960s and the mid-1980s. Floating exchange rate has been shown to be preferable to the fixed arrangement because of the responsiveness of the rates to the foreign exchange market (Nwankwo, 1980).

The liberalization of the exchange rate regime in 1986 led to introduction of various techniques with a view to finding the most appropriate method for achieving acceptable exchange rate for the Naira. The frequency with which these measures were introduced and charged is informed by the determined efforts of the monetary authorities to relentlessly combat the increasing depreciation and instability of the Naira exchange rate.

To ensure effective management of foreign exchange, the fundamental problems of the nation's economy must be addressed. This involves an improvement in the state of infrastructural increase, local capacity utilization and a reduction of the cost of doing business in Nigeria. This should be done through the deregulation and diversification of the relevant sectors of the nation's economy.

Since the seventies, there has been an increasing importance attached to exchange which could be attributed to the following such as:
Increased demand for foreign exchange; increased rate and volume of fund flows due to globalization process; trade liberalization undertaken by developing countries since 1980s; the internationalization of modern business; continued growth in world trade relative to national economies; the trends towards economic integration; and the rapid pace of change in the technology of money transfer.

Thus, it is important to note that exchange rate plays a vital role in determining the performances of other macroeconomic variables such as Gross Domestic Product (GDP) growth rate, Savings, Investment, Interest rate, Inflation, Trade, Balance of Payment (BOP), Unemployment, Poverty, Revenue, Money supply, etc. However, key macroeconomic variables such as GDP growth rate, inflation, interest rate, exchange rate, Balance of Payment (BOP) and Trade will be considered here. These are critical for every free market economy in the world. It is therefore not surprising that, exchange rate is among the most watched, analyzed and government manipulated macroeconomic indicators. Most countries attempt to moderate their domestic currency fluctuations by imposing restrictions on exchange rate movements (Benita and Lauterbach, 2007). It is a key macroeconomic measure in the context of general economic reform programmes and

because of its importance government takes active part in its determination. Specifically, it is important as the connection between the price systems of countries, as price in the allocation of real resources among tradable and non-tradable sectors, as a promoter or otherwise of imports and exports, and as an instrument in the design of the balance of payment programme of a country.

CONCEPTUAL ISSUES

A clear understanding of some key concepts is critical in appreciating the structure and content of this study. In this regard, concepts such as Macroeconomic performance and Exchange rate will need to be defined and well understood.

Macroeconomic performance refers to an assessment of how well a country is doing in reaching key objectives of government policy (Li, 2006). The main aim of policy is to ensure an improvement in the real standard of living for the population of a Country. Indeed, the essence of the existence of every successive Government is to see to the well-being of its citizenry in terms of the Health, Education, Nutritional status and Safety of life and property of the people as well as Infrastructural development.

On the other hand, Exchange rate is the price of the currency of one country expressed in terms of the currency of another. For example, the Nigerian Naira has exchange rate against the U.S. dollar and many other currencies. It may be expressed as nominal exchange rate or real exchange rate.

The nominal exchange rate is a monetary concept which measures the relative price of two currencies e.g. Naira in relation to dollar (N/$), while the real exchange rate refers to the purchasing power of the domestic currency in terms of its relative price or value taking the effect of inflation into consideration.

An exchange rate system can also be fixed or allowed to fluctuate. A fixed exchange rate is a system in which a country's exchange rate remains constant or stays within some small margin of fluctuation around a constant par value. On the other hand, the floating exchange rate is an exchange rate system with no government or central bank action to keep it stable (Black 2003). Rather the value of the nation's currency is determined by the forces of demand and supply. With floating rates external shocks especially foreign trade shocks are less disruptive and monetary policy is more effective in influencing aggregate demand (Pugel, 2007), hence economic growth is achieved. Economic growth is an increase in an economic variable normally persisting over successive periods. The variable concerned may be real or nominal. Growth in real economic variable such as Gross Domestic Product (GDP) for short periods or at low rate may occur by simply having similar activities conducted on a large scale. Rapid or persistent growth is likely to involve positive changes in the nature of economic activity while exchange rate fluctuation has the tendency of encouraging instability and risk of transaction in a developing economy like that of Nigeria.

HISTORICAL PERSPECTIVE OF EXCHANGE RATE REGIMES IN NIGERIA

In Nigeria, the exchange rate policy has undergone substantial transformation from the immediate post-independence period when the country maintained a fixed parity with the British pound, through the oil boom of the 1970's, to the floating of the currency in 1986, following the near collapse of the economy between 1982 and 1985. In each of these epochs, the economic and political considerations underpinning the exchange rate policy had important

repercussions for the structural evolution of the economy, inflation, the balance of payments and real income.

