



# EXCHANGE RATE VOLATILITY AND ECONOMIC GROWTH IN NIGERIA

SHAMSUDDEEN ABUBAKAR

Department of Banking and Finance, Abubakar Tatari Ali Polytechnic,  
Bauchi

## ABSTRACT

*This study examined the effect of exchange rate volatility on economic growth in Nigeria 2000 to 2021. The study adopted gross domestic product (GDP) as proxy for economic growth and the dependent variable; while trades balance (TBA), exchange rate (EXR) and inflation (INF) were used as the independent variables. Time series data were sourced from annual reports of Central Bank of Nigeria (CBN) Statistical Bulletins and National Bureau of Statistics covering the period. The study employed descriptive statistics and multiple regression techniques for the analysis of*

## Introduction

Exchange rate volatility has become an imperative issue amid academics, financial analyst, internal and external regulators due to its impact on the world economy at large (Razzaque, Bidisha and Khondker, 2017). Researchers have investigated the impact of this phenomenon on economic growth, trade, security valuation, import, profitability, export, investment analysis, international trade and risk management. The abolishment of the fixed exchange rate after the collapse of the Bretton woods system which gave rise to the floating exchange rate which exposed the currencies across the globe to a greater volatility. The volatility attached to exchange rate has made projections by most importers and exporters across the globe to be unrealistic due to the depreciation/appreciation of the exchange rates (lateef, 2019). Therefore volatility in profits of traders, risk & uncertainties in prices of commodities, increasing transaction cost and inflation could occur due to the fluctuation in the exchange rate.

However exchange rate volatility has been the persistent fluctuation of the exchange rate, and exchange rate management is important in economic development globally and more particularly in developing countries like Nigeria. This is because it has contributed not only to economic instability but also political instability. Essentially, a stable exchange rate would have positive effects on household incomes and consumption decisions, governments' fiscal, monetary policies, and trade balance (Alagidede and Ibrahim, 2017).

Exchange rate is the price of one country's currency in terms of another's (lyeli and Clement, 2017). It is a vital macroeconomic variable regarded as an indicator of the competitiveness of the



*data. It was discovered that trade balance (TBA) has positive but insignificant effect on gross domestic product in Nigeria. Exchange rate (EXR) has positive and significant effect on gross domestic product in Nigeria. Inflation (INF) shows negative but significant effect on gross domestic product. It was recommended that appropriate monetary and fiscal policies should be used in order to achieve stable exchange rate in Nigeria. There is also a need for new economic policies on diversification from over dependence on crude oil exports and price monitoring in order to maintain stable of rate of inflation.*

**KEYWORDS:** conomic growth; gross domestic product; exchange rate; inflation; trade balance.

currency of any economy. As one of the most important prices in an open economy, it influences international flow of goods and services, capital among countries, and therefore commands a strong pressure on balance of payments, inflation and other macroeconomic variables.

The fluctuation of exchange rate can lead to currency depreciation or appreciation. When exchange rate appreciates, it causes the cost of production to rise in a country's economy, and this will lead to low and volatile foreign direct investment, poverty, high inequality, high level of unemployment and underdevelopment also will ensue with the attendant huge deficit that will be recorded in the domestic country's balance of trade and of payment. On the other hand, depreciation in exchange rate creates competitive advantages in international trade. It makes domestic goods cheaper and increases the demand for export goods; it causes an increase in international demand for domestic goods while import decreases. This will impact positively on FDI inflow into the country. An equilibrium foreign exchange can assist decision makers to reduce the level of uncertainty caused by volatility in exchange rate and hence growth and development. The volatility in exchange rate leads to uncertainty, which has a negative effect on trade flows (Daniel and Samuel, 2019).

Aghion, Bacchetta, Rancieri and Rogoff (2009) and Ndambendia and Alhayky (2011) postulated that the level of financial development influences the impact of exchange rate volatility on economic growth. They posit that economies with a relatively low level of financial development tend to be more negatively affected than economies with relatively high level of financial development. Nigeria is an open economy with a relatively low level of financial development. Therefore, the need to stabilize this factor in a bid to discourage risk adverse agents from redirecting their activity to other lower risk market occupies a critical aspect of economic management of any country in this globalized world.

