

EFFECTS OF EXTERNAL RESERVE AND EXCHANGE RATE ON ECONOMIC STABILIZATION IN NIGERIA

Anu K. TORIOLA^{1*}, WalidGbadebo ADEBOSIN², OKE-BELLO, M. Adesina³ and SIYANBOLA Adedamola⁴

¹Department of Economics, OlabisiOnabanjo University, Ago-Iwoye, Nigeria

²Department of Economics, Lagos State University of Education, Lagos, Nigeria

³Department of Banking and Finance, Yaba College of Technology, Lagos, Nigeria

⁴School of Economics and Finance, University of Witwatersrand, Johannesburg, South Africa

E-mail: ¹toriolaanu@gmail.com, ²ddwalid3@gmail.com, ³adesina.oke-bello@yabatech.edu.ng,

⁴siyanbolaadedamola@hgmail.com

ABSTRACT

Nigeria's over-reliance on oil revenue exposed her external reserves and exchange rate to global price fluctuations. The study investigates external reserve and exchange rate effects on economic stability in Nigeria. The explanatory variables are external reserve, exchange rate, current account vulnerability, capital account vulnerability, and oil revenue expressed as a function of economic stability. The study used ARDL to analyze data sourced World Bank Development Indicator covering 1981 to 2019. The results showed that capital account vulnerability has a significant positive effect on economic stability while external reserve has a negative effect in Nigeria. Finally, exchange rate was found to granger causes external reserve but not economic stability in Nigeria. The study concluded that foreign reserve has a significant negative effect on economic stability whereas exchange rate has no effect. Among other things, it was suggested that the government should diversify the economy to improve foreign reserves. Also, Importation of locally produced products and services should be discouraged.

Keywords: Economic sustainability, external reserve, exchange rate, ARDL, Nigeria.

1. INTRODUCTION

Governments and policymakers across nations emphasize achieving external balance to safeguard against adverse macroeconomic effects caused by external shocks (Zhattau, 2013). This entails a blend of fiscal, monetary, exchange rate policies, and external reserve management strategies to stabilize economies (Akinwunmi&Adekoya, 2016). The utilization of foreign exchange reserves, also known as external reserves, to influence exchange rates, manage trade deficits, and guard against shocks has gained prominence (Akinwunmi & Adekoya, 2016).

Discussion revolves around the implications of excessive foreign currency accumulation and its macroeconomic consequences, especially for developing economies with mono-product exports, limited financial markets, and weak institutions (Sofia, 2009). Nigeria, heavily reliant on volatile crude oil revenues, faces economic challenges, given the sector's instability (Aigheyisi, 2018). The country's heavy dependence on crude oil revenue, accounting for over 90% of foreign exchange earnings, makes it vulnerable to oil price fluctuations (Nwachukwu et al., 2016). The

interaction between oil price variations and substantial import expenses has contributed to fluctuations in foreign reserves and their management (Nwachukwu et al., 2016).

Despite multiple policy attempts, Nigeria's external reserves management, including various exchange rate mechanisms, has not provided stability due to inadequately structured approaches (Akinwunmi & Adekoya, 2016). This has led to detrimental imbalances, impacting exchange rates, inflation, investment, GDP growth, productivity, and employment (Nwachukwu et al., 2016).

Existing literature focuses on foreign reserves' impact on growth, trade, capital flows, and various macroeconomic variables, but a comprehensive examination of foreign reserves' effect on economic stability, particularly in a mono-cultural import-dependent economy like Nigeria, remains limited. Furthermore, the linkage between foreign reserves, exchange rates, and economic stability has not been thoroughly explored in a single empirical analysis. Thus, this study addresses this gap by investigating the relationship between Nigeria's foreign reserves, exchange rates, and economic stability, along with causal connections between these variables.

The aim of this study is to investigate the effect of external reserve and exchange rate on economic stabilization (Changes in GDP rate) in Nigeria. The specific objectives are to:

- a. determine the effect of external reserve on economic stability in Nigeria?
- b. analyze the effect of exchange rate movements on economic stability in Nigeria?
- c. estimate the causality among exchange rate, external reserve and economic stability in Nigeria?

The outcome of this study will be beneficial to the following groups of people: policymakers, academics, government and international organizations. This study will aid policy makers and researchers to establishing policy mix needed to sustain and stabilize long-term growth, and protect economies from undesirable short run fluctuations. This study enlightened government and international organizations on the extent at which external reserve and exchange rate influence economic stabilization in Nigeria. The study will further be a reference point for future studies to expand their frontier of knowledge.

2. REVIEW OF THE LITERATURE

The exchange rate is the valuation of a country's currency in comparison to another country's currency (Olweni&Omondi, 2011). O'Sullivan and Sheffrin (2003) described it as the relative value of one nation's currency against another. Conversely, external reserves, also referred to as international reserves, foreign reserves, or exchange reserves, encompass foreign currency deposits held by central banks and monetary authorities, as defined by the International Monetary Fund (IMF, 2009). These reserve currencies are utilized to support various liabilities of the central bank, including the local currency issuance, reserve deposits within deposit money banks (DMBs), government entities, and other financial institutions (Akinwunmi&Adekoya, 2016).

Economic stabilization, as defined by Crockett (1981), involves enhancing the supply-demand equilibrium of an economy with the objective of mitigating inflationary pressures, advancing balance of payments conditions, and fostering economic progress. Meanwhile, Yilmaz and Ataer (2017) characterized economic stability as the sustenance of monetary, tax, and revenue policies that do not adversely affect the functioning of the market economy and its operations.

This study adopts a theoretical perspective rooted in Keynesian theory. This theory advocates government intervention to stabilize aggregate demand, thus mitigating the negative repercussions of welfare loss stemming from economic cycle fluctuations that could lead to social imbalances. Nevertheless, a notable deficiency of this school of thought is its failure to incorporate dynamic effects, rational expectations, and the necessary microeconomic foundation to substantiate its position.