Analysis of Nigeria's exchange rate movement from 1970-2010 showed that there exists a causal relationship between the exchange rate movements and macroeconomic aggregates such as inflation, BOP and economic growth. Consequently, the persistent depreciation of the exchange rate trended with major economic variables such as inflation, GDP growth, BOP and GDP ratio. In this context, the exchange rate movement in the 1990's trended with inflation rate. During periods of high inflation rate, volatility in the exchange rate was high, which was reversed in a period of relative stability. For instance, while the inflation rate moved from 7.5 per cent in 1990 to 57.2 per cent and 72.8 per cent in 1993 and 1995 respectively, the exchange rate moved from N8.04 to $1 in 1990 to N22.05 and N21.89 to a dollar in the same period.

When the inflation rate dropped from 72.8 percent in1995 to 29.3 per cent and 8.5 per cent, in 1996 and 1997 respectively, and rose thereafter to 10.0 per cent in 1998 and averaged 12.5 per cent in 1999-2009, the exchange rate trended in the same direction.

Similarly, as at 2010, the exchange rate for the naira was ₦150.00/$1, while inflation rate was 11.8 percent. This trend continues up till 2015 when the US Dollar increased astronomically to ₦199.45/$1 in 2015.

In a continued effort to stabilised the exchange rate, as well as ensure a single exchange rate for the Naira, numerous variants of market determined rates have been adopted since 1986. The Second tier Foreign Exchange Market (SFEM) was introduced in 1986, while the First and Second tier markets were merged into enlarged Foreign Exchange Market (FEM) in 1987, this was later changed to the Inter-Bank Foreign Exchange Market (IFEM) in January 1989. This new system allowed for bureau de change to source for their foreign exchange requirement from the IFEM. This was later modified to the Autonomous Foreign Exchange Market (AFEM) in 1995 which allowed the Central Bank to purchase foreign exchange from oil companies.

The fact that a fast depreciating local currency can create instability within other macroeconomic variables has necessitated the efforts by the Central Bank, the pivot monetary authority in Nigeria to put in place different measures at stabilizing the local currency. The Central Bank of Nigeria has over the years done a lot in the area of exchange rate and foreign exchange market management with a view to achieving a realistic exchange rate that will aid economic growth and achieve a relative stability in the value of the Naira against the dollar and other foreign currencies.

EMPIRICAL REVIEW

There are various empirical literatures that have been carried out in developing and developed countries on the linkage between Exchange rate and Macroeconomic performances. Some of these studies are reviewed in this section as follows:

Okhira and Saliu (2008) examined the impact of exchange rate on Inflation rate and the relationship that exists among government expenditure, money supply, exchange rate, oil revenue and Inflation in Nigeria. The study adopted the Augmented Dickey-Fuller to carry out the unit root test and cointegration with Johansen test. The study observed that the variables are correlated, which means the impact of each variable on exchange rate in the economy is inseparable. This is a confirmation to show that exchange rate affects various macroeconomic variables which eventually affect investment and Economic Growth.

Ngerebo and Ibe (2013) examined Exchange Rate and Macroeconomic Performance in Nigeria: A Causal Post Structural Adjustment Programme Investigation. They used cointegration and granger causality. The Granger causality test between the dependent and independent variables shows a unidirectional causality from exchange rate to BOP, inflation and gross domestic product growth rate. They inferred that exchange rate affect external reserve and BOP.

Iqbal, Major and Habib (2011) studied Exchange Rate Volatility & Macroeconomic Variables in Pakistan. GARCH model has been applied in this study to calculate volatility of real exchange rate and Ordinary Least Square regression technique has been used to investigate the relationship between dependent and independent variables. Finding of this study confirmed the impact of exchange rate volatility on macroeconomic variables in Pakistan. It is also concluded that exchange rate volatility positively affects GDP.

Ismaila (2016) examined exchange rate depreciation and Nigerian economic performance after the Structural Adjustment Programmes (SAP). The study used cointegration and error correction mechanism. The results show that broad money supply, net export and total government expenditure have significant impact on real output performance in the long run while exchange rate has direct and insignificant effect on Nigerian economic growth in both short and long run. Therefore, the study suggested that policy makers should not totally rely on exchange rate depreciation policy instrument to induce economic growth.

Mirchandani (2013) examined Analysis of Macroeconomic Determinants of Exchange Rate Volatility in India using correlation analysis. The study found exchange rate and inflation to be highly correlated. The study recommended the proper exchange rate management.

Danmola (2013) analysed the impact of exchange rate volatility on the macro economic variables in Nigeria. The Ordinary least square and Granger Causality was used. Exchange rate has a significant impact on economic growth which is direct and substantial. They recommended Exchange rate control.

Farhana and Nushrat (2015) studied the Effects of Macroeconomic Variables on Exchange Rates in Bangladesh. The study employed Correlation and Regression Analysis. The results showed that macroeconomic variables significantly influenced exchange rate. The study suggested the need for proper management of exchange rate policy in an economy.