Volatility of exchange rate induces uncertainty and risk in investment decision with destabilizing impact on the macroeconomic performance. Those operators in the private sector are more concerned about volatility of exchange rate because of its effect on their investment which may be capital gains or losses. Exchange rate volatility has asymmetric effects on macroeconomic variables (Mahmood and Ali, 2011).



The fact that this study is to examine the effect of exchange rate volatility on economic growth in Nigeria. This has become necessary as Nigeria seeks to grow the economy by attracting more investors in the light of rising fluctuation of the Nigerian currency against major currencies around the world. The fluctuation and instability in the naira has been more profound with the inception of the liberalization of the exchange rate. The study will make significant contributions to literature and policy debate in Nigeria. Measuring the trend and correlation between these macroeconomic variables and economic growth is especially important for Nigeria, since the real exchange rate can be used as a strategy or policy tool in Nigeria's bid to reduce poverty within the context of export-led growth.

As a key relative price in the economy, the real exchange rate may not only alter the country's external balance but also other more socially sensitive variables such as income distribution, poverty and employment. A better understanding of whether exchange rate volatility boosts or hinders economic growth would certainly have useful implications for the exchange rate, fiscal, and monetary policies. The study is among few studies in developing countries and Africa that have examined the impact of exchange rate volatility on economic growth. The study therefore adds to the scanty literature on the subject matter especially in Africa and Nigeria. Therefore this study seeks to examine effect of exchange rate volatility on economic growth in Nigeria for the period cover 2000 to 2020.

#### **REVIEW OF EMPERICAL LITERATURE**

Okorontah and Odoemena (2016) investigated the effect of exchange rate fluctuation on economic growth in Nigeria using secondary data from 1986 to 2012. They adopted real gross domestic product as proxy for economic growth (the dependent variable), while exchange rate, money supply and inflation were used as the independent variables. Secondary time series data for the study variables were sourced from CBN Statistical Bulletin. The study employed OLS technique, Johansen cointegration test and Error Correction Mechanism as the tools for data analysis. The results of their investigation did not show strong relationship between exchange rate and economic growth.

Ayunku and Etale (2016) examined the effect of external debt and exchange rate on economic growth in Nigeria using secondary data from 1981 to 2012. In the study model real gross domestic product, proxy for economic growth was regressed as a function of external debt and exchange rate. The study employed descriptive statistics, ADF unit root test, Johansen-Juselius cointegration test and ECM based on Eviews computer software for data analysis. Their findings showed that exchange rate had a significantly negative effect on economic growth in the short run, but the long run effect was positive. It was recommended that policy makers and the regulatory authorities adopt appropriate exchange rate regime for the country to achieve meaningful economic development.

Ufoeze, Okuma, Nwakoby and Alajekwu (2018) investigated the effect of exchange rate fluctuation on economic growth in Nigeria using time series data covering 1970 to 2012. The study adopted exchange rate, inflation, money supply and oil revenue as the explanatory variables, while gross domestic product (proxy for economic growth) was used as the response variable. Secondary data for the study were obtained from CBN Statistical Bulletin. They employed multiple



regression technique based on OLS for the analysis of data. Their study produced mixed findings, and they concluded that floating exchange rate outperformed fixed

Eunice (2019) carried out his research on the effect of exchange rate volatility on economic growth in Ghana. The investigation covers the period between 1983 and 2010. The variables of concern were five in all which included Exchange rate volatility and Trade Openness, GDP per capita and Physical capital stock and Human capital stock. The ARCH and GARCH Models were used to model the volatility of the exchange rate. The exchange rate volatility variables generated were then used in the growth determinant function. The time series analysis the study employed is the Autoregressive Distributed Lag Approach to analyze the relationship between exchange rate volatility and economic growth in Ghana. The results indicated that exchange rate volatility exerted significant negative effect on economic growth during the period both in the short and long run.