Another significant theory relevant to the relationship between exchange rates, external reserves, and economic stability is the mercantilism trade theory. This theory centers on the accumulation of international reserves to prevent or limit currency appreciation, ultimately aiming to foster export expansion. Consequently, the mercantilist approach to reserves accumulation is associated with heightened export growth rates and a depreciated real exchange rate in comparison to the fundamental purchasing power parity (PPP) real exchange rate (Aizenman & Lee, 2007).

The literature has extensively explored the relationship between exchange rates, foreign reserves, and economic stability, both in developed and developing nations. For instance, Chowdhry and Wheeler (2018) examined exchange rate volatility's impact on foreign direct investment (FDI) flow across developed countries like Canada, Japan, the United States, and the United Kingdom. Utilizing a vector autoregressive (VAR) approach, their findings indicated a significant and positive relationship between shocks in exchange rate volatility and FDI flow. Aslam (2016) investigated the influence of exchange rate fluctuations on economic development in Sri Lanka through Ordinary Least Square analysis, employing data from 1970 to 2015. The study established a significant effect of exchange rate movements on Sri Lanka's economic growth.

Moving to emerging nations, Kazdal and Yilmaz (2021) explored the exchange rate-inflation nexus and external vulnerabilities within the context of emerging economies from 2010 to 2018. Utilizing the interacting panel vector autoregression (IPVAR) model, they categorized emerging economies as "more vulnerable" or "less vulnerable" based on vulnerability indicators. Their findings revealed that stronger emerging economies exhibited less exchange rate pass-through (ERPT), and factors such as higher inflation, risk premium,

and FX debt levels were associated with heightened ERPT. In the context of Brazil, Kashif, Sridharan, and Thiyagarayan (2017) focused on the relationship between economic development and overseas reserve holdings from 1980 to 2014. Applying the error correction procedure, their results demonstrated a substantial influence of economic development on Brazil's foreign reserves, with negative and statistically significant error correction estimates reinforcing the model. In a Nepalese context, Kaphle (2021) examined the role of foreign exchange reserves in the country's economic growth from 1975 to 2018. Employing unit root tests, cointegration analysis, and Vector Error Correction Model (VECM), the study demonstrated a long-term link between variables and showed that historical exchange rate values positively contributed to economic growth.

In Nigeria, various studies have explored the connection between foreign reserves, exchange rates, and economic stability. Amassoma and Odeniyi (2016) used the error correction model (ECM) to assess the impact of exchange rate variation on Nigeria's economic growth from 1970 to 2013, revealing a positive but insignificant relationship between exchange rate fluctuation and economic growth. Nwosa (2017) investigated the link between Nigeria's external reserves and economic development from 1981 to 2014, employing ordinary least square (OLS) analysis and finding a substantial and favorable impact of external reserves on economic growth. Kalu et al. (2019) employed an autoregressive distributed lag model (ARDL) to analyze the responsiveness of foreign reserves to exchange rate factors in the Nigerian economy from 1996 to 2016. The study indicated positive but non-significant associations between real exchange rate, nominal exchange rate, foreign reserves, and economic stability.

Nnamaka, Odungweru, and Chukwuma-Ogbonna (2021) investigated international trade's impact on Nigeria's foreign reserves using data from 1980 to 2019. Their study indicated that oil and non-oil exports positively influenced foreign reserves, while the impact of non-oil imports was negligible. The granger causality test established a unidirectional causal link between oil exports and external reserves, while exchange rate exhibited a bidirectional causal relationship. Michael and Inam (2020) assessed the influence of exchange rate factors on the Nigerian economy from 1981 to 2018 using ARDL and Error Correction Mechanism

(ECM) techniques. Their findings demonstrated a favorable relationship between gross domestic product growth, exchange rate, and balance of trade. The study highlighted that exchange rate had a significant long-term and short-term influence on the balance of trade

3. METHODOLOGY

Because this study relates to events that have already occurred, the ex-post facto research design is adopted. For the theoretical framework, the national income model one of Keynes's most important contributions to macroeconomics theory on national equilibrium. To establish macroeconomic stability, Keynes believes that the economy must develop in a balanced way. The aggregate income must match collective demand in order for macroeconomic equilibrium to exist. An identity can be used to represent the economy's equilibrium situation.

$$C + T + S = C + I + G + X - M = C + I + G + X - M = C + I + G + X - M = C + I + G \quad (1)$$

Where C represents consumption, T represents tax, S represents savings, Y represents national income, I represents investment, G represents government, and M represents imports.

The components of national income on the left and aggregate demand on the right are represented in equation (1). A portion of a household's income is spent on consumption, while the remainder is used to pay taxes or save. These three components are combined at the national level to produce aggregate income, which is then used to create aggregate supply of products in the economy. As a result, the identity of national income or aggregate supply is:

$$C+T+S=Y \quad (2)$$

The equation (1) presents the relationships among household consumption (C), household taxes (T), household savings (S), and national income (Y). In accordance with Keynesian theory, the right-hand side of equation (1) illustrates aggregate demand, which is the total demand for domestic and international goods and services that generates the Gross Domestic Product (GDP). The components of domestic demand include government spending (G), household spending (C), and domestic investment (I), while the demand from foreign buyers is captured in the exports account (X). Both domestically produced and imported goods contribute to domestic demand, leading to imports (M). The aggregate demand (X-M) is the sum of the elements in C, I, G, and net exports. Consequently,

the interplay of these four components of aggregate demand determines the GDP.

$$GDP = C + I + G + X - M \tag{3}$$

Equation (3) represents a Keynesian GDP identity, wherein exogenous factors like inadequate infrastructure, power shortages, insufficient input supply, or natural disasters can negatively impact the supply side of the equation.