Ojo and Alege (2014) examined exchange rate fluctuations and macroeconomic Performance in Sub-Saharan Africa: A dynamic panel Cointegration analysis. They employed the dynamic generalized methods of moments (GMM) and the use of panel data. The Panel Granger Causality test confirms the bilateral relationships between some variables in the model.

Asinya and Nelson (2014) examined Exchange rate depreciation and government policy is Nigeria: an empirical evidence: The study used the Ordinary Least Squares (OLS) econometric technique and short-run Vector Error Correction (VEC) model to determine the speed of the adjustment to equilibrium. It was empirically shown that, there is significant relationship between government fiscal and monetary policies and exchange rate depreciation. The results further revealed high explanatory power of the coefficient of multiple determination (R2) and the overall model was significant. Hence, government can curtail the naira depreciation by adopting a flexible exchange rate regime, reducing external trade imbalances and checking the performance of some macroeconomic variables.

THEORETICAL ISSUES

The theoretical background for this presentation is the fact that exchange rate theory is one of the key issues in the mainstream neoclassical or "New Keynesian" stream of thought. It is now widely accepted that exchange rates cannot be forecast better than 'random walk' in the short and medium run. For the long run, however, most authors stick to the old purchasing power parity theory whose empirical validation is not much better than for the theories used for the short run, mainly interest rate parity theory. The Literatures reviewed followed the old theories, ignoring other approaches and refraining from systematically checking empirical evidence. Yet, it is amazing to see that they differ considerably, even though they remain within the leading theoretical paradigm. Some of the theories reviewed include the following:

The earliest theory developed by Mundell (1961) and Mickinnon (1963) focused on trade and stabilization of the business cycle. According to the theory, a fixed exchange rate regime can increase trade and output growth by reducing exchange rate uncertainty and encourages investment by lowering currency premium from interest rates. On the other hand, a flexible exchange rate could increase output growth and trade by price adjustment process. For this theory, there is a positive relationship between exchange rate and economic growth.

Another standing point of exchange rate theory is the purchasing power parity (PPP) which is also called the inflation theory of exchange rates. This theory argues that the exchange rate will change so that the price of a particular good or service will be the same regardless of where it is bought from. For this reason, the theory of PPP is often known as the law of one price. It is expressed with the equation:

E = Pdd /Pff

Where;

E = Nominal exchange rate

Pdd = Domestic prices in domestic currency (P)

Pff = Foreign prices in foreign currency (P*)

This is simply expressed as $E = P/P^*$.

From the equation, it is deduced that E depends mainly on the factor that influence domestic price level. Therefore, taking E as endogenously determined. A commonly used variant expresses the equation in terms of differences relating the changes in the nominal exchange rate of changes in relative prices. This is known as relative PPP: Showing that;

$\% \Delta E = \%\Delta P - \%\Delta P^*$ Where $\%\Delta$ = Percentage change (Chamberline and Yaeh, 2006).

There is also the monetary theory of the exchange rate. According to this theory, the exchange rate is determined by the actions of the domestic monetary authority and is an extension of the simple quantity theory of money: $Mv = Py$.

Where M = Monetary stock; v = velocity of money in circulation, P = price level, Y = full employment of output. With V and Y being constant, the equation gives

$P = 1/v\ (M/y)$, therefore, $\%\Delta M = \%\Delta P$

If relative prices are determined by different monetary regimes, then it is easy to make the additional step; using the relative PPP equation, the change in domestic prices can then feed directly and proportionally into exchange rate;

i.e. $\%\Delta M = \%\Delta P = \%\Delta E$.

This takes exchange rate to be exogenously determined and its changes has effect on economic growth through changes in monetary stock. (Chamberline and Yaeh, 2006).

Another theory that explained exchange rate is the balance of payment (BOP) theory as postulated by Bo Sodersten (1980). According to him, BOP is merely a way of listing receipts and

payments in international transactions for a country. It holds that under free exchange rates, the exchange rate of the currency of a country depends upon its balance of payment. A favorable balance of payment raises the exchange rate, while an unfavorable balance of payment reduces the exchange rate. Thus, the theory implies that exchange rate is determined by the demand for and supply of exchange rate which depends on imports and exports of goods and services, international loans, reparation payments, etc. (Jhingan, 2003). It takes exchange rate to be endogenously determined. In effect, this theory constitutes the theoretical framework for the analyses of the impact of exchange rate on macroeconomic performances.

METHODOLOGY

Model Specification

Based on the **Balance of Payment Theory** as mentioned in the last section, there exists a relationship between exchange rate and other macroeconomic variables such as Balance of Payments and Trade. In this connection, this study adapted the model of Ngerebo and Ibe (2013) who examined Exchange Rate and Macroeconomic Performance in Nigeria: A Causal Post Structural Adjustment Programme Investigation.