Adenekan, Sanni and Itodo (2019) investigate the impact of naira-to-dollar exchange rate volatility on naira exchange rate returns in Nigeria. Using daily percentage exchange rate returns of the naira per US dollar, the study estimated an AR(5)-TGARCH (1,1) to examine whether there is an existence of asymmetry in the time path of the naira exchange rate volatility. The findings indicated that exchange rate volatility leads to increase in exchange rate returns (depreciation). Also, there is the presence of asymmetry in the movement of the exchange rate volatility, such that negative shocks that cause exchange rate returns to fall lead to fall in volatility by a size higher than the impact of positive shocks of the same magnitude.

Exchange rates have been highly volatile in African countries since the adoption of the flexible exchange rate system. Nigeria adopted the Structural Adjustment Programme recommended by the Bretton Woods institutions (World Bank and International Monetary Fund) in 1986. This led to shift from the fixed exchange rate system to the flexible exchange rate system (Mordi, 2006).

Volatility of exchange rate induces uncertainty and risk in investment decision with destabilizing impact on the macroeconomic performance (Mahmood and Ali, 2011). Mordi (2006) noted that operators in the private sector are concerned about volatility of exchange rate because of its effect on their investment which may be capital gains or losses. Exchange rate volatility has asymmetric effects on macroeconomic variables.

Aliyu (2011) cited that appreciation of exchange rate results in increased imports and reduced export while depreciation would expand export and discourage import. Also, depreciation of exchange rate tends to cause a shift from foreign goods to domestic goods. Hence, it leads to diversion of income from importing countries to countries exporting through a shift in terms of trade, and this tends to have impact on the exporting and importing countries economic growth. Exchange rate depreciation has a negative effect on developing countries (Razaxadehkarsalari, Haghiri and Behrooznia, 2011).

In Nigeria, the management of the exchange rate is carried out by the Central Bank of Nigeria. Following the adoption of Structural Adjustment Policy (SAP) in 1986, the country has moved from a peg regime to a flexible exchange rate regime in practice, no exchange rate is clean or pure float, that is, a situation where it is left completely to be determined by market forces but rather the prevailing system is the managed float whereby monetary authorities intervene periodically in the foreign exchange market in order to attain some strategic objectives (Mordi, 2006).



**Table 1. Scheme of Events in Exchange Rate Management in Nigeria**

S/N	Year	Event	Remark
1	1959 - 1967	Fixed Parity Solely with the British Pound Sterling	Suspended in 1972
2	1968 - 1972	Included the US dollar in the parity exchange	Aftermath of the 1967 devaluation of the pound and the emergence of a strong dollar.
3	1973	Revert to fixed parity with the British Pounds	Devaluation of the US dollar.
4	1974	Parity to both pounds and dollars	To minimize the effect of devaluation of the individual currency.
5	1978	Trade (import) weighted basket of currency approach.	Tied to seven currencies; British Pounds, US Dollars, German Mark, French Franc, Japanese Yen, Dutch Guilder, Swiss Franc.
6	1985	Reference on the dollar	To prevent arbitrage prevalent in the basket of currencies.
7	1986	Adoption of the second tier foreign exchange market	Deregulation of the economy
8	1987	Merger of the first and second tier markets	Merger of the rates
9	1988	Introduction of the interbank foreign exchange market	Merger between the autonomous and the FEM rates
10	1994	Fixed Exchange rate	Regulate the economy
11	1995	Introduction of the	Autonomous Foreign Exchange Market (AFEM) Guided deregulation.
12	1999	Re-introduction of the interbank foreign exchange market (IFEM).	Merger of dual exchange rate, following the abolition of the official exchange rate from January 1st.
13	2002	Re-introduction of the Dutch Auction System (DAS).	Retail DAS was implemented at first instance with CBN selling to end-users through the authorized users (banks)
14	2006 - 2010	Introduction of Wholesale DAS	Further liberalized the market
15	2016	Interbank Foreign Exchange Market	Closure of Official window
16	2021	Naira for dollar scheme	Which offers recipient of diaspora through CBN's IMTOs to be paid N5 for every \$1 received as remittance inflow.

