Exchange Rate Volatility on Investment and Growth in Nigeria, an Empirical Analysis

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Abstract

This paper examines the effect of exchange rate volatility on investment and growth in Nigeria over the period of 1986 to 2014. The vector error correction method, impulse responses function, co-integration and Augmented Dickey Fuller (ADF) test for stationarity were employed to capture the interactions between the variables. The results confirm the existence of long run relationship between exchange rate, investment, interest rate, inflation and growth. Finally the results show that exchange rate volatility has a negative effect with investment and growth while exchange rate volatility has a positive relationship with inflation and interest rate in Nigeria. Based on our findings, we recommended that the policy makers should developed sound exchange rate management system in the country potent enough for better growth in the economy.

Index terms— exchange rate, volatility, investment, VAR.

1 Introduction

n Nigeria, exchange rate management has undergone large changes over four decades. In 1960s Nigeria operated a fixed exchange regime which was fixed at par with the British pound and later the American dollar in addition to restrictions on import via strict administrative controls on foreign exchange. In 1978, the monetary authorities pegged the naira to a basket of 12 currencies of her major trading partners. The sharp fall in international oil price and consequent decline in foreign exchange receipts in the early 1980s were such that the economy could not meet its international financial commitments, and to migrate the challenges, the stabilization act of 1982 was implemented which led to accelerated depreciation of the naira. In Nigeria, the management of the exchange rate is vested in the Central bank of Nigeria (CBN) and since the introduction of the structural Adjustment Programme (SAP) in 1986; exchange rate management has been a core macroeconomic policy function. Mordi, (2006) agreed that exchange rate has appreciated and has been relatively stable. Benson and Victor, (2012) and Aliyu, (2011) noted that despite various efforts by the government to maintain a stable exchange rate, the naira has depreciated throughout the 80's to date.

Exchange rate volatility became significant following the breakdown of the Bretton Wood Agreement in 1973 after which exchange rate became flexible among world currencies. Literature put it that exchange rate became more volatile in Nigeria after the introduction of widely known currency control measures called the Structural Adjustment Programme (SAP) in 1986. Volatility in Nigeria manifests in different forms ranging from volatility in real growth rates, price inflation, investment per capita and government revenues per capita to fluctuations in terms of trade and real exchange rate. There are numerous reasons why research into the effect of exchange rate volatility on investment inflows is important for a developing resource-based economy like Nigeria. First, macroeconomic volatility represents a measure of the uncertainty that economic agents face about the future. In turn, uncertainty affects the future level of growth and investment. Second, government policy is often directed towards reducing volatility by smoothing out the fluctuations in the time path of income, price and investment, among others.

According to the literature, exchange rate volatility has to do with the unusual movements of the exchange rate. Exchange rate is one of the economic indicators which directly affect investment as such as its role in the overall economic objectives of a country cannot be underestimated. This gives confidence to why the public sectors, foreign investor and private individual pay a lot of attention to the exchange rate volatility. Since September 1986, when the market determined exchange rate system was introduced via the second tier foreign exchange market, the naira exchange rate has exhibited the features of continuous depreciation and instability. People have not been investing due to exchange rate volatility. This instability and continued depreciation of the naira in the foreign exchange market has resulted in declines in the investment, standard of living of the populace, increased cost of production which also leads to cost push inflation. It has also tended to undermine the international competitiveness of non-oil exports and make planning and projections difficult at both micro and macro levels of the economy. A good number of small and medium scale enterprises have been strangled out as a result of low dollar/ naira exchange rate and so many other problems resulting from fluctuations in exchange rates can also be identified.

The purpose of this paper is therefore, to examine the effect of exchange rate volatility on investment and growth in Nigeria. The vector error correction method is applied to estimate the impulse response functions for investment and growth in order to determine how investment and growth responds to exchange rate volatility.

2 II.

3 Literature Review

Several studies have been conducted on the effect of exchange rate volatility. Few of the studies have conducted both exchange rate volatility on growth and investment in Nigeria.

