



Exchange Rate Shock and Financial Stability In Nigeria: An Empirical Analysis

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Date of Submission: 06-11-2022

Date of Acceptance: 20-11-2022

Abstract

This study investigated the impact of exchange rate shock and financial stability in Nigeria from the year 1981 to the year 2020. The Portfolio Balance Theory of exchange rate is used as a theoretical construct and the study employed yearly time series secondary data obtained from the Central Bank of Nigeria Annual Statistical Bulletins of various years and World Bank National Account data, subjecting them to statistical analysis for relevant inferences. None of the variables is stationary at levels and at 1% level of significance. The Structural Vector Error Correction Model (SVEM) was adopted for the research. The SVEM result reveals that the impact of exchange rate shock on financial stability depends on the cycle. Financial shock leads to depreciation of the domestic currency, but this would return to its initial value after a short period. The forecast error decomposition analysis indicates that exchange rate shock accounted for an average of 13% of the variation in the financial sector in the short, medium, and long runs. The aggregate demand shock to the general price level accounted for the more significant proportion of the variation in the financial sector. Therefore, the study recommended that the monetary authority should strive to ensure a stable exchange rate regime as this would ameliorate the uncertainties in the financial system and boost investor confidence to pursue long term investment within the Nigerian financial system hence enhancing the performance of the financial system. Also, monetary policies should not be the only policy used in fighting inflation, fiscal policy should be adequately deployed to work in tandem with monetary policy and finally, interest rate should be regulated to encourage investment within the financial system.

Keywords: Exchange Rate Shock, Structural Vector Error Correction Model, Financial Stability

I. INTRODUCTION

The exchange rate of the Naira to the Dollar in recent years has experienced huge fluctuation and the attendant effect has been enormous to the economy. Also, amidst the variation in exchange rate the real GDP which is a good proxy for economic growth has shrunk in recent time causing the nation to experience two (2) recession within a short interval of 2017 and 2020.

The effects of exchange rate volatility on growth, seen as a comprehensive measure of the benefits and costs of exchange rate stabilization can be x-rayed through international trade (imports/exports), foreign direct investment, credit flow, and asymmetric shock, some of the most important transmission channels from exchange rate volatility on growth, Arratibel, Furceri, Martin and Zdzienicka (2009). Previous research on the impact of exchange rate stability on growth has tended to find mixed relationship.

Azid et al (2005) noted that volatility of exchange rates creates uncertainty in international transactions both in goods and in financial assets. Exchange rates are modeled as forward-looking relative asset prices that reflect unanticipated change in relative demand and supply of domestic and foreign currencies, so exchange rate volatility reflects agents' expectations of changes in determinants of money supplies, interest rates and incomes.

In 1986 Nigeria adopted Structural Adjustment Programme (SAP), the programme considered exchange rate devaluation as the main instrument in resolving the country's economic problems. However as observed by many, the repeated and sustained devaluation of the exchange rate has not transformed the Nigeria's economy, because the devaluation wrongly assumed the structure of the economy was similar to that of the developed economies. (Osahon, 2014)



The current exchange rate policy of the CBN is the Managed Float Exchange Rate System Nigeria and in 2016 the Bank discontinued sales of foreign exchange to Bureau De Change Operators and requested BDC operators to source their foreign exchange from autonomous source to stall the depletion of the foreign reserve,(Emefiele, 2016). In effort to stabilize the foreign exchange market and ensure the efficient utilization of foreign exchange in Nigeria the CBN listed 41 items that would no longer be valid for foreign exchange in the Nigerian (CBN, 2015)

This study is motivated to offer an empirical answer to the issues of exchange rate shock and how it affects financial stability in Nigeria. Some previous works have examined exchange rate shock or dynamism these includes (Fasanya& Akinwale, 2022; Akpan, 2012; Lartey, 2007),Iwegbu&Nwaogwugwu,, 2019,Yunusa, 2020, Anifowose, 2021. To the best of the knowledge of the researcher, asat the time of writing this paper no work has been published on exchange rate shock and financial stability in Nigeria.The scope of the study is from 1981 to 2020 while the structure of the paper is as follows—the next section is the second section and it deals on theoretical and literature reviews. Section 3 dealson the methodology employed in the study while section 4 details the analysisand empirical results, and section 5 provide conclusion and recommendation.

II. THERORICTICAL AND LITERATURE REVIEW

2.1 THEORETICAL CONSTRUCT

The theoretical framework chosen for this work is thePortfolio Balance Theory (PBT)also knownAsset Market Approach. The PBT hypothesizes that an ideal exchange rate is the outcome of the exchange between cash and financial securities (assets) in the home economy as well as the exchange of domestic financial asset with foreign ones (CBN, 1998). It argues is that an increase in money supply will lead to a depreciation of the exchange rate. The theory was developed as an extension of monetary model to exchange rate determination claiming that financial markets determine the exchange rates by creating demand for an asset in compliance with pre-determined stock supplies (Ismaila, 2016). This approach assumes that money, local and foreign bonds are part of investors' portfolio and that changes in any one of these three assets oblige the investor to re-establish the balance in his portfolio in such a manner that he desires.In a nutshell the PBT opines that the exchange rate is determined in the process

of equilibrating or balancing the demand for and supply of financial assets out of which money is only one form of asset.