Source: Central Bank of Nigeria Bullion (various years).

Despite various efforts by the government to maintain a stable exchange rate, the naira has depreciated throughout the 80's (Iyeli, Nenbee and Opué, 2011). It depreciated from No.61 in 1981



to N2.02 in 1986 and further to N7.901 in 1990, all against the US dollar. The policy of guided or managed deregulation pegged the naira at N21.886 against the US dollar in 1994. Further deregulation pushed it to N86.322 S1.00 in 1999 (Aliyu, 2011). It depreciated further to N120.97 in 2002 and 135.5 in 2004. Thereafter, the exchange rate appreciated to N132.15 in 2005 and later N118.57 in 2008. Towards the end of 2008 when the Global Financial Crisis took its toll, the naira depreciated to N150.0124 at the end of 2009, N365 in 2015 up N430 in 2018 naira continued to depreciate against US dollar up to N368 at the end of 2020 and still naira depreciate in the second quota of 2021 to about 420 per us dollar official exchange rate.

### **METHODOLOGY**

The study used ex post facto research design since the study relies on already existing time series secondary data. This makes it impossible for the researcher to manipulate the data used in the study. Data were collected from various annual reports from the Central Bank of Nigeria (CBN) Statistical Bulletins.

### **Variables Descriptions**

#### **Gross domestic product (GDP)**

GDP was used as a proxy to economic growth which is viewed as an increase in per capita national output or net national product over a long period of time. It is considered as growth if the rate of increase in total output (goods and services) is greater than the rate of growth of the population. It is the quantitative increase in the monetary value of goods and services produced in the economy within a given year, and can be measured as a percentage change in the gross domestic product or gross national product.

#### **Exchange rate (EXR)**

This is the price one currency against another. It is the number of units of a currency that is required to purchase another currency. It can be expressed as units of a local currency per unit of foreign currency or the other way round. For example the Nigerian Naira exchanged for N305.00 to a US Dollar in 2017. Exchange rate determines the relative prices of domestic and foreign goods as well as the strength of external sector participation in the international trade (Obansa et al, 2013). Since the collapse of the generalized fixed exchange rate regime and the adoption of a generalized floating system by the developed economies in 1973, most countries Nigeria inclusive, have experimented with various types of exchange rate arrangements ranging from the peg system to weighted currency basket to managed floating, and more recently to monetary zone arrangement (Mordi, 2006).

According to Mordi (2006) exchange rate volatility refers to the swings in exchange rate over a period of time or the deviations from a benchmark or equilibrium exchange rate. The latter which also reflects the misalignment of exchange rate could occur where there is multiplicity of markets parallel to the official market. Exchange rate volatility is measured in terms of the coefficient of variation which is the standard deviation divided by the mean for a series. Price volatility may be measured on any time scale, from yearly to daily.



**Trade balance (TBA)**

Trade balance is the difference between the value of a country’s imports and exports for a given period. It is the largest component of a country’s balance of payments. In public sector accounting and finance literature, trade balance is used to measure a country’s relative strength in the comity of nations. It is also referred to as balance of payments, balance of trade or international trade balance. The term trade surplus is used to refer to a country that exports more goods and services than it imports in monetary value; and the reverse is called trade deficit.

**Inflation (INF)**

Inflation can be defined as a sustained significant increase in the general price of goods and services. It responds to the forces of demand and supply. The demand pressure arises from changes in monetary aggregates, while the supply pressure comes from the existing structural conditions in the economy. Some of the macroeconomic factors giving rise to inflation include increase in prices of goods and services, income levels, capital inflow, persistent deficit budgeting and increase in money supply.