The determinants influencing external reserves in Nigeria, as indicated by Keynes' macroeconomic theory and previous studies on foreign reserves (Lane & Burke, 2001; Ketan, 2006), encompass economic size, current account vulnerability, capital account vulnerability, and opportunity cost. Economic size is often quantified by GDP or GDP per capita, while current account vulnerability is assessed through the proportion of imports or exports in relation to output. Capital account vulnerability is gauged by financial openness, determined by the ratio of capital flows, broad money to GDP, short-term external debt, or foreign equity positions. Furthermore, opportunity cost is evaluated by interest rate differentials (Ketan, 2006).

In this study, economic stability is measured by variations in GDP growth rate, serving as the dependent variable. Meanwhile, the explanatory variables consist of external reserves and its determinants, namely economic size, current account vulnerability, capital account vulnerability, and opportunity cost. Hence, considering the above, the implicit function of the model is expressed as:

$$ESB_t = \beta_0 + \beta_1 ESB_{t-1} + \beta_2 EXR_{t-1} + \beta_3 ERS_{t-1} + \beta_4 CRV_{t-1} + \beta_5 CAV_{t-1} + \beta_6 OIR_{t-1} + u_t \tag{3.4}$$

Following from external reserve, exchange rate and economic stability model stated in model one

Table 3.1: Data Sources and Measurement

Variables	Definition	Measurements	Sources
ESB	Economic Stability	This was is proxy by changes in GDP growth rate	World Development Indicators (WDI), 2020
ERS	External reserve	The total amount of money in international foreign reserves.	World Development Indicators (WDI), 2020
CRV	Current account vulnerability	Share of imports in GDP	World Development Indicators (WDI), 2020
CAV	Capital, account vulnerability	Ratio of capital flows to GDP	World Development Indicators (WDI), 2020
OilR	Oil revenue	Annual proceeds from oil export	World Development Indicators (WDI), 2020
EXR	Exchange rate	Official exchange rate (LCU per US\$, period average)	World Development Indicators (WDI), 2020

To assess the enduring relationship and dynamic interplays among the variables, the Autoregressive Distributed Lag (ARDL) technique for

above, a Multivariate Granger system for the relationship between exchange rate and external reserve is specified in general form as follows.

$$\begin{pmatrix} y_{1t} \\ y_{2t} \\ y_{3t} \end{pmatrix} = CD_t + \sum_{t=1}^p \begin{pmatrix} \alpha_{11} & \alpha_{12} & \alpha_{13} \\ \alpha_{21} & \alpha_{22} & \alpha_{23} \\ \alpha_{31} & \alpha_{32} & \alpha_{33} \end{pmatrix} \begin{pmatrix} y_{1t-1} \\ y_{2t-1} \\ y_{3t-1} \end{pmatrix} + \begin{pmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \end{pmatrix} \tag{3.5}$$

Where

y_{1t} and y_{2t} are exchange rate and external reserve respectively and CD_t captures economic stability In the model set up, y_{1t} does not Granger cause y_{2t} if and only if $\alpha_{2i} = 0, i = 1, 2, \dots, p$

The relationship between external reserve and economic stability can be positive or negative i.e

$$\frac{dESB}{dERS} > 0 <$$

. For the direct relationship, if there is increase in external reserve, there will be change in economic stability. On the other hand, an increase in external reserve with high possibility of political distortion will leads to a change in economic stability as the economy tends to borrow more. Similarly, the relationship between exchange rate and economic stability may be negative and

$$\frac{dESB}{dEXR} > 0 <$$

. It is positive because an appreciation in exchange rate that makes imports cheaper tends to distort the economy in later year that will eventually increase government debt, thereby causing a negative fiscal balance. Also, this may also increase government revenue to increase its revenue through tax than the amount spent.

The World Development Indicators (WDI), 2020, published annual time series data for the period of 38 years (1981-2019) was used for this research. The data sources and measurements are listed in Table 3.1.

cointegration, developed by Pesaran et al. (2001), was adopted. The choice of the auto regressive distributed lag (ARDL) bound test approach in this study is underpinned by three main reasons: firstly,

its straightforward nature compared to other multivariate cointegration methods (e.g., Johansen & Juselius, 1990), as it permits the computation of the co-integration relationship using Ordinary Least Squares (OLS) once the model's lag order is determined. Secondly, the bound testing technique obviates the necessity for a preliminary test like the unit root test. Lastly, it facilitates the concurrent estimation of both the models' long and short run parameters (Lawal, Nwanji, Asaleyeh & Ahmed, 2016).

In any econometric investigation, establishing the stochastic properties of time series data is a crucial initial step. Prior to model estimation, unit root testing was conducted to unveil the long-term relationship in this study. Phillip Perron's approach was employed to assess the stationarity of variables. The adoption of the Phillip Perron (PP) approach

for the unit root test is justified due to its demonstrated suitability in addressing serial correlation issues (Iyoha & Ekanem, 2002).

4. RESULTS AND DISCUSSION

4.1 Preliminary Tests

The tests carried-out to determine the nature of the properties and distribution of the dataset collected for the study that informed the choice of the estimation comprises of Jarque-Bera Normality tests, multicollinearity test, Lag-Order selection, unitroot test and trend analysis. The descriptive statistics comprises the mean, minimum and maximum value, skewness and kurtosis, standard deviation and variance as well as Jarque-Bera statistics.