2.2 LITERATURE REVIEW

The issues in exchange rates regimes have been with us for some time, as the leader of the Monetary School of thought Milton Friedman noted over half a century ago, Flexible exchange rates, assist to protect a domestic economy from external shocks and would engender policies that has the tendencies to satisfy domestic goals (Friedman, 1953). Friedman also. argued that exchange rate instability is a reflection of economic volatility.Mundell (1961, 1963) observed the impact of monetary and fiscal policies under fixed and floating exchange rates on employment, balance of trade, output, etc. Supporters of flexible exchange rate regimes argue that floating exchange rate ensures easy adjustment of economies to asymmetric real shocks (Edwards and Levy-Yeyati 2003)

Duasa, 2008 investigated the impact of exchange rate shock on prices of Malaysian imports and exports. Using Vector Error Correction (VECM) model. The variables in the study were nominal exchange rates, money supply, prices of imports and prices of exports and monthly data were employed from 1999 to 2006. The study calculated exchange rate pass-through on Malaysian import prices and export prices. The result noted that exchange rate shock has a significant affecton the fluctuation of import prices, however, the degree of passthrough was incomplete.

Anifowose, 2021 using the Non Linear Autoregressive Distributed Lag Model (NARDL) approach analyzed the effect of exchange rate on economic growth in Nigeria from 1981 to 2020. The result indicates that , in the long-run, there is a positive relationship between exchange rates shocks and economic growth .It was also observed that both negative and positive shock to inflation rate was found to have adverse noncontemporaneous effect on growth in the long-run. Thus positive and negative changes in exchange rate affect economic growth negatively. It was recommended the fiscal, monetary and general trade policies should align with the exchange rate policies for desired output growth. Also, recommended was that monetary authority should implement policies that will boost Nigeria production base to maximize the benefits from foreign exchange.

Iwegbu&Nwaogwugwu, 2019 conducted an examination of the effect of exchange rate shock



on the industrial and agricultural sector in Nigeria using structural VAR. The paper noted that any shock in a regulated exchange rate system greatly affects the industrial sector than the agricultural sector in the long run. While in the guided deregulated regime, exchange rate shock in the long run negatively affects the agricultural sector in the long run and also affects the industrial sector in the short run. The findings notes that prolonged exchange rate shocks stimulate exportation of agricultural products and thus, increases foreign exchange earnings from sales of agricultural product.

Nguyen &Do, 2020 investigated impact of real exchange rate shocks on export performance in Vietnam. The results demonstrate that a higher value of import significantly accelerates export performance in the short run, but insignificantly generates in the long run. When the volume of registered foreign investment goes up, the export performance will predominantly decrease in the both short run and long run. According to the study, the exchange rate volatility has an effect on the external trade in the long run but no effect in the short run. Finally, Vietnam's export performance converges on its long-run equilibrium by roughly 6.3% with the speed adjustment via a combination of import, every presence of foreign investment, and real exchange rate fluctuations.

Duru et al. (2022) using quarterly data from 2005Q1 to 2020Q4, analyzed impact of exchange rate volatility on exports in Nigeria. The findings validated the presence of exchange rate volatility. In addition, the results revealed that exchange rate volatility had a negative and insignificant impact on exports. The paper, thus, recommends that the government of Nigeria through the monetary authority should foster stable regimes of exchange rate through the implementation of appropriate policies of the exchange rate.

Analysis of Econometric Models, Dahiru and Asemota (2015) examined exchange rates with monthly exchange rates returns from 1985 to 2013 for Naira/US Dollar return series and from 2004 to 2011 for Naira/British Pounds and Naira/Euro returns. The study compared estimates of variants of GARCH models with breaks in respect to the US Dollar rates with exogenously determined breakpoints. The results showed that there is volatility in the three currencies and equally show a leverage effect in most asymmetric models rejected the presence of a volatility break except for models with a breakpoint. Evaluating the models through standard information criteria, volatility persistence and log likelihood statistic, revealed that estimation

decreases persistence when introducing volatility breaks as against those without.

Elijah, Anakwue & Musa (2022), investigated the impact of Exchange rate fluctuations on the Economic Growth of Nigeria and recommended that the monetary authority and policy makers should pursue diversification of the Nigerian economy to inspire local domestic production and reduce the reliance on the oil industry. Increase in local production would reduce import dependent and may engender greater export, with a resultant effect of a stable exchange rate.

Ahiabor and Amoah (2019) using data from 1980 to 2015 studied the questioned if real effective exchange rate volatility is deleterious to economic growth in Ghana. The Fully Modified Ordinary Least Squares (FMOLS) was employed and the findings revealed that real effective exchange rate volatility has a negative and highly statistically significant impact on Ghana's economic growth in the period under review. The studied also estimated the models with traditional control variables as well as a novel measure of financial market fragility, the results is in tandem with their previous results. It was recommended that good and effective policies should be enacted to ensure that Ghana's economy is internationally competitive.