Manalo, Perera and Rees (2014) examine the effects of exchange rate movements on the Australian economy using the structural vector auto-regression model using seasonally adjusted data at quarterly frequencies for the period of 1985Q1 to 2013Q2. They found out that a temporary 10 per cent appreciation of the real exchange rate that is unrelated to the terms of trade or interest rate differentials lowers the level of real GDP over the subsequent one-to-two years by 0.3 per cent and year-ended inflation by 0.3 percentage points. Chowdhry and Wheeler (2008) in an empirical analysis studied the relationship between volatility of exchange rate for the four developed countries of Canada, Japan, United State and United Kingdom. Using a number of variables this study applied vector auto regressive (VAR) approach and found that shocks to exchange rate volatility have positive and significant impact on flow of FDI. Akeju(2014) also examines the impact of real exchange rate on terms of trade and ecopnomic growth which relies on cointegration techniquies and error correction model using annual data covering from 1980-2012. It was revealed that a real exchange rate moves along the same direction with terms of trade in the long run. Rasaq (2013) examined the impact of exchange rate volatility on the macro economic variables in nigeria and findings shows that exchange rate volatilty has a positive influence on GDP, FDI and trade openess with a negative influence on the inflationary rate in the country. Dada and oyeranti (2012) examines exchange rate and macroeconomic aggregates in Nigeria. The result shows that there is no evidence of a strong direction between changes in the exchange rate and GDP growth. Rather, the countrys growth has been directly affected by fiscal and monetary policies and other economic variables particularly the growth of exports which is marjorly oil. In short, the nature of the effect of exchange rate volatility on investment and growth is yet unresolved. There is therefore the need for more empirical research on the subject matter. This is particularly important in view of the nature of exchange rate in developing countries like Nigeria.

4 III.

5 Theoretical Underpinnings

Romer in his first paper on endogenous growth in 1986 presented a variant on Arrow's model which is known as learning by investment. He assumes creation of knowledge as a side product of investment. He takes knowledge as an input in the production function of the following form Y = A(R) F (R i , K i , L i) Where Y = aggregate output/Gross Domestic Product (GDP), A = public stock of knowledge R and R i = stock of expenditure i, K i and L i = capital stock and labour stock of firm i respectively.

He assume the function F homogeneous of degree one in all its input R i , K i , and L i and treat R i as a rival good. Romer took three key elements in his model, namely externalities, increasing returns in the production of output and diminishing returns in the production of new knowledge. According to Romer, it is spill-over's from research efforts by a firm that leads to the creation of new knowledge by other firms. In other words, words, new research technology by a firm spills-over instantly across the entire economy. In his model, new knowledge is the ultimate determinant of long-run growth which is determined by investment in research technology. Research technology exhibits diminishing returns which mean that investment in research technology will not double knowledge. Moreover, the firm investing in research technology will not be the exclusive beneficiary of the increase in knowledge. The other firms also make use of the new knowledge due to the inadequacy of patent protection and increase their production. Thus the production of goods from increased knowledge displays increasing returns and competitive equilibrium is consistent with increasing aggregate returns

owing to externalities. Thus Romer takes investment in research technology as endogenous factor in terms of the acquisition of new knowledge by rational profit.

6 IV.

7 Methodology

The goal of the paper is to ascertain if exchange rate volatility enhance investment and economic growth. This study will adopt Vector Autoregressive (VAR model). The vector autoregressive (VAR) model is one of the most successful, flexible, and easy to use models for the analysis of multivariate time series. It is a natural extension of the univariate autoregressive model to dynamic multivariate time series. This study will adapt the model specified by (Sims 1980). He said a pathorder VAR is also called a VAR with p lags. The process of choosing the maximum lag p in the VAR model requires special attention because inference is dependent on correctness of the selected lag order: A p-th order VAR, denoted VAR (p), is **??**————-(i) where the l-periods back observation y t?l is called the lthlag of y, c is a k × 1 vector of constants (intercepts), A i is a time-invariant k × kmatrix and e t is a k × 1 vector of error terms satisfying.