Table 4.1: Descriptive Statistics

	ESB	ERS	EXR	CRV	CAV	OILR
Mean	-0.051189	1.83E+10	94.14346	0.131828	0.000402	93.75125
Median	0.220194	7.57E+09	101.6973	0.129990	0.000163	94.77950
Maximum	9.857505	5.36E+10	306.9210	0.228113	0.004542	99.65650
Minimum	-17.33270	9.33E+08	0.617708	0.030298	-0.014700	84.03897
Std. Dev.	5.502035	1.85E+10	92.82186	0.054153	0.002726	4.268920
Skewness	-0.673550	0.598241	0.810180	-0.072001	-4.325219	-0.603582
Kurtosis	4.346949	1.689165	2.854578	2.343726	25.70010	2.360966
Jarque-Bera	5.897047	5.118523	4.300915	0.733576	958.9524	2.176542
Probability	0.052417	0.077362	0.116431	0.692956	0.000000	0.336798
Observations	39	39	39	39	39	28

Source: Authors Computation, 2021

The average value of economic stability (ESB) is within its minimum and maximum values i.e the smallest and largest value of economic stability all through the period of 1981 to 2019 (Min = -17.33270 \geq Mean = -0.051189 \leq Max = 9.857505). By implication, the expected value of economic stability over the period is -0.051189 which is negative suggesting economic instability in Nigeria over the period. While the highest value of the level of economic stability experience over the period is 9.857505, the lowest value of the level of stability experienced is -17.33270. The average value of external reserve (ERS) is within its minimum and maximum values (Min = 9.33E+08 \geq Mean = 1.83E+10 \leq Max = 5.36E+10). By implication, the highest amount in Nigeria external reserve is 53.6billion US Dollar and the minimum amount of 0.933billion while the mean expected value is

18.3billion over the entire period. For exchange rate (EXR) the average value is within its minimum and maximum values (Min = 0.617708 \geq Mean = 94.14346 \leq Max = 306.9210). By implication, the highest value of official Naira to US Dollar exchange rate over the period is 307Naira to 1US Dollar and the minimum is 0.62Naira to 1US Dollar while the mean expected value is 94Naira to 1US Dollar over the entire period.

Furthermore, the highest value of Nigeria current account vulnerability is 0.23 and the minimum amount of 0.03 while the mean expected value is 0.13 over the entire period. Also, the highest value of Nigeria capital account vulnerability is 0.00 and the minimum amount of -0.015 while the mean expected value is 0.004 over the entire period. Finally, the highest value of Nigeria oil revenue is 99.06billion and the minimum amount of

84.03billion while the mean expected value is 93.75billion over the entire period.

The skewness value for a variable is higher than the sample mean it implies that the variables are positively skewed which means that the distribution has a long-right tail and when the skewness value is lower than the sample mean it implies that the variable has a long left tail which embodies negative skewness. In this study, the skewness value of all the variables comprising of economic stability, external reserve, exchange rate, current account vulnerability, capital account vulnerability, and oil revenue are all lower than the sample mean implying that the variable has a long left tail which embodies negative skewness.

Since the value of the kurtosis of is less than 3, the variable is platykurtic implying a negative kurtosis (i.e the curve has a flat peak and a more dispersed scores with lighter tails), when the value of the kurtosis of is equal to 3, the variables is Mesokurtic implying its distribution is the same as normal distribution (i.e the distribution are moderate breadth and curves meaning it is neither low nor high) and when the value of the kurtosis is greater than 3, the variable is leptokurtic implying positive kurtosis (sharply peaked with heavy tails). In this study, the values of the kurtosis of ERS, EXR,

CRV, and OILR are less than 3 indicating that the variables are platykurtic implying a negative kurtosis (i.e the curve has a flat peak and a more dispersed scores with lighter tails), while the values of the kurtosis of ESB, CAV and OILR are greater than 3 indicating that the variables are leptokurtic implying positive kurtosis (sharply peaked with heavy tails)

For the Jaque Bera analysis, since the probability values of current account variability CAV (0.00000) is lesser than the significance value of 0.05, the null hypothesis of a normal distribution is rejected while the null hypothesis in respect to ESB, ERS, EXR, CRV, and OILR cannot be rejected since the probability value (0.052417, 0.077362, 0.116431, 0.692956 and 0.336798 respectively) are above the significance level of 0.05 which implies that these variables are normally distributed.

The correlation, coefficient serves as a useful measure of the extent of association between two variables which is an important indicator of the presence of multicollinearity between a pair of two variables. The closer is the degree of association between any two variables to +1 and -1, the higher the tendency of multicollinearity between them.

Table 4.2: Correlation Matrix

	ESB	ERS	EXR	CRV	CAV	OILR
ESB	1.000000					
ERS	0.023709	1.000000				
EXR	0.026719	0.714669	1.000000			
CRV	-0.067242	0.319162	0.379276	1.000000		
CAV	0.615582	0.051720	0.076258	-0.054067	1.000000	
OILR	-0.009888	-0.595791	-0.365818	-0.055104	-0.118448	1.000000

Source: Authors Computation, 2021

The result of the correlation matrix in Table 4.2 correlation analysis result reveals that there is a weak positive correlation between EBS and ERS, between EBS and EXR, between EBS and CRV,

EBS and CAV and, between EBS and OILR since correlation values between the variables are less than 0.7.

Table 4.3: Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	3690.647	NA*	5.8e-159*	-347.4902*	-345.4012*	-347.0369*
1	3536.127	-117.7300	1.3e-150	-329.3454	-325.4658	-328.5034
2	3390.237	-27.78845	1.5e-140	-312.0226	-306.3523	-310.7920

Source: Authors Computation, 2021.

The analysis of data in this study was guided by the outcomes of lag order criterion presented in Table 4.3. As recommended by the sequential modified LR test, Final Prediction Error, Akaike Information Criterion (AIC), and Hannan-Quinn Information

Criterion (HQ), the analysis utilized a maximum of 0 lag. The assessment of stationarity for the selected variables was carried out through the Augmented Dickey-Fuller (ADF) unit root test, and the results are outlined in Table 4.4 as follows:

Table 4.4: Unit root test results.