Yunusa, (2020) the paper investigated the impact of exchange rate volatility on Nigerian crude oil export to its trading partners (UK, USA, Italy, France, Spain, Canada and Brazil) using monthly data from 2006 to 2019. To test for the volatility exchange rate, GARCH technics was employed while ARDL was used to examine the effect of exchange rate volatility on crude oil export. The GARCH result indicated that the exchange rates of the trading partners are volatile. The ARDL revealed that the volatility of the exchange rate of Nigeria's trading partners is statistically significant for all the trading partners but with different magnitudes which means the volatility of exchange rate between Nigeria and its trading partners is very imperative in determining the volume of crude oil exportation made by Nigeria to its trading partner. The findings advocates that the volatility of the exchange rate significantly stimulate

Morina et al (2020) analyzed the impact of real effective exchange rate volatility on economic growth in the Central and Eastern European countries (CEE) using annual data for fourteen (14) CEE countries from 2002–2018. From the panel data results the fixed effects estimation was employed and the finding showed that the volatility of the exchange rate has a significant negative effect



on real economic growth. The study recommended that policymakers should introduce various policies to ensure that exchange rate is stable as this would enhance economic growth

Senadza and Diaba 2018, in their study observed that exchange rate liberalization in sub-Saharan Africa (SSA) creates exchange rate volatility, the study employs the pooled mean estimator of dynamic heterogeneous panel techniques to the data of eleven (11) countries in SSA from 1993 to 2014. The results indicates no significant effects of exchange rate volatility on imports however, for exports, the study noted a negative effect of volatility in the short-run, but a positive impact in the long-run.

According to Sugiharti, Esquivias, and Setyorani, 2020, the effect of exchange rate volatility on export can be either positive or negative, with the positive influence lowering the value of export and the negative effect increasing it. While Yakubu et al. (2019), observed that exchange rate volatility is negatively associated to trade flow in the short run but positively related to trade flow in the long run.

$$\begin{aligned} \Delta fsi_t &= \alpha_0 + \sum_{j=1}^m \alpha_{1j} \Delta fsi_{t-j} + \sum_{j=1}^m \alpha_{2j} \Delta e_{t-j} + \sum_{j=1}^m \alpha_{3j} \Delta r_{t-j} + \sum_{j=1}^m \alpha_{4j} \Delta p_{t-j} + \lambda_1 \mu_{t-1} + \varepsilon_{1t} \\ \Delta e_t &= \beta_0 + \sum_{j=1}^m \beta_{1j} \Delta fsi_{t-j} + \sum_{j=1}^m \beta_{2j} \Delta e_{t-j} + \sum_{j=1}^m \beta_{3j} \Delta r_{t-j} + \sum_{j=1}^m \beta_{4j} \Delta p_{t-j} + \lambda_2 \mu_{t-1} + \varepsilon_{2t} \\ \Delta r_t &= \gamma_0 + \sum_{j=1}^m \gamma_{1j} \Delta fsi_{t-j} + \sum_{j=1}^m \gamma_{2j} \Delta e_{t-j} + \sum_{j=1}^m \gamma_{3j} \Delta r_{t-j} + \sum_{j=1}^m \gamma_{4j} \Delta p_{t-j} + \lambda_3 \mu_{t-1} + \varepsilon_{3t} \\ \Delta p_t &= \delta_0 + \sum_{j=1}^m \delta_{1j} \Delta fsi_{t-j} + \sum_{j=1}^m \delta_{2j} \Delta e_{t-j} + \sum_{j=1}^m \delta_{3j} \Delta r_{t-j} + \sum_{j=1}^m \delta_{4j} \Delta p_{t-j} + \lambda_4 \mu_{t-1} + \varepsilon_{4t} \end{aligned}$$

Where: fsi is financial stability index, e is log of exchange rate, r is log of interest rate, p is log of consumer price index

This study employed a Structural Vector Error Correction (SVEC) model, which works similarly to the SVAR model but accounts for cointegration. The identification restriction is similar to the SVAR but by decomposing the identification into three different components, of which two are for long-run restriction. Firstly, assume that all the variables are $I(1)$; in a model of K endogenous variables, there are r ($r < K$) possible cointegration vectors, and this implies that there is/are $k^*(k^* = K - r)$ permanent shock(s) and r temporary or transitory shock(s). The column(s) corresponding to the transitory shock(s) is/are restricted to be zero, and it stands for k^*

Victoria (2019) discovered that the exchange rate is inversely proportional to economic growth. External reserves, money supply, and capital input are all favorably associated to economic growth in Nigeria, whereas labor has a favorable impact on it. Iyeli and Utting (2017) explored the influence of exchange rate volatility on economic growth in Nigeria. The empirical results reveal that exchange rate volatility and oil revenue have a positive impact on economic growth, whereas inflation has a negative impact.

III. Methodology

The study adopts the structural vector error correction model (SVECM). The starting point of the SVECM is the specification of the vector error correction model (VECM). VECM belongs to a category of multiple time series model commonly used for data where the underlying variables have a long-run stochastic trend, also known as cointegration. It is a theoretically driven approach useful for estimating both short-term and long-term effect of one time series on another. The VECM is specified below as follows;

independent restrictions. Given the transitory shocks, the corresponding zero columns imply k^*r independent restrictions only. $k^*(k^* - 1)/2$ additional restrictions are needed to identify the permanent shocks exactly. King et al. (1991) revealed that $r(r - 1)/2$ additional contemporaneous restrictions are needed to identify the transitory shocks. The sum of these restrictions is identical to the SVAR way of identification. Together these are a total of $k^*r + k^*(k^* - 1)/2 + r(r - 1)/2 = K(K - 1)/2$ restrictions. Based on this framework, this study identifies four types of underlying shocks respectively; financial shock, interest rate shock, exchange rate shock, and aggregate demand shock. The shock vector is presented as $\varepsilon_t = (\varepsilon_t^{fsi}, \varepsilon_t^r, \varepsilon_t^e, \varepsilon_t^p)'$. In this study, two long-run



vectors are assumed; the relationship between financial stability and exchange rate and the fisher equation (interest rate and price equation). Following the above descriptions, $K = 4, r = 2, k^* =$

$$B = \begin{bmatrix} * & * & * & * \\ 0 & * & * & 0 \\ * & * & * & * \\ * & * & * & * \end{bmatrix}, \Xi B = \begin{bmatrix} 0 & 0 & * & * \\ 0 & 0 & * & * \\ 0 & 0 & * & * \\ 0 & 0 & * & * \end{bmatrix} \dots (1)$$