The model for this study is therefore represented as:EXR = c + A 1 Gdp t-1 + A 2 Invest t-2 + A 3 Inf t-3 + A 4 Int t-4 + e t ————————**(2)**

Where:EXR = Exchange rate GDP = Gross Domestic Product INVEST = Investment INF = Inflation Rate INT = Interest Rate E t = Error Term

The VAR model is expressed in a system as:t p i i t i p i i t i p i i t i p i i t i p i i t i t INT INF INVEST GDP EXR c EXR , 1 1 , 15 1 , 14 1 , 13 1 12 1 , 11 1 µ ? ? ? ? ? + + + + + + = ? ? ? ? ? = ? = ? = ? = ? = ? (3) t p i i t i p i i t i p i i t i p i i t i p i i t i t INT INF INVEST EXR GDP c GDP , 1 1 , 15 1 , 14 1 , 13 1 12 1 , 11 1 µ ? ? ? ? ? + + + + + + = ? ? ? ? ? = ? = ? = ? = ? = ? (4) t p i i t i p i i t i p i i t i p i i t i p i i t i t INT INF GDP EXR INVEST c INVEST ,**1 1 , 15 1 , 14 1 , 13 1 12 1**, 11 1 µ ? ? ? ? ? + + + + + + = ? ? ? ? ? = ? = ? = ? = ? = ? (5) t p i i t i p i i t i p i i t i p i i t i p i i t i t INT GDP INVEST EXR INF c INF , 1 1 , 15 1 , 14 1 , 13 1 12 1 , 11 1 µ ? ? ? ? ? + + + + + + = ? ? ? ? ? = ? = ? = ? = ? = ? (6) t p i i t i p i i t i p i i t i p i i t i p i i t i t GDP INF INVEST EXR INT c INT , 1 1 , 15 1 , 14 1 , 13 1 12 1 , 11 1 µ ? ? ? ? ? + + + + + + = ? ? ? ? ? = ? = ? = ? = ? = ? (7)

The VAR (p) system equation (3) to equation (7) can be represented in a reduced form within a matrix framework as: Exchange Rate Volatility is measured by taking the standard deviation of the moving average of the logarithm of real exchange rate, as well as a dummy capturing the amount of times the exchange rate moves above and below the average values of the real effective exchange rate in predetermined intervals.? + ? × ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? + ? = ? = ? t t t t t i t i t i t i t i t

8 V. Empirical Result and Discussions a) Trend Analysis Result

This section of this study access the trend of exchange rate volatility on investment and growth in Nigeria from 1986 to 2014. This enables to determine causal relationship among exchange rate volatility, investment and growth proxy as growth rate of gross domestic product (GDP). The above co-integration result tests for long run relationship between the dependent variable and the independent variables (EXR), (GDP), (INFR), (INT) and (INVEST). For rank (0), since the trace statistics (0.795271) is more than 5% critical value (69.81889), we reject the null hypothesis (there is no co-integration among variables). Otherwise, accept the alternate hypothesis indicating that there is a long run relationship among the variables. There is unidirectional causality between INVEST and GDP While INT and INF has bi-directional relationship at Lag 2 and 5% or significance level.©

9 f) Vector Error Correction Estimates Result

The formulated and estimated vector error correction model (VECM) using an optimal lag structure of two is shown below to examine the dynamic effects of exchange rate volatility on investment and growth in Nigeria from 1986 to 2014. It has been pointed out in the literature that individual coefficients from the error-correction model are hard to interpret in the case of vector-autoregressive model. Consequently, the dynamic properties of the model are analyzed by examining the impulse response functions and the variance decompositions.

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11 g) Impulse Responses Analysis

The impulse response result allow us to see the shock from the impulse sector which is the exchange rate in this study case and the response sector include investment, and gross domestic product. Impulse Response plot of exchange rate movement on investment and growth shocks.

Figure I below presents the contemporaneous response of exchange rate to Cholesky one squares variances shocks on investment and growth performance. As shocks in exchange rate (EXR) arise, the response of gross

domestic product (GDP) was negative .This is similar to the response of exchange rate (EXR) to investment (INVEST). Contrary, gross domestic product (GDP) and investment (INVEST) react negatively.

12 h) Variance Decomposition

This section presents the variance decomposition, which seperates the variation in an endogenous variable into the component shocks of the VEC model. The table7 below present the variance decomposition of exchange rate to innovation shocks from investment, interest rate, inflation and growth. In the second column, the labelled "S.E." contains the forecast error of the variable at a given forecast horizon. The source of this forecast error is the variation in the current and future values of the innovations to each endogenous variable in the VECM.. The other columns for each of variables give the percentage of the forecast variance due to each innovation, with each row adding up to 100.

