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The Impact of Exchange Rate Fluctuations on Private Domestic Investment Performance in Nigeria

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Abstract: *Since September 1986, when market determined exchange rate system was introduced, the naira exchange rate has exhibited the features of continuous depreciation and instability. This instability and continued depreciation of the naira in the foreign exchange market has resulted to declines in investments as a result of high degree of uncertainty in the Nigeria business environment, standard of living of the populace and increased cost of production which leads to cost push inflation. Against this background, this research seeks to undertake an empirical analysis of the link between exchange rate fluctuations and private domestic investment in Nigeria. Descriptive statistics and econometric method were employed. Thus, simple averages of descriptive statistics, and Error Correction Model (ECM) technique within the Ordinary Least Square estimation were employed to analyze the various trends in the data. The descriptive statistics of the variables included in the model shows the existence of wide variations in the variables as depicted by the standard deviation of the exchange rate variable that was unusually high. This depicts a high degree of volatility in the exchange rate during the period under investigation. The findings suggest that, the depreciation of the currency and interest rate does not stimulate private domestic investment activities in Nigeria. On the other hand, infrastructures, government size and inflation rate had a positive effect on private domestic investment in Nigeria. It is thus recommended that monetary authorities should adopt appropriate policy in appreciating the value of the naira as devaluation has been a mistake since 1986, reduce borrowing and lending charges to boast the performance of private domestic investment through stable macroeconomic environment.*

Keywords: *Investment, Exchange Rate, Monetary Policy, Infrastructures, Interest Rates*
JEL Codes: E22, D51, E52, H54 and E43

I. Introduction

Prior to the introduction of Structural Adjustment Program (SAP) in 1986, Naira enjoyed appreciable value against US dollar, a factor that creates opportunity for rapid economic growth and stability. With introduction of new economic program, the country began to suffer unstable exchange rate that caused a high degree of uncertainty in the Nigeria business environment. Domestic investors face enormous risk as no one, no matter how intelligent could predict the likelihood of the foreign exchange market performance. The situation must equally have an effect on importation level of the country. Nigeria as a developing country striving to develop its industrial base needs to harness its foreign exchange market to enable domestic investors import relevant machineries, equipments and raw materials for the industrial consumption (Abba, 2009).

For Ngerebo-a and Ibe (2013), Exchange rate is the ratio between a unit of one currency and the amount of another currency for which that unit can be exchanged at a particular time. Exchange rate of currency is the link between domestic and foreign prices of goods and services. Also, exchange rate can either appreciate or depreciate. Appreciation in the exchange rate occurs if less unit of domestic currency exchanges for a unit of foreign currency while depreciation in exchange rate occurs if more unit of domestic currency exchanges for a unit of foreign currency. Economic history has shown that there are two common concepts of exchange rate namely nominal exchange rate and real exchange rate. The nominal exchange rate is the number of unit of domestic currency that must be given up to get a unit of foreign currency. In other word, nominal exchange rate is the price of domestic currency in term of foreign currency. It is denoted as E. The real exchange rate is the relative price of foreign goods in term of domestic goods. In other word, it is the exchange rate adjusted for price. It is denoted as; $e = Ep^*/p$. Where E= nominal exchange rate, p^* = foreign price and p = domestic price.

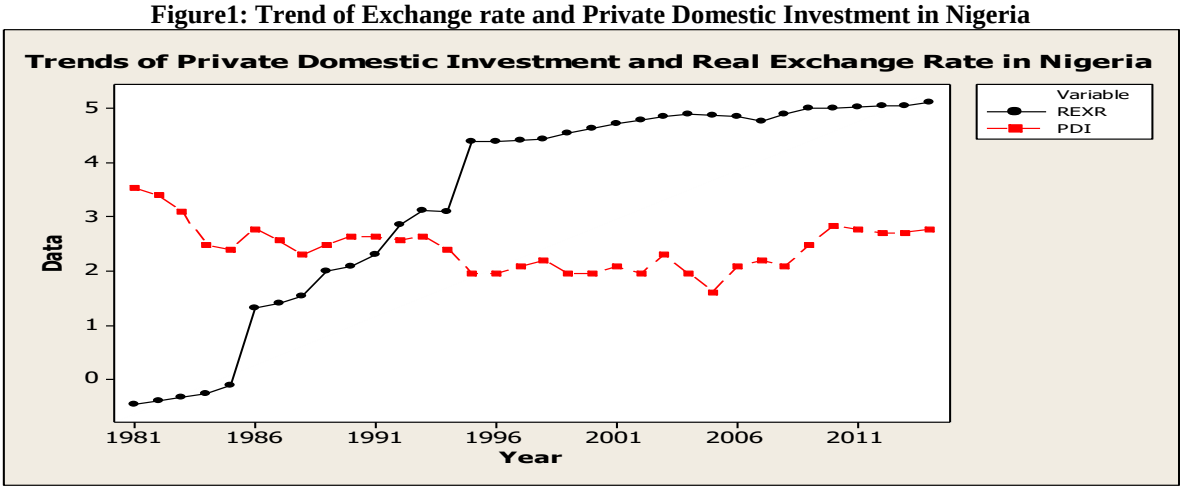
Exchange rate is one of the economic indicators which directly affect investment as such its role in the overall economic objectives of a country cannot be underestimated. This gives confidence to why the public sectors, foreign investor and private individual pay a lot of attention to the exchange rate variation. The exchange rate is among the most watched, analyzed and government manipulated macroeconomic indicators. 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 (Adelowokan, Adesoye and Balogun, 2015). This frequent appreciation of the dollar against the naira has led to sharp drop in private domestic investment in the country (See Fig. 1 below).