The first two columns in ΞB matrix corresponds to the transitory shocks attributed to the financial stability index (i.e. financial shock) and the interest rate shock. The last two columns are permanent shocks to exchange rate and price, respectively. The two additional zero restrictions imposed on the contemporaneous matrix B separate the financial shock from the interest rate shock; the first zero implies that financial shock has zero contemporaneous effect on the interest rate,

$K - r = 2, k^*r = 4, k^*(k^* - 1)/2 = 1, r(r - 1)/2 = 1$. The contemporaneous (B) and long-run (ΞB) restrictions used in this study are presented below;

while the last zero implies that aggregate demand shock has no immediate effect on the interest rate.

The SVEC model described above is estimated with yearly historical data on the consumer price index, exchange rates, and interest rates covering the periods of 1981 to 2020 and is sourced from the World Bank Development Index database. However, the financial stability index is computed using the principal component of several variables (see Table A1 in the appendix) that describe the dynamics of the financial sector.

IV. Data Analysis and Interpretations

Table 1. Descriptive statistics

	Mean	SD	CV	J-B	Pairwise correlation		
FSI	-3e16	2.581	-9e15	3.830	1		
Interest rate	17.454	4.603	0.263	5.225*	-0.124	1	
CPI	68.152	83.638	1.227	1.017	0.656***	-0.110	1
Exchange rate	100.87	100.75	0.999	17.511***	0.707***	-0.012	0.960*** 1

Source: Authors computation

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table 1 shows the descriptive statistics for the financial stability index, interest rate, consumer price index, and exchange rate, respectively. The first column shows the mean values for the variables and is all positive. The second column shows the standard deviations, while the third column shows the coefficient of variation, which shows the relative dispersion of the variables. It can be deduced from the coefficient of variation that the interest rate has a slight variation than the other variables, followed by the exchange rate. The coefficient of variation predicts the high degree of instability of the financial system. The Jarque-Bera probability values in the fourth column are only significant for interest and exchange rates; this signifies that these variables follow a normal distribution. The last segment of the

table shows the pairwise correlation between the variables. There is a significant positive association between the financial stability index, consumer price index, and exchange rate. It can be seen that consumer price index and exchange rate correlate negatively with interest rate but are insignificant. A high degree of significant positive correlation exists between the consumer price index and the exchange rate; this suggests that the appreciation of the dollar against the domestic currency will have a negative effect by reducing the purchasing power of the domestic consumer. In another word, the depreciation of the naira in the international market will bring about a rise in the price of domestic goods and services.



Table 2. ADF test result

Variable	Deterministic term	level	Diff.
Stability Index (fsi)	Constant	-1.657	-4.882***
	Constant and Trend	-3.056	-4.812***
Log interest rate (r)	Constant	-3.482**	-5.319***
	Constant and Trend	-3.109	-5.810***
Log CPI (p)	Constant	-1.454	-3.662***
	Constant and Trend	-1.075	-3.876***
Log exchange rate (e)	Constant	-2.112	-5.300***
	Constant and Trend	-1.365	-5.678***

Source: Authors computation
 *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table 2 shows the ADF unit root test result for financial stability index, log interest rate, log consumer price index, and log exchange rate, respectively. None of the variables is stationary at levels and at 1% level of significance but has a

unit root; the probabilities of the t-stat at first difference are all significant. Since there is evidence of unit root in the variables, then a test for possible cointegration among the variables is needed to be carried out.

Table 3: Johansen tests result with VAR(1)

H_0	LR	Critical Value		
		90%	95%	99%
$r = 0$	95.68***	50.50	53.94	60.81
$r = 1$	33.69*	32.25	35.07	40.78
$r = 2$	12.02	17.98	20.16	24.69
$r = 3$	5.86	7.60	9.14	12.53

Source: Authors computation
 *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table 3 shows the Johansen Likelihood Ratio (LR) tests with the respective critical values. It can be deduced from the results that there is evidence of two cointegration vectors in the system;

one cointegration vector is assumed for the financial stability index and exchange rate relationship, and the second vector is assigned to the interest rate-price relationship (Fisher equation).