Ngerebo and Ibe (2013) model is specified as:

$$EXR = \beta_0 + \beta_1 BOP + \beta_2 Trade + \mu \quad 3.1$$

Where EXR is Exchange rate
BOP is Balance of Payment
μ = Error Term

This study adapted Ngerebo and Ibe (2013) model to include the interaction of other macroeconomic variables that have the tendency of affecting exchange rate in an economy. Other important macroeconomic variables such as GDP, Inflation rate and interest rate were added to their model as follows:

$$EXR = f(INF, GDP, BOP, Trade, INT) \quad 3.2$$

The mathematical form of the model is stated as follows:

$$EXR = \beta 0 + \beta 1 INF + \beta 2 GDP + \beta 3 BOP + \beta 4 Trade + \beta 5 INT + \mu \quad 3.3$$

Where:
INF = Inflation rate
INR = Interest rate
GDP = Gross Domestic Product Growth rate.
β_0 is the constant
β_1- β_6 are the parameter estimates
μ = is the error term

However, to do a granger causality test to establish bi-causality amongst variables, a ***Vector Autoregressive (VAR) model*** is specified.
Conventionally the VAR model is given as;

$$Y_t = a \sum_{j=1}^{m} Y_{t-i} \, \emptyset_j + \mu_t, \quad \mu_t \sim IID(0,\sigma^2) \quad 3.4$$

Where,
Y_t = Vector of endogenous variables in the system at time t, the current period
α = vector of constant term

Y_{t-i} = Lagged endogenous variables. This captures the effect of the variables in the system as suggested by Sims.
$Ø_i$ = the matrix of the coefficients of the variables in the system
m = lag length
U_t = the vector of random disturbance error term, which are assumed to be independently and identically distributed error term with zero mean and finite variance.
Instructively, this study employed a six-variable VAR model comprising BOP, Trade, exchange rate, inflation rate, economic growth and interest rate. Thus, the VAR models can be specified below.

$$EXR_t = \alpha_0 + \sum_{j=1}^{m} \alpha_{1j} GDP_{t-j} + \sum_{j=1}^{m} \alpha_{2j} INT_{t-j} + \sum_{j=1}^{m} \alpha_{3j} Trade_{t-j} + \sum_{j=1}^{m} \alpha_{4j} EXR_{t-j} + \sum_{j=1}^{m} \alpha_{5j} BOP_{t-j} + \sum_{j=1}^{m} \alpha_{6j} INF_{t-j} + U_{1t}$$

…….. (3.5)

$$GDP_t = \beta_0 + \sum_{j=1}^{m} \beta_{1j} GDP_{t-j} + \sum_{j=1}^{m} \beta_{2j} INT_{t-j} + \sum_{j=1}^{m} \beta_{3j} Trade_{t-j} + \sum_{j=1}^{m} \beta_{4j} EXR_{t-j} + \sum_{j=1}^{m} \beta_{5j} BOP_{t-j} + \sum_{j=1}^{m} \beta_{6j} INF_{t-j} + U_{2t}$$

……(3.6)

$$INT_t = \lambda_0 + \sum_{j=1}^{m} \lambda_{1j} GDP_{t-j} + \sum_{j=1}^{m} \lambda_{2j} INT_{t-j} + \sum_{j=1}^{m} \lambda_{3j} Trade_{t-j} + \sum_{j=1}^{m} \lambda_{4j} EXR_{t-j} + \sum_{j=1}^{m} \lambda_{5j} BOP_{t-j} + \sum_{j=1}^{m} \lambda_{6j} INF_{t-j} + U_{3t}$$

……(3.7)

$$BOP_t = \gamma_0 + \sum_{j=1}^{m} \gamma_{1j} GDP_{t-j} + \sum_{j=1}^{m} \gamma_{2j} INT_{t-j} + \sum_{j=1}^{m} \gamma_{3j} BOP_{t-j} + \sum_{j=1}^{m} \gamma_{4j} EXR_{t-j} + \sum_{j=1}^{m} \gamma_{5j} Trade_{t-j} + \sum_{j=1}^{m} \gamma_{6j} INF_{t-j} + U_{4t}$$

…….. (3.8)

$$INF_t = \delta_0 + \sum_{j=1}^{m} \delta_{1j} GDP_{t-j} + \sum_{j=1}^{m} \delta_{2j} INT_{t-j} + \sum_{j=1}^{m} \delta_{3j} BOP_{t-j} + \sum_{j=1}^{m} \delta_{4j} EXR_{t-j} + \sum_{j=1}^{m} \delta_{5j} Trade_{t-j} + \sum_{j=1}^{m} \delta_{6j} INF_{t-j} + U_{5t}$$