**Model Specification**

Model for this study is based on Razazadehkarsalari, Haghiri and Behrooznia (2011) and Aliyu (2011) models with slight modification and the optimal currency area (OCA) theory developed by Mundell (1996) and Mckinnon (1963) which states that 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. On the other hand it can also reduce trade and output by stopping, delaying or slowing the necessary relative price adjustment process. Based on this premise we specify our model as follows:

$$RGDP = f(EXR, TBA, INF) \dots\dots\dots (1)$$

The econometric model is expressed below:

$$RGDP = \beta_0 + \beta_1 EXR + \beta_2 TBA + \beta_3 INF + \mu \dots\dots\dots (2)$$

Where:

RGDP = Real Gross Domestic Product

EXR = Nominal Effective Exchange Rate

TBA = Trade Balance

INF= inflation rate

By log linear, the model becomes

$$\log (RGDP) = \beta_0 + \beta_1 \log (EXR) + \beta_2 \log (TBA) + \beta_3 \log (INF) + \mu \dots\dots\dots (3)$$

Where: log = Natural log

From Equation 3, the model can be specified in a time series form as:

$$\log (RGDP) t = \beta_0 + \beta_1 \log (EXR) t + \beta_2 (TBA)t + \beta_3 \log (INF) t + \mu \dots\dots\dots (4)$$

**RESULT AND DISCUSSION OF FINDINGS**

This chapter presents the result of the analysis of the data collected from the relevant sources. The data was presented using Tables and subsequently discussed. Analysis conducted for the study includes; descriptive analysis, correlation and regression analysis.

The data collected for this research presented as follow.



Table 4.1 Data for GDP, TBA, EXR and INF Period from 2000-2021

Years	GDP(bn)	TBA(b\$)	EXR	INF
2000	7,062.75	7,427,061	101.70	6.93
2001	8,234.49	2,477,763	111.23	18.87
2002	11,501.45	1,083,111	120.58	12.88
2003	13,556.97	3,390,606	129.22	14.03
2004	18,124.06	16,840,540	132.89	15.00
2005	23,121.88	36,529,020	131.27	17.86
2006	30,375.18	36,517,580	128.65	8.23
2007	34,675.94	27,648,260	125.81	5.39
2008	39,954.21	29,145,210	118.57	11.58
2009	43,461.46	13,869,490	148.88	12.55
2010	55,469.35	13,111,280	150.30	13.72
2011	63,713.36	10,668,380	153.86	10.84
2012	72,599.63	17,374,280	157.50	12.22
2013	81,009.96	10,048,980	157.31	8.48
2014	90,136.98	906,535	158.55	8.06
2015	95,177.74	-15,438,640	192.44	9.01
2016	102,575.42	5,007,217	253.49	15.68
2017	114,899.25	12,689,340	305.79	16.52
2018	129,086.91	6,260,575	306.08	12.09
2019	145,639.14	-14,627,010	306.92	11.40
2020	154,252.32	-16,975,920	358.81	13.25
<b>2021</b>	<b>176,075.50</b>	<b>-2,980,000</b>	<b>413.49</b>	<b>16.95</b>

Source: CBN and NBS annual statistical data (2021)

Note: GDP = Gross Domestic Product, TBA = Trade Balances, EXR = Exchange Rate, and INF = Inflation.

The descriptive statistics of the study variables, generated from the E-views presented in Table 2 below. The mean figures of GDP, TBA, EXR, and INF are 68.2727, 50.0909, 1.8924E2 and 12.343 respectively. In the order the variables are presented, the minimum figures are 7.062, -16.975, 101.70 and 5.4 respectively, while the maximum figures are 176.075, 36.529, 413.49 and 18.9, with standard deviation of 51.52825, 191.71281, 90.74303 and 3.6420 respectively.

Table 4.2 Descriptive statistics of GDP, BTA, EXR and INF

	Minimum	Maximum	Mean	Std. Dev.
GDP	7.062	176.075	68.2727	51.52825
TBA	-16.975	36.529	50.0909	191.71281
EXR	101.70	413.49	1.8924E2	90.74303
INF	5.4	18.9	12.343	3.6420
Observations	<b>22</b>			



Sample	2000 – 2021			
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Source: IBM Computed result 2022.