Table 4: long-run and adjustment coefficients estimate

	fsi	r	e	p
β'	1		-0.723*** (0.212)	
		1		-0.054** (0.022)
α'	-0.317*** (0.088)	-0.008 (0.021)	-0.042 (0.031)	0.001 (0.011)
	-0.791 (0.773)	-0.431** (0.184)	-0.332 (0.276)	0.077 (0.099)

Source: Authors computation
 () contains the standard error
 *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$



Table 4 depicts the two estimated long-run vectors and the corresponding adjustment coefficient estimates. The result shows that if the domestic currency depreciates by a value equivalent to one percent, the financial stability index increases by about 72% on average in the longrun. Also, from the result, it can be deduced that if the price increases by one percent, the average value of the interest rate goes up by about 0.054% in the longrun. The alpha row shows the speed of adjustment coefficients towards the long-run path. It can be seen from the table that the long-run financial stability and exchange rate equation (i.e. the first long-run vector) contribute significantly only to the short-run movements of financial stability. As such, the contemporaneous change in the financial

stability index is below 31.7% (i.e. about 31.7% error is corrected within a year) of any deviation from the long-run financial system equilibrium. The contemporaneous change in interest rate, exchange rate, and price do not respond to deviation from the long-run financial system equilibrium and, therefore, is weakly exogenous. Also, it can be seen from the alpha row that the fisher equation (the long-run interest rate and price relationship) contributes significantly only to the short-run movements of the interest rate. As such, the contemporaneous change in the interest rate is below 43.1% (i.e. about 43.1% error is corrected within a year) of any deviation from the long-run interest rate equilibrium.

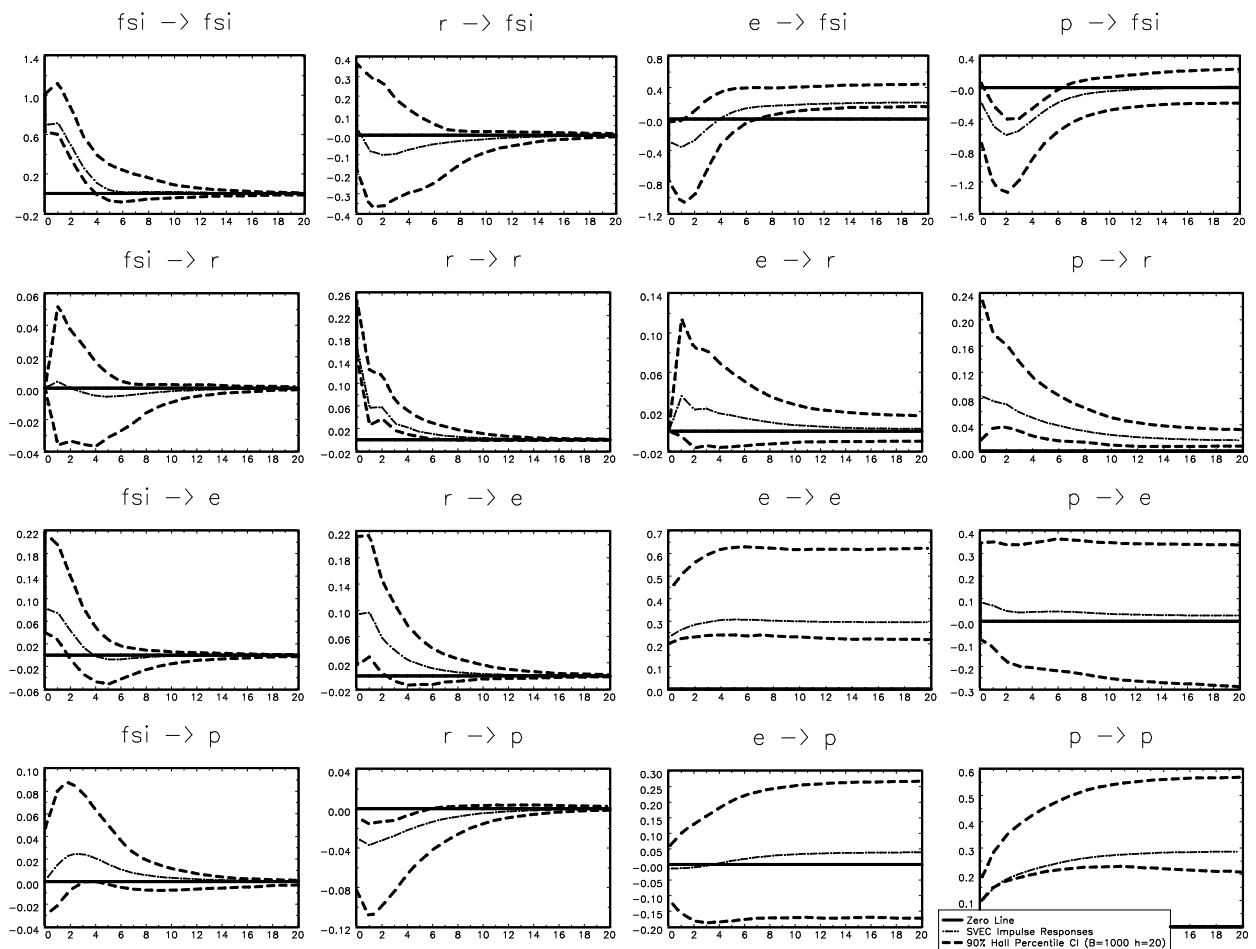


Figure 1: SVECM impulse response

Source: Author's computation

Figure 1 depicts the structural impulse response function, and the direction of the arrow implies a shock to a variable while the other variable is responding to it. It can be deduced from the first

row of the figure that the financial sector responds insignificantly to the interest rate shock. The financial sector is shown to respond negatively to the exchange rate shock on the impact, but the effect



changes positively after the fourth period. However, the financial sector responded negatively to the aggregate demand shock to the general price level. The interest rate failed to react significantly to the financial and the exchange rate shocks. The aggregate demand shock brings about an immediate increment in the interest rate but with a declining effect over the horizon. The exchange rate responds positively to the financial and the interest rate shocks on the impact, but the effects decline rapidly. However, the effect of exchange rate shock

on the exchange rate itself is positive and persistent. There is no evidence of the exchange rate responding to the aggregate demand shock. The general price index is shown not to respond to the financial and exchange rate shocks significantly. The interest rate shock brings about an immediate decrement in the general price level, but the effect declines gradually over the horizon. The effect of the aggregate demand shock on the general price level is positive and persistent.