……(3.9)

$$Trade_t = \phi_0 + \sum_{j=1}^{m} \phi_{1j} GDP_{t-j} + \sum_{j=1}^{m} \phi_{2j} INT_{t-j} + \sum_{j=1}^{m} \phi_{3j} Trade_{t-j} + \sum_{j=1}^{m} \phi_{4j} EXR_{t-j} + \sum_{j=1}^{m} \phi_{5j} BOP_{t-j} + \sum_{j=1}^{m} \phi_{6j} INF_{t-j} + U_{6t}$$

……(3.10)

Where:
$\alpha_0 - \alpha_6$, $\beta_0 - \beta_6$, $\lambda_0 - \lambda_6$, $\gamma_0 - \gamma_6$, $\delta_0 - \delta_6$, $\phi_0 - \phi_6$ are Coefficients to be estimated,
$U_{1t} - U_{6t}$ are the Gaussian 'white noise' that are independently and identically distributed random variables.

Techniques of Analysis
The study made use of Empirical Analysis since the data used were from secondary sources. Unit root test was carried out on the time series to ascertain their properties. Because the variables were non stationary at level, Johansen cointegration test was conducted to estimate the long run relationship between them. Using the results of the VAR Analysis, the Granger Causality test was

used to determine the interactions amongst the variables. All the Analyses were carried out using Econometric Views (E-Views) Software Version 9.0.

Sources of Data

The data on GDP, Trade and Inflation rate were from the National Bureau of Statistics (NBS), whereas the data for other variables such as Balance of Payment (BOP), Interest Rate and Exchange Rate were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin. The data sample size covers 30 years (1986 – 2015). The choice of 1986 as a base year was to enable us see the changes that would have occurred as a result of the Government Structural Adjustment Programme (SAP) that was meant to holistically reform the economy then. The number of years was meant to analyse the impact of exchange rate on Economic Growth during the economic reforms era and the time period was chosen because a time series analysis requires a number of years for it to be meaningful and to take proper account of the persistent dynamics.

DATA PRESENTATION AND ANALYSIS

The Data used for the Analyses are as presented on Table 1.0. The data were analyzed with Econometric views (E-views) using various econometric techniques to determine the direction of interaction amongst the variables under consideration. Graphical analysis was carried out in order to observe trend flows in the variables under consideration. Diagnostic tests were conducted on the data to be sure they were valid enough for relevant inferences to be made. The model was then estimated and interpretations of major findings were made.

Trend Analysis

Graphically, the trend analyses showed that there was volatility in all the variables under study at one point or the other during the period under review. This was attributed to the effects of Government policies that would have had attendant effects on some of the variables. These are presented graphically below:

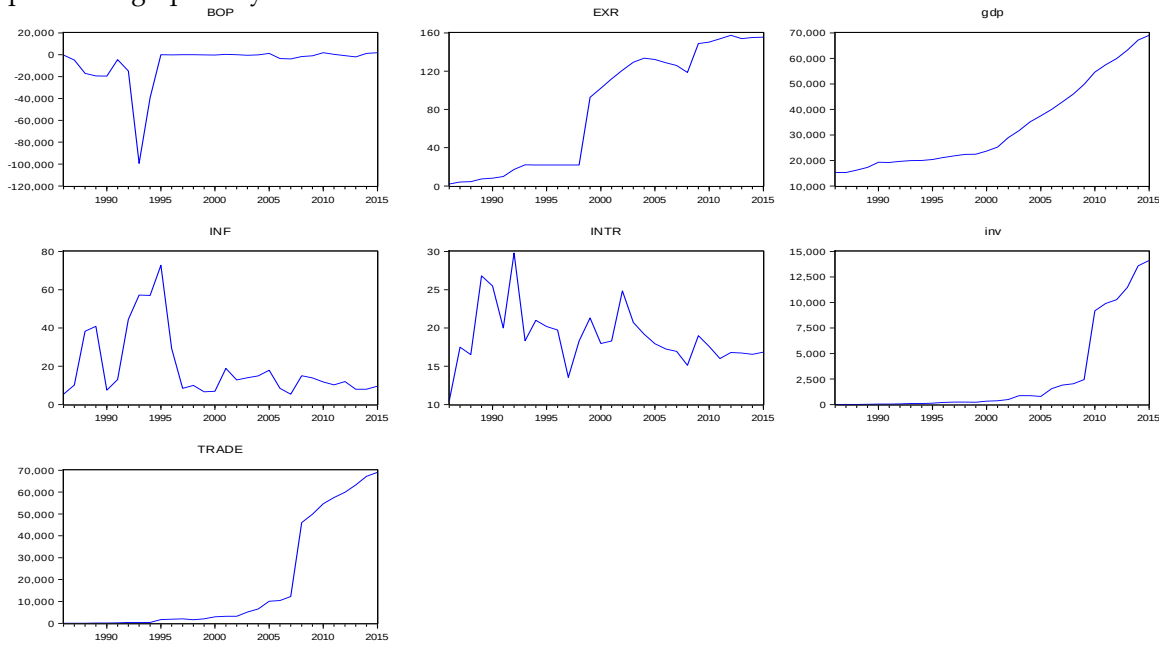

Table 7.1: UNIT ROOT TEST (Augmented Dickey Fuller Test)