13 VI. Conclusion and Recommendations

This paper examines the relationship between exchange rate, its volatility on investment and growth both theoretically and empirically from 1986 to 2014 in Nigeria. Exchange rate has poorly been managed over time and the time is long overdue to salvage the situation from getting worse. The theoretical issue on exchange rate was discussed and empirical finding were done to know the past findings on authors work that have done research relating to exchange rate volatility. The model adopted for this research work is vector autoregressive model (VAR).The Augmented Dickey Fuller (ADF) test was carried out to test for unit roots for the variables involved. Descriptive statistics was used to understand the data; trend analysis was used to know the trend and pattern of exchange rate volatility on investment and growth. Johansen cointegration test was used to determine whether there is long-run relationship among the variables and the results reveal the presence of two co-integration equations which indicate the existence of long run relationship among the five variables. Granger causality was used to know the causal effect among the variables, impulse response econometric estimators was used to known the impulse responses among the variables, the vector error correction method (VECM) was used to known whether there is any effect and the variance decomposition was also used to know the percentage of shocks in the variable .

Conclusively the volatility in exchange rate has a negative influence on investment and gross domestic product (GDP) which proxed growth and exchange rate volatility has significant influence with inflation and interest rate. The empirical findings are in conformity with Diallo (2009) and Bleaney & Greenaway (2010) results findings.

The general findings in this study have necessitated some policy directions which may be useful recommendations for policy authorities. Since the role of exchange rate volatility in investment indicates slight negative effect, it is appropriate for the authorities to develop sound exchange rate management in the country. The Central Bank should use the allocations and disbursement of foreign currencies as well as the naira to regulate the vacillations in exchange rate over time. Proper effective management of economic and noneconomic factors that will triggers exchange rate volatility. [1]

Figure 1:

$$_{\mathbf{13}}y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \cdots + A_p y_{t-p} + e_t,$$

Figure 2: Figure 1 :Figure 3 :

Year 2015
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(B)

The descriptive statistics was carried out between exchange rate volatility, investment and growth in Nigeria (1986-2014).

Table 1

	EXR	GDP	INFR	INT	INVEST
Mean	33.34287	12636.84	21.23017	12.60615	3965.474
Median	7.461668	6713.575	12.16854	12.59	3408.54
Maximum	291.8318	42396.77	76.75887	23.99	8439.51
Minimum	0.11754	134.6033	0.223606	4.704871	1916.04
Std. Dev.	68.35224	14319.1	19.95911	5.339686	2035.76
Skewness	3.091287	1.008109	1.490246	0.57736	1.078553
Kurtosis	11.3787	2.583133	3.935269	2.512348	2.925836
Jarque-Bera	131.0157	5.12202	11.791	1.898511	5.629148
Probability	0	0.077227	0.002752	0.387029	0.05993
Sum	966.9433	366468.3	615.6749	365.5784	114998.7
Sum Sq. Dev.	130816.8	5.74E+09	11154.25	798.343	1.16E+08
Observations	29	29	29	29	29

[Note: Source: Author's computation, 2015.]

Figure 3:

Source: Author's Computation, 2015.
The Augmented Dickey Fuller (ADF) unit-root test results presented in table 2 indicate that exchange rate (EXR), gross domestic product (GDP), inflation (INFR), interest rate (INT) and investment (INVEST) are stationary at first difference. We then applied the Johansen-Juselius (1990) co-integration technique to determine whether there is at least one linear combination of these variables that is I(0).
Hp: rank = p (no deterministic trend in the data)
Hr: rank r < p (co-integration relations)
Series: EXR GDP INFR INT INVEST

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics Likelihood Ratio	Max-Eigen Statistics	5% Sig. lev.
None	0.795297	71.28870*	69.81889	41.23773*
At most 1	0.760858	36.05092*	27.85613	37.20295*
At most 2	0.348428	8.850032	29.79707	11.13748
At most 3	0.254072	6.712555	15.49471	7.619674
At most 4	0.003566	0.092880	3.841466	0.092880

* denotes rejection of the hypothesis at 5% significance level. Likelihood ratio test of both Trace and Max-E
indicates 2 co-integrating equation(s)
Source: Author's computation (2015).