Variables	ADF Test Statistics				Order of Integration
	Level		First Diff		
	t-statistics	Prob.	t-statistics	Prob.	
ESB	-11.75077	0.0000	-7.689517	0.0000	I(0)
ERS	-0.763300	0.3788	-5.647429	0.0000	I(1)
EXR	1.537563	0.9671	-3.056868	0.0032	I(1)
CRV	-0.091229	0.6456	-4.603975	0.0000	I(1)
CAV	-2.531000	0.0128	-12.04497	0.0000	I(0)
OILR	-0.447514	0.5085	-2.898153	0.0063	I(1)
Test critical value	1%	-2.627238		-2.627238	
	5%	-1.949856		-1.949856	
	10%	-1.611469		-1.611469	

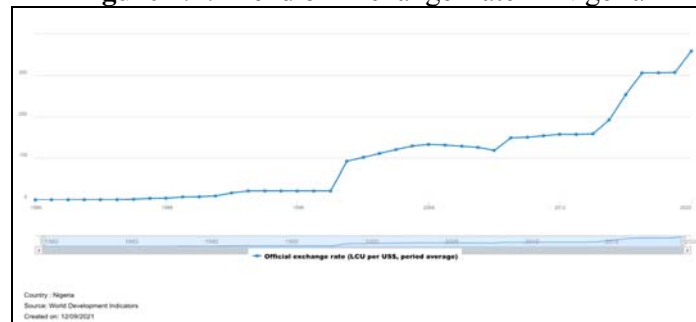
Source: Authors Computation, 2021.

The result of the unit root test in Table 4.4 using Augmented Dickey Fuller (ADF) test showed that both economic stability (ESB) and current account vulnerability (CAV) are the only variable in the data set that was stationary at level at 5% level of significance. After taking their first difference, external reserve (ERS), exchange rate (EXR), current account variability (CRV) and oil revenue (OILR) become stationary.

Hence, the result of the ADF test showed that while economic stability (ESB) and current account vulnerability (CAV) were stationary at level, all other variables external reserve (ERS), exchange rate (EXR), current account variability (CRV) and oil revenue (OILR) are all stationary only at first difference [I(1)] at 5% level of significance.

4.2 Trend Analysis

Figure 4.1: Trend of Exchange Rate in Nigeria

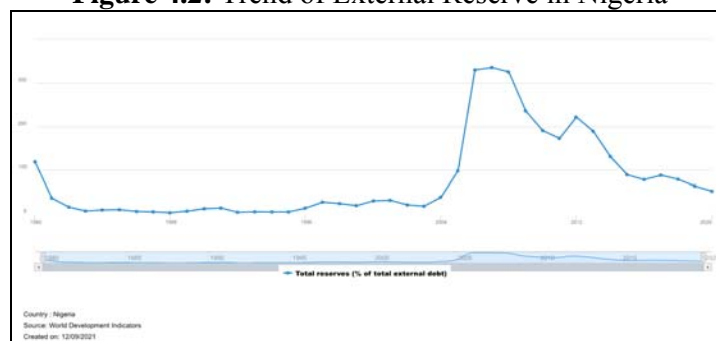


Source: Authors Computation, 2021.

The line graph in Figure 4.1 above illustrates that exchange rate in Nigeria has fluctuated considerably in an upward direction over the entire period. Between 1980 and 1998 the value of exchange rate was close to the origin and somehow stable but between 1998 and 1999 there was a sharp

rise in exchange rate. Also, between 1999 and 2015 exchange rate maintain subtle but fairly stable upward rise and thereafter up till 2019, exchange rate has been rising rapidly in an unstable magnitude.

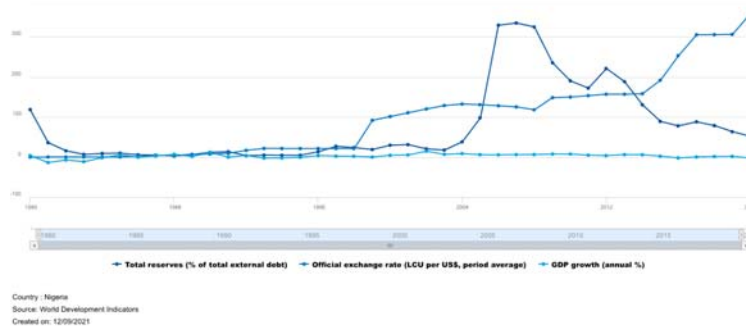
Figure 4.2: Trend of External Reserve in Nigeria



Source: Author, 2021

The graph in Figure 4.2 shows that the trend of external reserve which was fairly high in 1980 decline from 1980 to 1982 but between 1982 and 2004 there was a relatively stable subtle rise and fall in external reserve. Between 2004 and 2005 there was an upsurge rise in external reserve which last till 2008 before the country begin to experience an unstable persistent decline in external reserve from 2008 to 2019

Figure 4.3: Trend of External Reserve, Exchange Rate and Economic Stability in Nigeria



Source: Author, 2021

The graph in Figure 4.3 shows that between 1980 and 1983, when exchange rate was on the origin, economic stability was below the origin while total reserve was above the origin but already falling. Between 1985 and 1995, exchange rate, economic stability and total reserve are all positive trending near the origin. Between 1995 and 2005, exchange rate rose above external reserve with both intersecting in 2005 while economic stability continued its trend near the origin. Finally, between 2005 and 2013, total reserve rose well above exchange rate with both intersecting again in 2013 while economic stability continued its trend near the origin. Between 2013 and 2019, exchange rate

rose well above external reserve while economic stability continued its trend near the origin.