Variable	Levels	Critical Values		First differences	Critical Values		Order of Integration	
INF	-2.847412	1%	-4.440739	-5.343534	1%	-4.394309	I(1)	**Stationary at 1st difference**
		5%	-3.632896		5%	-3.612199		
		10%	-3.254671		10%	-3.243079		
INTR	-3.473491	1%	-3.679322	-4.612287	1%	-4.416345	I(1)	**Stationary at 1st difference**
		5%	-2.967767		5%	-3.622033		
		10%	-2.622989		10%	-3.248592		
INV	8.433056	1%	-4.416345	- 4.992494	1%	-4.440739	I(1)	**Stationary at 1st difference**
		5%	-3.622033		5%	-3.632896		
		10%	-3.248592		10%	-3.254671		
GDP	-3.131129	1%	-4.309824	-7.460081	1%	-4.323979	I(1)	**Stationary at 1st difference**
		5%	-3.574244		5%	-3.580623		
		10%	-3.221728		10%	-3.225334		
BOP	-3.177009	1%	-4.356068	-4.891551	1%	-4.323979	I(1)	**Stationary at 1st difference**
		5%	-3.595026		5%	-3.580623		
		10%	-3.233456		10%	-3.225334		
TRADE	-2.567528	1%	-4.309824	-5.953600	1%	-4.323979	I(1)	**Stationary at 1st difference**
		5%	-3.574244		5%	-3.580623		
		10%	-3.221728		10%	-3.225334		
		5%	-3.574244		5%	-3.580623		
		10%	-3.221728		10%	-3.225334		

Source: *Author's own computation using E-Views Software, Version 9.0*

From the above summary table of the Augmented Dickey Fuller Test, it is evident that all variables are not stationary at level at 1%, 5% and 10% level of significance. However, when the variables were examined at first difference they were stationary. This showed that if the variables are estimated in first difference the regression result will be free of spurious result.

Table 7.2 Cointegration Analysis

Series: BOP EXR GDP INF INTR INV TRADE
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.977525	316.4731	139.2753	0.0000
At most 1 *	0.927032	210.2029	107.3466	0.0000
At most 2 *	0.883168	136.9065	79.34145	0.0000
At most 3 *	0.682812	76.78986	55.24578	0.0002
At most 4 *	0.542555	44.63857	35.01090	0.0035
At most 5 *	0.380830	22.73982	18.39771	0.0116
At most 6 *	0.283059	9.317331	3.841466	0.0023

Trace test indicates 7 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

The table above shows the long run relationship existing among the variables of study. The table shows the variables converge in the long run thereby depicting the existence of long run relationship among them. The long run relationship exists at 5% level of significance according to the Trace test statistics and the Eigenvalue. This implies there exists seven (7) co-integrating relationship among the variables. Therefore there is long run relationship among them.

Table 7. 3 VAR Lag Order Selection Criteria
VAR Lag Order Selection Criteria
Endogenous variables: INF GDP UMP TRADE BOP INV INT
Sample: 1986 2015
Included observations: 28

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-759.0090	NA	1.37e+15	54.71493	55.04798	54.81675
1	-630.0444	184.2352	5.06e+12	49.00317	51.66758*	49.81771
2	-555.5346	69.18767*	1.75e+12*	47.18104*	52.17681	48.70830*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: *Author's Computation, 2018*

To carryout VAR analyses on the variables, the second lag will be selected since all the lag selection criteria chose the second lag except Schwarz information criterion that which chose the first lag.