Figure 4:

2

Variables	ADF Statistics	Critical Values		Level of Significance	Order of Integration
EXR	-8.4651	-4.3393		1%	I (1)
GDP	-4.6099	-4.3393		1%	I (1)
INFR	-4.4641	-4.3943		1%	I (1)
INT	-4.52553	-4.3561	1%	I (1)	
INVEST	-6.9921	-4.3393		1%	I (1)

d) Co-integration

Johansen (1990) approach is use to fi existence or inexistence of a long-run relationship among the variables employed for this study in other to avoid biased results. The Johansen co-integration test for (EXR), (GDP), (INFR), (INT) and (INVEST) are presented in the table below.

Figure 5: Table 2 :

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Null Hypothesis	Lag	F-Statistic	Probability	Remarks
GDP does not Granger Cause EXR	2	1.29562	0.2938	Accept
EXR does not Granger Cause GDP	2	0.41943	0.6626	Accept
INFR does not Granger Cause EXR	2	0.08482	0.9190	Accept
EXR does not Granger Cause INFR	2	2.23632	0.1306	Accept
INT does not Granger Cause EXR	2	0.02513	0.9752	Accept
EXR does not Granger Cause INT	2	0.17139	0.8436	Accept
INVEST does not Granger Cause EXR	2	0.19013	0.8282	Accept
EXR does not Granger Cause INVEST	2	0.52496	0.5988	Accept
INFR does not Granger Cause GDP	2	0.07808	0.5988	Accept
GDP does not Granger Cause INFR	2	1.72511	0.2014	Accept
INT does not Granger Cause GDP	2	0.03623	0.9645	Accept
GDP does not Granger Cause INT	2	1.71727	0.2028	Accept
INVEST does not Granger Cause GDP	2	6.81810	0.0050	Reject
GDP does not Granger Cause INVEST	2	1.29693	0.2935	Accept
INT does not Granger Cause INFR	2	6.71784	0.0053	Reject
INFR does not Granger Cause INT	2	2.71481	0.0884	Reject
INVEST does not Granger Cause INFR	2	1.23826	0.3093	Accept
INFR does not Granger Cause INVEST	2	0.01137	0.9887	Accept
INVEST does not Granger Cause INT	2	1.55009	0.2345	Accept
INT does not Granger Cause INVEST	2	0.56282	0.5776	Accept

Figure 6: Table 5 :

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Source: Author's computation, 2015.

Endogenous variable: EXR _GDP _INFR _INT _INVEST
Econometric Method: VECM Estimate
Sample: 1986-2014

Equation	D(EXR)	D(GDP)	D(INFR)	D(INT)	D(INVEST)
ECM	-1.383746	-5.879700	0.290144	-0.000359	-23.24526
	(0.54922)	(17.1828)	(0.10537)	(0.03021)	(11.7367)
	[-2.51946]	[-0.34219]	[2.75369]	[-0.01188]	[-1.98057]
D(EXR(-1))	0.322968	8.796626	-0.160456	-0.005085	13.17914
	(0.43047)	(13.4675)	(0.08258)	(0.02368)	(9.19896)
	[0.75027]	[0.65317]	[-1.94296]	[-0.21472]	[1.43268]

Figure 7: Table 6 :