4.3 Empirical Results

As specified in model 3.4 of chapter three, the equation to be estimated to accomplish the second objective is restated as follows:

$$ESB_t = \beta_0 + \beta_1 ESB_{t-1} + \beta_2 EXR_{t-1} + \beta_3 ERS_{t-1} + \beta_4 CRV_{t-1} + \beta_5 CAV_{t-1} + \beta_6 OIR_{t-1} + \mu_{t-1}$$

Based on evidence from the unitroot tests presented in Table where ESB and CAV were found to be stationary at level i.e I(0), while EXR, CRV and OILR are stationary at first difference i.e I(1), the model is estimated using Autorregresive Distributed Lag (ARDL) estimation technique. The result is presented as follows:

Table 4.9: Bound Test

Model	Number of Lag	F-statistics	5% (I1) Critical value
2	0	6.839324	3.79

Source: Author, 2021

The bound test compares the F-value of a model at 5% level when the model is unrestricted and has no trend. Since the F-value (4.800909>4.01) is more than upper bound value, the null hypothesis that all the variables are zero jointly is rejected. Therefore it can be inferred that the variables economic

stability (ESB), exchange rate (EXR), external reserve (ERS), current account vulnerability (CAV), exchange rate (EXR), current account variability (CRV) and oil revenue (OILR) have a long run association.

Table 4.10: Short Run Estimate Results

Variable	Short Run Estimate		Long Run Estimate	
	Coefficient	t-Statistics	Coefficient	t-Statistics
ESB(-1)	2.525618 (0.0003) [0.538984]	4.685882		
EXR	0.017519 (0.2941) [0.016114]	1.087174	0.003846 (0.2680) [0.003343]	1.150379
ERS	-0.000000 (0.0096)	-2.968797	-0.000000 (0.0015)	-3.869000

	[0.000000]		[0.000000]	
CRV	1.892691 (0.3198) [1.839472]	0.3198	0.415497 (0.2965) [0.384167]	1.081553
CAV	2.997434 (0.0379) [1.316827]	2.276255	0.658019 (0.0161) [0.242630]	2.712021
OILR	-0.273879 (0.2116) [0.209878]	-1.304943	-0.060124 (0.1896) [0.043753]	-1.374181
Constants			13.392042 (0.0243) [5.348532]	2.503873
ECM(-1)	-1.304943 (0.0000) [0.731593]	-6.226471		
R-squared	0.867033			
Adjusted R-squared	0.787252			
Durbin-Watson stat	2.254259			
F-statistic	10.86774			
Prob(F-statistics)	0.000042			

Source: Author, 2021

In the short-run the coefficient of lag of economic stability ($\beta = 2.525618$, $t = 4.685882$, $p < 0.05$), and capital account vulnerability ($\beta = 2.997434$, $t = 2.276255$, $p < 0.05$) are positive and significant implying both lag of economic stability and capital account vulnerability have a significant positive effect on economic stability. That is, as the capital account becomes more vulnerable, the economy becomes more unstable and vice versa. Also, the coefficient of external reserve ($\beta = -0.000000$, $t = -2.968797$, $p < 0.05$) is negative and significant implying that external reserve has a significant negative effect on economic stability in Nigeria. That is a 1% increase in external reserve leads to 00% (negligible) decline in changes in GDP which is a proxy for economic stability. Finally, the coefficient of exchange rate ($\beta = 0.003846$, $t = 1.087174$, $p < 0.05$), current account vulnerability ($\beta = 1.892691$, $t = 0.3198$, $p > 0.05$) and oil revenue ($\beta = -0.273878$, $t = -1.304943$, $p > 0.05$) are not significant implying that current account vulnerability and oil revenue do not have a significant effect on economic stability in the short run. The coefficient of error correction term ECT(-1) ($\beta = -1.304943$, $t = -6.226471$, $p < 0.05$) which is the speed of adjustment is appropriately sign (i.e negative) and significant. It means the whole system can get back to long-run equilibrium at the speed of 62%.

In the long-run the coefficient of external reserve ($\beta = -0.000000$, $t = -3.869000$, $p < 0.05$) is negative and significant implying that external reserve has a significant negative effect on economic stability in Nigeria. That is a 1% increase in external reserve leads to 00% (negligible) decline in changes in GDP which is a proxy for economic stability. Also, the coefficient of capital account vulnerability ($\beta = 0.658019$, $t = 2.78343$, $p < 0.05$) is significant and positive implying that capital account vulnerability has a significant positive effect on economic stability in the long-run. Finally, the coefficient of exchange rate ($\beta = 0.003846$, $t = 1.150379$, $p > 0.05$), current account vulnerability ($\beta = 0.415497$, $t = 1.081553$, $p > 0.05$) and oil revenue ($\beta = -0.060124$, $t = -1.374181$, $p > 0.05$) are not significant implying that current account vulnerability and oil revenue do not have a significant effect on economic stability in the long run.

By and Large, the ARDL estimates indicates that in both the short run and long run, capital account vulnerability have a significant positive effect on economic stability while external reserve has a significant negative effect on economic stability in Nigeria. Meanwhile, exchange rate, current account vulnerability and oil revenue do not show any effect on economic stability in Nigeria To determine the reliability of the estimates for the second objective, the following post estimation test was carried out:

Table 4.11: Heteroskedasticity Test: ARCH

Heteroskedasticity Test: ARCH			
F-statistic	0.152575	Prob. F(1,20)	0.7002
Obs*R-squared	0.166562	Prob. Chi-Square(1)	0.6832