Table 7.4: Vector Autoregression Estimates

	INF	GDP	BOP	TRADE	INV	INT
INF(-1)	0.247618	0.100089	0.032683	0.041670	-19.11581	0.146385
	(0.27862)	(0.05056)	(0.03862)	(0.02692)	(30.3920)	(0.05441)
	[0.88872]	[1.97971]	[0.84628]	[1.54808]	[-0.62897]	[2.69064]
INF(-2)	-0.205861	-0.013910	-0.073405	-0.073607	20.26179	-0.172785
	(0.30108)	(0.05463)	(0.04173)	(0.02909)	(32.8418)	(0.05879)
	[-0.68374]	[-0.25461]	[-1.75893]	[-2.53058]	[0.61695]	[-2.93899]
GDP(-1)	-1.891432	-0.042711	0.363610	-0.019116	2.344240	0.272187
	(1.35889)	(0.24658)	(0.18835)	(0.13128)	(148.226)	(0.26534)
	[-1.39190]	[-0.17322]	[1.93048]	[-0.14561]	[-0.01582]	[1.02579]
GDP(-2)	-1.128935	0.260308	0.050353	0.092919	61.25081	0.383773
	(1.02738)	(0.18642)	(0.14240)	(0.09925)	(112.066)	(0.20061)
	[-1.09884]	[1.39633]	[0.35359]	[0.93619]	[-0.54656]	[1.91301]
BOP(-1)	0.886252	0.510150	0.821635	0.008730	309.9713	0.023258
	(1.62027)	(0.29400)	(0.22458)	(0.15653)	(176.737)	(0.31638)
	[0.54698]	[1.73518]	[3.65851]	[0.05577]	[1.75385]	[0.07351]
BOP(-2)	1.334037	0.469573	-0.711834	0.014710	-92.44972	0.038014
	(1.99333)	(0.36170)	(0.27629)	(0.19257)	(217.431)	(0.38923)
	[0.66925]	[1.29824]	[-2.57638]	[0.07639]	[-0.42519]	[0.09767]
TRADE(-1)	-0.812544	0.333596	-0.515266	0.756381	-207.5257	0.099091
	(1.74535)	(0.31670)	(0.24192)	(0.16861)	(190.382)	(0.34081)
	[-0.46555]	[1.05334]	[-2.12990]	[4.48587]	[-1.09005]	[0.29076]
TRADE(-2)	2.662830	0.155293	-0.169211	0.426200	191.5738	0.926558
	(1.74417)	(0.31649)	(0.24176)	(0.16850)	(190.253)	(0.34057)
	[1.52670]	[0.49068]	[-0.69993]	[2.52938]	[1.00694]	[2.72057]
INV(-1)	0.000298	-0.001262	0.000654	0.000254	0.834796	-0.000419
	(0.00278)	(0.00050)	(0.00039)	(0.00027)	(0.30329)	(0.00054)
	[0.10718]	[-2.50101]	[1.69734]	[0.94463]	[2.75251]	[-0.77144]
INV(-2)	-0.002831	-0.000433	0.000529	-0.000224	0.027427	0.000218
	(0.00347)	(0.00063)	(0.00048)	(0.00033)	(0.37812)	(0.00068)
	[-0.81672]	[-0.68867]	[1.10113]	[-0.66851]	[0.07253]	[0.32276]
INT(-1)	0.331519	-0.036406	0.077179	0.050632	62.98676	-0.194220
	(1.01543)	(0.18425)	(0.14075)	(0.09810)	(110.762)	(0.19828)
	[0.32648]	[-0.19759]	[0.54836]	[0.51614]	[0.56867]	[-0.97954]
INT(-2)	0.613271	-0.431009	0.005324	-0.241212	-69.21342	-0.237719
	(0.89481)	(0.16237)	(0.12403)	(0.08645)	(97.6055)	(0.17473)
	[0.68536]	[-2.65452]	[0.04293]	[-2.79032]	[-0.70911]	[-1.36053]
C	15.90025	-11.74402	17.00031	-0.612666	4212.034	1.013208
	(44.2814)	(8.03505)	(6.13776)	(4.27791)	(4830.18)	(8.64659)
	[0.35907]	[-1.46160]	[2.76979]	[-0.14322]	[0.87202]	[0.11718]
R-squared	0.771099	0.810031	0.980149	0.977548	0.958408	0.784210
Adj. R-squared	0.524591	0.605448	0.958770	0.953369	0.913616	0.551821
Sum sq. resids	2043.198	67.27377	39.25439	19.06923	24310552	77.90380
S.E. equation	12.53671	2.274842	1.737690	1.211141	1367.495	2.447979

F-statistic	3.128087	3.959432	45.84771	40.42932	21.39702	3.374559
Log likelihood	-99.79122	-52.00220	-44.46030	-34.35248	-231.1693	-54.05606
Akaike AIC	8.199373	4.785871	4.247164	3.525177	17.58352	4.932576
Schwarz SC	8.913054	5.499552	4.960845	4.238858	18.29720	5.646257
Mean dependent	20.49286	5.597143	11.89286	7.281786	2917.336	19.24321
S.D. dependent	18.18235	3.621588	8.557904	5.608622	4652.746	3.656639

Source: *Author's Computation, (2018)*

The VAR Result indicate the short run relationship among the variables, from the VAR table, the equation with the best fit is trade equation because it has the least error based on Akaike AIC and Schwarz SC criterion. However, the purpose of the VAR model is to allow us test for causality among the variables. This is presented in table 7.5.