D(EXR(-2))	0.257668	3.262722	-0.063176	-0.020610	7.604156
	(0.26982)	(8.44135)	(0.05176)	(0.01484)	(5.76584)
	[0.95498]	[0.38652]	[-1.22050]	[-1.38856]	[1.31883]
D(GDP(-1))	-0.002614	0.257383	-1.94E-06	-2.31E-05	0.102106
	(0.00752)	(0.23525)	(0.00144)	(0.00041)	(0.16069)
	[-0.34757]	[1.09409]	[-0.00135]	[-0.05573]	[0.63544]
D(GDP(-2))	-0.001446	0.386496	0.001041	3.98E-06	-0.404125
	(0.00735)	(0.23010)	(0.00141)	(0.00040)	(0.15717)
	[-0.19658]	[1.67966]	[0.73801]	[0.00984]	[-2.57124]
D(INFR(-1))	0.380760	-9.943477	0.126762	0.072811	-10.84402
	(0.76110)	(23.8116)	(0.14601)	(0.04187)	(16.2645)
	[0.50027]	[-0.41759]	[0.86815]	[1.73901]	[-0.66673]
D(INFR(-2))	-0.865093	25.63898	-0.521405	-0.047959	13.89294
	(0.78024)	(24.4103)	(0.14969)	(0.04292)	(16.6734)
	[-1.10875]	[1.05033]	[-3.48335]	[-1.11736]	[0.83324]
D(INT(-1))	8.389574	-41.44684	0.369651	0.048553	60.28723
	(4.98301)	(155.896)	(0.95596)	(0.27412)	(106.485)
	[1.68364]	[-0.26586]	[0.38668]	[0.17712]	[0.56616]
D(INT(-2))	-1.732057	178.1472	-0.132236	-0.313833	177.1733
	(4.44637)	(139.107)	(0.85301)	(0.24460)	(95.0168)
	[-0.38954]	[1.28065]	[-0.15502]	[-1.28305]	[1.86465]
D(INVEST(-1))	-0.006871	-0.170825	0.004320	0.000164	-0.602886
	(0.00982)	(0.30718)	(0.00188)	(0.00054)	(0.20982)
	[-0.69976]	[-0.55610]	[2.29366]	[0.30365]	[-2.87335]
D(INVEST-(-2))	-0.012772	0.523666	0.002665	-0.000312	-0.123608
	(0.01047)	(0.32746)	(0.00201)	(0.00058)	(0.22367)
C	[-1.22021]	[1.59916]	[1.32726]	[-0.54207]	[-0.55263]
R-squared	12.15895	621.3444	-4.560084	-0.477976	673.0130
Adj. R-squared	(18.4536)	(577.331)	(3.54022)	(1.01515)	(394.345)
F-statistic	[0.65889]	[1.07624]	[-1.28808]	[-0.47084]	[1.70666]
Log likelihood	0.632117	0.472427	0.661631	0.509225	0.611142
Akaike AIC	0.343065	0.057905	0.395769	0.123616	0.305610
	2.186868	1.139692	2.488629	1.320573	2.000257
	-136.7861	-226.3082	-93.85828	-61.38034	-216.3972
	11.44508	18.33140	8.142944	5.644641	17.56901

: Source: Authors' computation (2015).

Figure 8:

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Period	S.E.	EXR	GDP	INFR	INT	INVEST
1	63.53453	100.0000	0.000000	0.000000	0.000000	0.000000
2	68.11116	87.01636	1.439582	8.704769	2.833542	0.005744
3	74.33258	74.75622	1.292649	7.558204	16.36513	0.027795
4	78.78545	66.56027	1.168008	7.070064	24.79396	0.407697
5	86.02979	57.58950	1.240587	8.290699	32.50966	0.369554
6	91.13239	51.38730	2.520283	12.01408	33.47854	0.599798
7	93.99140	48.84268	2.604488	12.71083	34.99580	0.846201
8	97.84740	45.31313	4.354474	12.15743	37.39347	0.781505
9	102.0088	41.90845	5.637120	12.49281	39.20906	0.752558
10	106.0786	39.00045	6.351065	12.74532	41.19321	0.709953

[Note: source: Author's computation,2015.]

Figure 9: Table 7 :

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Exchange rate shocks	Growth shocks	Inflation shocks	Interest rate shocks	Investment shocks
61.24%	2.66%	9.37%	26.28%	0.45%

Source : Authors' computation (2015).

The table revealed that shocks within itself (i.e exchange rate shocks), growth shocks, inflation shocks, interest rate shocks and investment shocks accounted for 61.24%, 2.66%, 9.37%, 26.28% and 0.45% of the total variation in exchange rate volatility in Nigeria respectively. It indicates that Investment is the least among various variable in Nigeria between 1986 to 2014.

Figure 10: Table 7 . 1 Table 7 . 1 :

[Mordi (2006)] 'Challenges of Exchange Rate Volatility in Economic Management of Nigeria'. M C Mordi . *the Dynamics of Exchange Rate in Nigeria, CBN Bullion*, 2006. July-September. 30 p. .