Table 5: SVECM forecast error variance decomposition

Proportions of forecast error in fsi				
forecast horizon	Fsi	accounted for by;		
		r	e	P
1	0.81	0.00	0.13	0.05
4	0.51	0.01	0.12	0.37
8	0.44	0.01	0.12	0.43
10	0.43	0.01	0.13	0.42

Proportions of forecast error in r				
forecast horizon	Fsi	accounted for by;		
		r	e	P
1	0.00	0.79	0.00	0.21
4	0.00	0.59	0.04	0.37
8	0.00	0.52	0.05	0.43
10	0.00	0.51	0.05	0.44

Proportions of forecast error in e				
forecast horizon	Fsi	accounted for by;		
		r	e	P
1	0.09	0.12	0.69	0.10
4	0.04	0.07	0.85	0.05
8	0.02	0.03	0.92	0.03
10	0.02	0.03	0.93	0.03

Proportions of forecast error in p				
forecast horizon	Fsi	accounted for by;		
		r	e	P
1	0.00	0.09	0.02	0.89
4	0.01	0.04	0.00	0.95
8	0.01	0.02	0.00	0.97
10	0.00	0.01	0.01	0.98

Source: Author's computation

Table 5 shows the SVECM forecast error variance decomposition of the variables. It can be observed that the variation in the financial sector is

majorly accounted for by the financial sector shock, exchange rate shock, and the aggregate demand shock. In the first period, the financial shock



contributes about 81% of the variation in the financial sector, whereas the exchange rate shock contributes 13% and the aggregate demand shock contributes just 5%. In the medium-run, the financial shock contributes about 51% of the variation in the financial sector, whereas the exchange rate shock contributes 12% and the aggregate demand shock contributes 37%. In the longrun, the financial shock contributes about 43% of the variation in the financial sector, whereas the exchange rate shock contributes 13% and the aggregate demand shock contributes 42%. The innovation in the interest rate is shown to be driven primarily by the interest rate and the aggregate demand shocks. Initially, the interest rate shock contributes about 79% of the variation in the interest rate, whereas the aggregate demand shock contributes 21%. In the medium-run, interest rate shock contributes about 59% of the variation in the interest rate, whereas the aggregate demand shock contributes 37%. In the longrun, the interest rate shock contributes about 51% of the variation in the interest rate, whereas the aggregate demand shock contributes 44%.

Looking at the exchange rate innovation accounting, it can be deduced that the exchange rate shock majorly accounts for the variation in the exchange rate. Initially, the exchange rate shock contributes about 69% of the variation in the exchange rate. In contrast, the financial shock contributes just 9%, the interest rate shock contributes 12%, and the aggregate demand shock contributes 10%. In the mediumrun, the exchange rate shock contributes about 85% of the variation in the exchange rate, whereas the financial shock contributes 4%, the interest rate shock contributes 7%, and the aggregate demand shock contributes 5%. In the longrun, the financial shock contributes just 2%, interest rate and the aggregate demand shocks contribute individually 3%. Lastly, it can be deduced that the aggregate demand shock contributes mainly to the variation in the general price level; the role played by the financial and the exchange rate shocks are highly insignificant compared to the interest rate shock. In the first period, the aggregate demand shock contributes about 89% of the variation in the general price level, whereas the interest rate shock contributes 9%. In the medium-run, aggregate demand shock contributes about 95% of the variation in the general price level, whereas the interest rate shock contributes 4%. In the longrun, the aggregate demand shock contributes about 98% of the variation in the general price level, whereas the interest rate shock contributes just 1%.

V. Conclusion and Recommendations

This study employed the SVEC model as an empirical tool to examine the effect of exchange rate shock on financial stability in Nigeria. The study found that the impact of exchange rate shock on financial stability depends on the cycle; for instance, this study revealed that exchange rate shock impacts the financial sector negatively in the immediate but switches to positive after the fourth period and then becomes persistent. However, the financial shock caused the domestic currency to depreciate on the impact but return to its initial value after a short period. The forecast error decomposition analysis tells a similar story; exchange rate shock accounted for an average of 13% of the variation in the financial sector in the short, medium, and long runs. Apart from the financial shock, the aggregate demand shock to the general price level accounted for the more significant proportion of the variation in the financial sector. Likewise, there is little evidence that the financial shock is likely to cause a significant variation in the exchange rate, as financial shock accounted for an average of 4.3% of the variation in the exchange rate in the short, medium, and long runs.

From the findings, in order to reduce the effect of exchange rate volatility on financial system stability, the monetary authority should strive to ensure a stable exchange rate regime which reduces uncertainties in the financial system and encouraging investor to pursue long term investment within the financial system thus improving the performance of the financial system.