Table 7.5: Causality Test

Null Hypothesis (H0)	**Chi-Square**	**Probability**	**Decision**
EXR does not cause GDP	12.9920	0.0005	Reject Ho
GDP does not cause EXR	9.01926	0.0011	Reject Ho
EXR does not cause BOP	11.92053	0.0002	Reject Ho
BOP does not cause EXR	18.72172	0.0000	Reject Ho
EXR does not cause Trade	10.12681	0.0062	Reject Ho
Trade does not cause EXR	15.47126	0.0000	Reject Ho
EXR does not cause INT	10.23023	0.0060	Reject Ho
INT does not cause EXR	0.574877	0.7781	Accept Ho
INF does not cause EXR	12.986681	0.2887	Accept Ho
EXR does not cause INF	14.51604	0.0006	Reject Ho
BOP does not cause GDP	11.51789	0.0027	Reject Ho
GDP does not cause BOP	3.714877	0.1481	Accept Ho
BOP does not cause Trade	0.0.90053	0.9889	Accept Ho
Trade does not cause BOP	11.60593	0.0031	Reject Ho
BOP does not cause INT	0.037243	0.9816	Accept Ho
INT does not cause BOP	0.374877	0.8586	Accept Ho
Trade does not cause GDP	3.986681	0.2887	Accept Ho
GDP does not cause Trade	15.93029	0.0001	Reject Ho
Trade does not cause INT	1.354877	0.5081	Accept Ho
INT does not cause Trade	0.890053	0.6477	Reject Ho
Trade does not cause INF	1.638593	0.4314	Accept Ho
INF does not cause Trade	12.98681	0.0027	Reject Ho
INT does not cause INF	14.96944	0.0008	Reject Ho
INF does not cause INT	10.51789	0.0917	Reject Ho
INT does not cause GDP	12.21477	0.0023	Reject Ho
GDP does not cause INT	0.760593	0.6314	Accept Ho
GDP does not cause INF	15.91281	0.00001	Reject Ho
INF does not cause GDP	11.14356	0.0032	Reject Ho

Source: *Author's Computation, (2018)*

From the Causality test carried out, there exists a two-way causality between Exchange rate and economic growth. Economic growth causes exchange rate and exchange rate also causes economic growth. In addition, there exists a two-way causality between exchange rate and BOP such that both exchange rate and BOP causes each other. The same applies for exchange rate and

Trade as well as exchange rate and inflation rate. There is one-way causality between exchange rate and interest rate and it flows from exchange rate to interest rate over the period investigated (1986-2015).

There exists a one-way causality between BOP and GDP whereby BOP causes GDP. There is also a one-way causality between BOP and Trade which flows from Trade to BOP.

There is a one-way causality between Trade and GDP and it flows from GDP to Trade. There is also no causality between Trade and Interest Rate. Also, there exist a one-way causality between trade and inflation rate which runs from inflation rate to trade. There exists two-way causality between interest rate and inflation rate whereby interest rate causes inflation rate and inflation rate also cause interest rate.
On the other hand, the result shows that there is a two-way causality between inflation rate and GDP meaning that inflation rate causes GDP and GDP also determines inflation rate. There is a one-way causality between interest rate and GDP and it runs from interest rate to GDP.

CONCLUSION AND RECOMMENDATIONS

In conclusion, it is pertinent to note that defective exchange rate management is one of the major macroeconomic problems that confront the Nigerian economy today. Attempts by the government to control this exchange rate fluctuation using the traditional monetary and fiscal policies have not provided a long lasting solution. Therefore, the knowledge of the exchange rate relationship with macroeconomic variables in Nigeria is the necessary prerequisite to evolving a long term solution. In this study, it was discovered that the macroeconomic uncertainties that are associated with exchange rate in Nigeria has serious effect on the level of trade and balance of payment. This reveals some important facts about the general impact of exchange rate in the Nigerian economy. These impacts are multi-dimensional and dynamic. Therefore, government should pursue with vigour, policies that will ensure stability in exchange rate. Such policies may include increase in export trade, monetary policy (reduction in money supply), fiscal policy (increase in personal income tax and reduction in government expenditure), total ban on importation of some goods, increase in output of goods and services, over-hauling of the distribution system, government/CBN intervention in Foreign Exchange market to check excessive bidding or depreciation of the Naira among others.

Finally, the study concludes that trade can be drastically hindered by exchange rate volatility which increase risk in international transactions and payment, and further results to decrease in economic growth. Thus, there is need to manage exchange rate fluctuations so as to ensure stability in the business cycle. Also, if exchange rate is not controlled, it would lead to macroeconomic instability and further reduce the already unacceptably low rate of economic growth.

From the findings the following recommendations are made;
The study found out that exchange rate volatility affects level of investment and economic growth. Exchange rate policy should be designed to bridge the savings investment gap, enhance government revenue and reduce the fiscal gap through the curtailment of deficits and guarantee of external balance in the long run. This implies that domestic productivity and exports should be enhanced in the medium to long term, while aggregate demand should be curtailed in the short run. To reduce exchange rate, the foreign exchange market should be policed to ensure that only those who have the aim to add value to the real sector get attention. This, among other steps would at least increase the value of the naira against major world currencies, and leave the economy with only the prices increases occasioned by increase in local money supply.

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