[Dickey and Fuller ()] 'Distribution of the estimators for autoregressive time series with a unit root'. D A Dickey , W A Fuller . *The American Statistical Association* 1979. 74 p. .

[Chaudhary et al. ()] 'Do Exchange Rate Volatility Effects Foreign Direct Investment? Evidence from Selected Asian Economies'. G M Chaudhary , S A Shah , M M Bagram . *Journal of Basic and Applied Scientific Research* 2090-4304. 2012. 2012. 2 (4) p. .

[Chowdhry and Wheeler ()] 'Does Real Exchange Rate Volatility Affect Foreign Direct Investment? Evidence from Four Developed Economies'. A Chowdhry , M Wheeler . *Int. Trade J* 2008. 22 (02) .

[Dada Eme and Oyeranti ()] 'Exchange Rate and Macro Economic Aggregates in Nigeria'. A Dada Eme , O A Oyeranti . *Journal of Economics and Sustainable Development* 2012. 3 (2) .

[Manalo et al. ()] 'Exchange Rate Movements and the Australian Economy'. J Manalo , D Perera , D Rees . *Journal of Research* 2014. (Discussion Paper RDP 2014-11)

[Olanipekun ()] *Exchange rate volatility and economic activities in Nigeria. A Post-Field Report Submitted in Partial Fulfilment for the Award of a Doctoral Degree (Economics) of the University of Ibadan*, D Olanipekun . 2013. Nigeria. p. B6.

[Omorokunwa and Ikponmwosa ()] 'Exchange Rate Volatility and Foreign Private Investment in Nigeria'. O Omorokunwa , N Ikponmwosa . *Asian Journal of Business Management* 2014. 2014. 6 (4) p. .

[Aliyu ()] 'Impact of Oil Price Shock and Exchange Rate Volatility on Economic Growth in Nigeria" An Empirical Investigation'. S R U Aliyu . *Research Journal of International Studies* 2011.

[Jhingan ()] M Jhingan . *International Economics. Vrinda Publications (p) LTD. B.5, Ashish Complex Copp*, 2006. Ahlcon Public School. (MayurVihar. Phase-1, Delhi-110091)

[Johansen and Juselius ()] 'Maximum likelihood estimation and inference on cointegration with application to the demand for money'. S Johansen , K Juselius . *Oxford Bulletin of Economics and Statistics* 1990. 52 p. .

[Benson and Victor ()] 'Real Exchange Rate and Macroeconomic Performance: Testing for the Balassa-Samuelson Hypothesis in Nigeria'. U Benson , E Victor . *International Journal of Economics and Finance* 2012. 4 (2) p. .

[Real Exchange Rates , Terms of Trade and Economic Growth in Nigeria Journal of Economics Theory ()] 'Real Exchange Rates , Terms of Trade and Economic Growth in Nigeria'. *Journal of Economics Theory* 1994-8212. 2014. 1980-2012. 2014. 8 (2) p. . (Akeju kemi)

[Inessa ()] 'The Dynamics of Exchange Rate Volatility: A panel VAR approach. The dynamics of exchange rate volatility: A panel VAR approach'. Axel G Inessa , L , AlexeiG . *Journal of International Financial Markets* 2014. 2014. 33 p. . (Institutions & Money)

[Mehdi et al. ()] 'The effect of exchange rate fluctuations on economic growth considering the level of development of financial markets in selected developing countries'. B Mehdi , N Arezoo , J Alireza . *Asian Economic and Financial Review* 2014. 2014. 4 (4) p. .

[Renani and Mirfatah ()] 'The Impact of Exchange Rate Volatility on Foreign Direct Investment in Iran'. H S Renani , M Mirfatah . *Journal of Procedia Economics and Finance* 2012. 2012. 1 p. .

[Rasaq Akonji Danmola ()] 'The Impact of Exchange Rate Volatility on the Macroeconomic Variables in Nigeria'. Rasaq Akonji Danmola . *European Scientific Journal* 2013. 9 (7) .

[Akpan ()] 'The Relevance of Exchange Control in Nigeria balance of payments adjustments process'. E Akpan , AtanJ . *Journal of Applied Statistics* 2012. 1983. 2 (2 2) . (Effects of Exchange Rate Movements on Economic Growth in Nigeria)