### Regression Result

In the Table 3 below, the regression equation could be stated as:

$$\text{GDP} = -11.779 + 0.0033\text{TBA} + 0.571\text{exr} - 2.923\text{INF}$$

This indicates that the constant or intercept is -11.779, meaning that if all the independent variables (trade balance, exchange rate and inflation) are held constant, the dependent variable, GDP (which is proxy for economic growth) would decrease by 11.779 units in an annual basis. This implies that in the absence of trade balance, exchange rate and inflation the economy of Nigeria would be growing at a declining rate. TBA and EXR have positive coefficients of 0.033 and 0.571 with probability values of 0.064 and 0.000 respectively. This means TBA has positive and not significant (at 6% level) relationship with GDP, also EXR is positive and significant (<5% 0.000 level). It is also discovered that INF has a negative but significant relationship with GDP (at 0.18% level).

Table 4.4 Regression Analysis

Dependent Variable: GDP

Method: Least Squares

Date: 19/11/22 Time: 10:00

Sample: 2000-2021

Included observations: 22

Variable	Coefficients	Std. Error	t-Statistic	Prob.
C	-11.779	12.181	-.967	0.346
TBA	0.033	0.017	1.974	0.064
EXR	0.571	0.036	15.840	0.000
INF	<b>-2.401</b>	0.926	-2.593	0.018
R-squared	0.934		Mean dep. var.	68.2727
Adjusted R-squared	0.923		S.D. dep. var.	51.52825
S. E. of the estimate	14.27927		F-statistics	85.154
Sum of Square	52088.206		Prob. (F-St)	0.000

Source: IBM Computed result 2022.

The coefficient of determination R<sup>2</sup> value at 0.94 shows that 94% of changes in the response variable are explained by the combined effect of changes in the explanatory variables; and the value of the Adjusted R<sup>2</sup> shows at 92% confidence level that the regression model adopted as the basis of the analysis is a proper and good fit.

### Testing of hypotheses

GDP and TBA

Hypothesis: Trade balance (TBA) has no significant influence on gross domestic product (GDP). The results in Table 3 show that the coefficient of TBA is 0.033 at 6% significant level (with a prob. of 0.064). This means that the null hypothesis is accepted as the results show that TBA has an insignificant positive link with GDP.



#### GDP and EXR

Hypothesis: Exchange rate (EXR) has no significant impact on gross domestic product (GDP). The results in Table 3 show that the coefficient of EXR is 0.571 at 5% significant level (with a prob. of 0.000). This means that the null hypothesis is rejected as the results show that EXR has significant positive impact on GDP.

#### GDP and INF

Hypothesis: Inflation (INF) has negative but significant impact on gross domestic product (GDP). The coefficient of INF in Table 3 is -2.401 with a prob. of 0.018. The null hypothesis therefore was also accepted as INF has an insignificant negative link with GDP.

#### Summary

The findings of this study summarized as follows:

- Trade balance (TBA) has positive but not significant effect on gross domestic product in Nigeria.
- Exchange rate (EXR) has positive and significant effect on gross domestic product in Nigeria.
- Inflation (INF) shows negative but significant effect on gross domestic product in Nigeria.

#### Conclusion

This study examined the effect of exchange rate volatility on economic growth in Nigeria. The empirical results showed that exchange rate had a significantly positive effect on gross domestic product, proxy for economic growth; trade balance had an insignificant positive effect on gross domestic product; while inflation had a negative but significant effect on gross domestic product. It is hoped that future researchers would dwell more than this study in terms of coverage and analytical tools. I hope the findings of this study would be of immense benefit to policy makers and the regulatory authorities in formulating appropriate policies that would stimulate sustained growth.

#### Recommendations

Based on the findings of this study the following recommendations are made:

1. There is need for new economic policies on diversification from over dependence on crude oil exports a depleting natural resource; and
2. Appropriate monetary and fiscal policies should be used in order to achieve stable exchange in Nigeria.
3. Policy makers and the regulatory authorities should strive to ensure the adoption of appropriate macroeconomic policy and price monitoring to ensure stable inflation rate in Nigeria.

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