Also, since inflation significantly impact the financial system, the monetary policy should not be the only policy use to fight inflation, fiscal policy should be adequately deployed to combine with monetary policy in order to achieve better result as this would spur investment into Nigeria. Finally, interest rate should be regulated to encourage investment within the financial system.

REFERENCES

- [1]. Ahiabor, G & Amoah, A (2019). Examining the Effect of Real Effective Exchange Rate Volatility on Economic Growth: Evidence from Ghana. *Journal of Economics and Economic Education Research* Vol: 20 (1), 1-14
- [2]. Akinlo, A. E., & Adejumo, V. A. (2014). Exchange rate volatility and non-oil exports in Nigeria: 1986 - 2008. *International Business and Management*, 9(3), 70-79



- [3]. Akpan, E. O. and Atan, J. A. (2012). Effects of exchange rate movements on economic growth in Nigeria; CBN Journal of Applied Statistics, Vol. 2, No.21.1-14
- [4]. Anifowose, A.D. (2018). Dynamics of Exchange Rate and Economic Growth: Empirical Evidence from the Nigerian Foreign Exchange Market. LASU Journal of Business Review Vol 5, No 1. 282-290
- [5]. Anifowose, A.D. (2021). Economic Growth and Exchange Rate Dynamics in Nigeria. Imo State University /Business & Finance Journal Vol: 12 No: 1. 36-48
- [6]. Arratibel, O., Furceri, D., Martin, R &Zdzienicka, A. (2009) The Effect of Nominal Exchange Rate Volatility on Real Macroeconomic Performance in the CEE Countries (December 1, 2009). GATE Working Paper No. 09-34, Available at SSRN: <https://ssrn.com/abstract=1553790> or <http://dx.doi.org/10.2139/ssrn.1553790>
- [7]. Azid et al. (2005).Exchange rate volatility and foreign trade: evidence from thirteen LDCs. Journal of Business and Economic Statistics 18, pg,10-18
- [8]. Azid T, Jamil M & Kousar A (2005), "Impact of Exchange Rate Volatility on Growth and Economic Performance: A Case Study of Pakistan, 1973-2003", The Pakistan DevelopmentReview, 44(4) 749-775.
- [9]. Bala, D.A & Asemota, J.O (2015) Exchange–Rates Volatility in Nigeria: Application of GARCH Models with Exogenous Break. CBN Journal of Applied Statistics Pg. 89-116
- [10]. Branson, W. H., & Henderson, D. W. (1985). The specification and influence of assets markets. In R. W. Jones, and P. B. Kenen (Eds.), Handbook of international economics (Vol. 2). Elsevier 749–805
- [11]. Central Bank of Nigeria. (2014). Statistical Bulletin. Abuja: Central Bank of Nigeria (CBN)
- [12]. Central Bank of Nigeria. (2016). Statistical Bulletin. Abuja: Central Bank of Nigeria (CBN)
- [13]. Central Bank of Nigeria (2016) Foreign exchange: Education in economics series. 4: 1–50.
- [14]. Duasa, J (2008). Impact of Exchange Rate Shock on Prices of Imports and Exports. Department of Economics, Kulliyah of Economics and Management Sciences, International Islamic University Malaysia
- [15]. Duru, I.U., Eze, M.A., Saleh, A.S., Uzochina, B.I., Ebeni, G.O & Chukwuka, E (2022) Exchange Rate Volatility and Exports: The Nigerian Scenario. Asian Journal of Empirical Research Volume 12, Issue 1 (2022): 11-28.
- [16]. Edwards, S & LevyYeyati, E. (2003) Flexible Exchange Rates As Shock Absorbers. Working Paper 9867 <http://www.nber.org/papers/w9867> National Bureau of Economic Research, NBER working paper series 1050 Massachusetts Avenue Cambridge, MA
- [17]. Elijah E.K., Anakwue E.C & Musa M. (2022). Effect of Foreign Exchange Fluctuations on the Economic Growth of Nigeria. Jalingo Journal of Social and Management Sciences Volume 3, Number 4 December, 2021 Page 33-44
- [18]. Emefiele, G.I (2016) PRESS STATEMENT ON FOREIGN EXCHANGE DEPOSITS IN COMMERCIAL BANKS AND SALES TO BDCS. CBN Press Release - CBN to stop Dollar Sales to BDCs January 2016.pdf
- [19]. Eneji M.A, Nanwul D.F, Eneji A.I, (2018) Effect of Exchange Rate Policy and its Volatility on Economic Growth in Nigeria. Int J Adv Stud Econ Public Sector Manage 6: 166–190.
- [20]. Fasanya, I.O., & Akinwale, O.A. (2022). Exchange Rate Shocks and Sectoral Stock Returns in Nigeria: Do Asymmetry and Structural Breaks Matter?, Cogent Economics & Finance, 10:1, 2045719, <https://doi.org/10.1080/23322039.2022.2045719>
- [21]. Friedman, M. (1953) "The Case for Flexible Exchange Rates." In M. Friedman (eds.), Essays in Positive Economics, 157-203. Chicago: University of Chicago Press
- [22]. Friedman, M and Schwartz, A. (1963). Money and business cycles. Review of Economics and Statistics, pp.32-64. 21.
- [23]. Gosh A, Gulde A. M and Wolf H (2003). Exchange Rate Regimes: Choices and Consequences, MIT Press, Massachusetts
- [24]. Hahn, E. (2007). The impact of exchange rate shocks on sectoral activity and prices in the Euro Area. European Central Bank (ECB) Working Paper Series, 796, 1-45
- [25]. Imoughele, L. E., &Ismaila, M. (2015). The impact of exchange rate on Nigerian non oil exports. International Journal of Academic in Research Accounting, Finance and Management Sciences, 5(1), 190-198
- [26]. Ismaila, M. (2016). Exchange rate depreciation and Nigeria economic