Source: Author, 2021

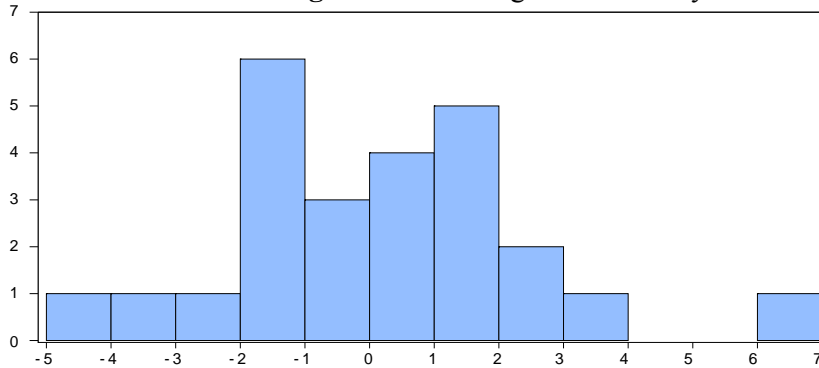
H0: there is no ARCH effect in the Residuals

H1: there is ARCH effect in the Residuals

From the heteroscedasticity test in the residuals of the estimated MS-AR model presented in Table 4.12 the null-hypothesis is accepted at 5% level of

significance and it is concluded that the ARCH test reported homogeneity of variance across error term series

Figure 4.13: Histogram-Normality Test



Source: Author, 2021

Table 4.14: Correlogram of residuals Q-statistic

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob*	
. .	. .	1	0.007	0.007	0.0016	0.968
.** .	.** .	2	-0.258	-0.258	1.9483	0.378
. * .	. * .	3	-0.185	-0.193	2.9938	0.393
. * .	. .	4	0.085	0.014	3.2245	0.521
. .	. * .	5	0.009	-0.094	3.2270	0.665
. * .	. * .	6	0.150	0.154	4.0299	0.673
.** .	.** .	7	-0.215	-0.240	5.7664	0.567
. * .	. * .	8	-0.130	-0.086	6.4378	0.598
. .	. * .	9	0.003	-0.066	6.4383	0.695
. .	. * .	10	0.037	-0.143	6.4993	0.772
. * .	. * .	11	0.158	0.185	7.7063	0.739
. * .	.** .	12	-0.095	-0.226	8.1766	0.771

*Probabilities may not be valid for this equation specification.

Source: Author, 2021

H0: The error terms (residuals) are independent

H1: The error terms (residuals) are not independent

From the Q-statistics test presented in Table 4.14, it is evident that the error terms are not serially correlated since the P-values across the maximum number of lags selected are greater than 0.05, the study therefore accept the null hypothesis and it is conclude that the residuals are independent.

Therefore the residuals is white noise since they are not serially correlated and have a constant variance. using the Granger causality test to establish the direction of causality between external reserve, exchange rate and economic stability. The result of the test is presented in Table 4.15:

Table 4.15: Granger Causality Test

Hypothesis	F-Statistics	Prob
Panel A: Causality from other variables to ESB		
ERS ESB	1.54565	0.2287
EXR ESB	1.17653	0.3213

Panel B: Causality from ESB to other variables			
ESB	ERS	0.06201	0.9400
ESB	EXR	0.92016	0.4087
Panel C: Causality from EXR and ERS to other variables			
EXR	ERS	3.58727	0.0393
ERS	ESB	0.64657	0.5305

Source: Author, 2021

The Granger causality test results shown in panel A, B and C of Table 4.15 shows that exchange rate granger cause external reserve in Nigeria [F= 11.2949, P(0.0020) <P(0.05)] while external reserve and exchange rate do not granger cause economic stability in Nigeria. It is evident that, there is one-way causality relationship between exchange rate and external reserve in Nigeria which runs only from exchange rate to external reserve.

5 SUMMARY, CONCLUSION AND RECOMMENDATIONS

This study investigates the effect of external reserves and exchange rates on economic stability in Nigeria, a mono-cultured economy heavily reliant on crude oil for foreign exchange earnings. Due to the dominance of oil revenue in the country's external reserves, the study explores how global oil market dynamics impact Nigeria's reserves. Drawing from Keynes' (1936) theoretical framework and adopting an ex-post facto research design, the study formulates a model to assess the relationship between exchange rates, external reserves, and economic stability. The annual time series data from 1981 to 2019 obtained from the World Development Indicators (WDI) used in the study was analysed via the Autoregressive

Distributed Lag (ARDL) approach to cointegration as developed by Pesaran et al. (2001). The results reveal that capital account vulnerability has a significant positive impact on economic stability both in the short and long run. However, external reserves have a significant negative effect on economic stability in Nigeria. Exchange rates, current account vulnerability, and oil revenue do not exhibit significant impacts on economic stability. Granger causality tests demonstrate that exchange rates Granger-cause external reserves in Nigeria. However, the neither external reserves nor exchange rates Granger-cause economic stability. The study concludes that external reserves have a significant negative effect on economic stability in Nigeria, implying that increased external reserves could contribute to reduced stability. Given that external reserves involve withdrawal from the circular flow of income, its expansion might destabilize the economy if not managed effectively. As policy recommendations, the study suggest the need to diversify the economy towards exports, discouraging imports of domestically producible goods and services, and implementing measures to stabilize the local currency's value considering external shocks arising from exchange rate fluctuations.