- performance after structural adjustment programmes (saps). *NG-Journal of Social Development*, 5(2): 122-132.
- [27]. Iwegbu, O. &Nwaogwugwu, I.C. (2019) Effect of Exchange Rate Shock on Key Sectors of the Nigerian Economy. n at: <https://www.researchgate.net/publication/340084950>
- [28]. Iyeli I.I, Utting C (2017) Exchange rate volatility and economic growth in Nigeria. *Int J Econ Commer Manage* 5: 583–595
- [29]. King, R. G., Plosser, C. I., Stock, J. H. & Watson, M. W. (1991). Stochastic trends and economic fluctuations, *American Economic Review* 81: 819–840
- [30]. Lartey, E. (2007). Capital inflows and the real exchange rate: an empirical study of sub-Saharan Africa. *Journal of International Trade and Economic Development*, 16(3), 337–57.
- [31]. Levy-Yeyati E and Sturzenegger F (2003), “To Float or to Fix: Evidence on the Impact of Exchange Rate Regimes on Growth”, *American Economic Review*, Vol. 93, No. 4, pp. 1173-1193.
- [32]. Morina, F., Hysa, E., Ergu, U., Panait, M., & Voica, M.C (2020). The Effect of Exchange Rate Volatility on Economic Growth: Case of the CEE Countries. *Journal of Risk and Financial Management* 2020, (13), 177-189
- [33]. Mundel, A. Robert (1961). The Monetary Dynamics of International Adjustment Under Fixed and Flexible Exchange Rate, *Quarterly Journal of Economic*, 74.
- [34]. Nguyen, V.C. & Do, T.T. 2020 Impact of Exchange Rate Shocks, Inward FDI and Import on Export Performance: A Cointegration Analysis. *Journal of Asian Finance, Economics and Business* Vol 7 No 4 (2020) 163 - 171
- [35]. Okorontah, C F. &Odoemena, I. U (2016). Effects of Exchange Rate Fluctuations on Economic Growth of Nigeria. *International Journal of Innovative Finance and Economics Research* 4(2):1-7, April-June. 2016
- [36]. Osahon, O.H. (2014). Measuring Nigerian Stock Market Volatility. *Singaporean Journal of Business Economics and Management Studies*. 2 (8)
- [37]. Senadza, B &Diaba, D(2018). Effect of exchange rate volatility on trade in Sub-Saharan Africa. *Journal of African Trade* 4 (2018) 20–36
- [38]. Sugiharti, L., Esquivias, M.U., &Setyorani, B. (2020).The impact of exchange rate volatility on Indonesia's top exports to the five main export markets. *Heliyon* 6 (2020) e03141
- [39]. Theories of Exchange Rate Determination | International Economics (economicsdiscussion.net)
- [40]. Umaru, H., Niyi, A. and Osagie, N. (2019). The Effects of Exchange Rate Volatility on Economic Growth of West African EnglishSpeaking Countries. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, Vol. 8, No.4, October 2018, pp. 131–143
- [41]. Victoria, K. S. (2019). Exchange rate management and economic growth: A FMOLS Approach. *Munich Personal RePEc Archive*.
- [42]. Yakub, M. U., Sani, Z., Obiezue, T. O. & Aliyu, V. O. (2019). Empirical investigation on exchange rate volatility and trade flows in Nigeria. *Economic and Financial Review* 57, (1), 23-46.
- [43]. Yunusa, L. A. (2020). Exchange Rate Volatility and Nigeria Crude Oil Export Market. *Scientific African* 9: e00538. <https://doi.org/10.1016/j.sciaf.2020.e00538>

Appendix

Table A1: Financial indices used in computing proxy for financial system stability index

Index	Code	Description
Depth	Di01	Private credit by deposit money banks to GDP (%)
	Di02	Deposit money banks' assets to GDP (%)
	Di04	Deposit money bank assets to deposit money bank assets and central bank assets (%)
	Di05	Liquid liabilities to GDP (%)
	Di06	Central bank assets to GDP (%)
	Di08	Financial system deposits to GDP (%)
	Di12	Private credit by deposit money banks and other financial institutions to GDP (%)
	Di14	Domestic credit to private sector (% of GDP)



Efficiency	Ei02	Bank lending-deposit spread
	Ei08	Credit to government and state owned enterprises to GDP (%)
Stability	Si04	Bank credit to bank deposits (%)
Others	Oi02	Bank deposits to GDP (%)
	Oi07	Liquid liabilities in millions USD (2010 constant)
	Oi13	Remittance inflows to GDP (%)

Source: Global Financial Development Database

Hahn, E. (2007). The impact of exchange rate shocks on sectoral activity and prices in the Euro Area. European Central Bank (ECB) Working Paper Series, 796, 1-45