REFERENCES

1. Acquaye, I. (1994). Monetary policy as a tool for macroeconomic stabilization in Ghana. A thesis submitted to the department of economics, University of Ghana, Legon, in partial fulfilment of the Requirements for the degree of master of philosophy in Economics
2. Aigheyisi, O.S (2018) Oil price volatility and business cycles in Nigeria. *Studies in Business and Economics no. 13(2)/2018, 13-21* doi 10.2478/sbe-2018-0018
3. Aizenman, J. & Marion, N. (2004). International reserve holdings with sovereign risk and costly tax collection. *The Economic Journal*, 114, 569-591.
4. Aizenman, J., & Lee, J. (2007). International reserves: Precautionary versus mercantilist views, Theory and Evidence. *Open Economies Review*, 18(2), 191-214.
5. Akinwunmi, A.A & Adekoya, R.B. (2016). External reserves management and its effect on economic growth of Nigeria, *IJBFR* 4(2016) 36-46
6. Akinyede O.M and Elumah, L.O (2017). Economic policy and economic stability in Nigeria, *Eurasian Review of Business and Finance*, 1(3), 1-9.
7. Amassoma, D. & Odeniyi, B. D. (2016). The nexus between exchange rate variation and economic growth in Nigeria. *Singaporean Journal of Business, Economics and Management Studies*, 51(3), 1-21.

8. Aslam, M. (2016). Impact of exchange rate on economic growth in Sri Lanka. *World Scientific News*, 252-266.
9. Central Bank of Nigeria (2018). CBN Statistical bulletin, Volume 29, 2018.
10. Central Bank of Nigeria (CBN, 2007). Building and managing external reserves for economic development. *The CBN Bullion*, 31(2), 24-36.
11. Chaudhry, I. S., Akhtar, M. H., Mahmood, K., & Faridi, M. Z. (2011). Foreign exchange reserves and inflation in Pakistan: Evidence from ARDL modelling approach. *International Journal of Economics and Finance*, 3(1), 69-76.
12. Crockett, A. (1981). Stabilization Policies in Developing Countries: Some Policy Considerations, IMF Staff Papers
13. Iyoha, M.A & O.T Ekanem (2002). Introduction to Econometrics III, Mareh publishers. Benin City, Edo State, Nigeria.
14. Johansen, S. and Juselius, K. (1990) Maximum Likelihood Estimation and Inference on Cointegration—With Applications to the Demand for Money. *Oxford Bulletin of Economics and Statistics*, 52, 169-210. <http://dx.doi.org/10.1111/j.1468-0084.1990.mp52002003.x>
15. Kalu, E. U., Ugwu, O. E., Ndubuaku, V. C. & Ifeanyi, O. P. (2019). Exchange rate and foreign reserves interface: Empirical evidence. *The Economic and Finance Letter*, 6(1), 1-8.
16. Kashif, M., Sridharan, P. & Thiyagarayan, S. (2017). Impact of economic growth on international reserve holdings in Brazil. *Brazilian Journal of Political Economy*, 37(3), 605-614.
17. Kazdal, A. & Yilmaz, M.H. (2021). "[External Vulnerabilities and Exchange Rate Pass-Through: The Case of Emerging Markets](#)," [Working Papers](#) 2105, Research and Monetary Policy Department, Central Bank of the Republic of Turkey.
18. Kazdal, A. & Yilmaz, M.H. (2021). External Vulnerabilities and Exchange Rate Pass-Through: The Case of Emerging Markets. Central Bank of the Republic of Turkey, Working Paper No21/05
19. Ketan, R. (2006) Excess foreign exchange reserves: The Indian cxv Case, A Thesis submitted to the Program in International Affairs In partial fulfillment of the Requirements for the degree of Master of Science Degree Awarded Spring Semester, 2006, The Florida State University
20. Keynes, J.M. (1936) *The General Theory of Employment, Interest, and Money*. John Maynard Keynes.
21. Lane, P. & Burke, D. (2001). [The Empirics of Foreign Reserves](#), *Open Economies Review*, 12, (4), 423-434
22. Lawal, A., Nwanji, T.I., Asaleye, A. & Ahmed, V. (2016), [Economic growth, financial development and trade openness in Nigeria: An application of the ARDL bound testing approach](#), *Cogent Economics & Finance*, 4, (1), 1258810
23. Nnamaka, U.C. Odungweru, K. & Chukwuma-Ogbonna J.A, (2021) Foreign Trade And External Reserves in Nigeria. *International Journal of Developing and Emerging Economies* Vol.9, No.2, pp.1-16,
24. Nwachukwu, N.E., Ali, A.I., Abdullahi, I.S., Shettima, M.A., Zirra, S.S., Falade, B.S., & Alenyi, M.J (2016) Exchange rate and external reserves in Nigeria: A Threshold Cointegration Analysis, *CBN Journal of Applied Statistics*, 7(1(b)), 233-242
25. Nwosa, P.I. (2017). External reserves on economic growth in Nigeria. *Journal of Entrepreneurship, Business and Economics*, 5(2), 110-126.
26. O'Sullivan, A. & Sheffrin, S. M. (2003). *Economics: Principles in action*. Upper Saddle River, New Jersey 07458: Pearson Prentice Hall. p. 458.
27. Olweny, T. and Omondi, K. (2011) The Effects of Macro-Economic Factors on Stock Return Volatility in the Nairobi Stock Exchange. *Economic and Finance Review*, 1, 34-48
28. Pesaran, M. H., Shin, Y. & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16, 289-326
29. Pesaran, M.H., Shin, Y. & Smith, R. (2001) Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16, 289-326. <https://doi.org/10.1002/jae.616>

-
30. Sofia, I.A (2009). The negative real and monetary implications of excessive accumulation of Foreign Exchange Reserves: Comparison between Mozambique and Nigeria. Dissertation is submitted in partial fulfilment of the requirements for the degree of MSc, Development Economics of the School of Oriental and African Studies (University of London)
 31. Yilmaz, B. & Ataer, S. (2017) The Built-In Flexibility of Income and Consumption Taxes in OECD Countries. *Handbook of Research on Global Enterprise Operations and Opportunities*, 162-170. doi:10.4018/978-1-5225-2245-4.ch010
 32. Zhattau, V. S. (2013). Fiscal policy as an engine of economic growth in Nigeria. *AFRREV IJAH, An International Journal of Arts and Humanities*, 2(2), 282-298