At the firm level for instance, exchange rate movements and its volatility had led to poor performances of private domestic investment in Nigeria. For example, private domestic investment declined from 34% of GDP in 1981 to 10% of GDP in 1988. Private domestic investment declined further to 7% of GDP between 1995 and 1996 and hovered around 8% of GDP to 10% of GDP from 1997 to 2003 before dropping to all time low of 5% of GDP in 2005. This downward trend in private domestic investment may partly be due to instability in the exchange rate and political instability. Private domestic investment then increased to 17% in 2010 and fluctuates around 16% and 15% of GDP between 2011 and now. Also, despite various efforts by the government to maintain a stable exchange rate, the naira has depreciated throughout the 80's. It depreciated from N0.61 in 1981 to N2.02 in 1986 and further to N7.901 in 1990, all against the US dollar. The policy of guided or managed deregulation pegged the Naira at N21.886 against the US dollar in 1994. Further deregulation pushed it to N86.322=S1.00 in 1999. It depreciated further to N120.97 in 2002. Thereafter, the exchange rate appreciated to N132.15 in 2005 and later N118.57 in 2008. Towards the end of 2008 when the Global Financial Crisis took its toll, the naira depreciated to N150.0124 at the end of 2009 and presently the value of the naira against the US dollar is now #199=$1.00. During this period, the economy recorded wide fluctuations in exchange rate and private domestic investment as depicted in figure 1 below:

Figure1: Trend of Exchange rate and Private Domestic Investment in Nigeria



Source: Author, using data from CBN and the World Bank (2014).

Figure 1 shows a declining trend in private domestic investment between 1986 and 2010. After this period, the share private domestic investment as a percentage of gross domestic product began to rise. The figure also reveals that the naira maintained upward trend throughout the study period with little variations here and there. This is a strong indication of the un-abating depreciation and instability of the naira exchange rate. The above downward trend in private investment is in line with the argument of Bleaney M., & Greenaway D (2001) who point to a decline or stagnation of private investment during the immediate past reform years. Political instability has made the climate for private saving and investment hostile in Nigeria. Also, the downward trend in private investment can be attributed to political upheavals in the country and policies inconsistency over time. The confidence of people must be rebuilt by putting a lasting solution to the political instability in the country so as to give room for more investment opportunities in the country. Consequently, it is important to undertake an empirical analysis of the link between exchange rate fluctuations and private domestic investment in Nigeria. The rest of this paper is organized as follows: Section 2 presents the literature review. The analytical framework of the study is discussed in section 3. In section 4 we carry out the data analysis and discuss the findings. The paper ends in section five with concluding remarks and policy options.

II. Literature Review

2.1. Theoretical Literature

The output effect of exchange rate changes has long been recognised in the literature but there is however, no consensus as to the direction of the effects while the traditionalists argued that exchange rate depreciation would promote trade balance, alleviate balance of payments difficulties and accordingly expand output and employment provided the Marshall-Lerner conditions are met (Marshall-Lerner condition states that depreciation would lead to expansion in output if the sum of price elasticity of demand for export and the price elasticity of demand for imports is greater than unity). The mechanism behind these positive effects, according to Taye (1999) is that devaluation switches demand from imports to domestically produced goods by increasing the relative prices of imports and making export industries more competitive in international markets thus stimulating domestic production of tradable goods and inducing domestic industries to use more domestic inputs. The monetarists on the other hand argued that exchange rate changes have no effect on real variables in the long run. The monetarists view is that exchange rate devaluation affect real magnitudes mainly through real balance effect in the short run but leaves all real variables unchanged in the long run Domac (1977).

The purchasing power parity (PPP) is also one of the earliest and perhaps, most theory of exchange rate between two currencies would be equal to the relative national price levels. This is a theory which states that exchange rates between currencies are in equilibrium when their purchasing power is the same in each of the countries. This means that the exchange rate between two countries should equal ratio of the countries price level of a fixed basket of goods and services. It assumes the absence of the trade barriers and transactions cost and existence of the purchasing power parity (PPP). When a country's' domestic price level is increasing (i.e. a country experiencing inflation), that country's exchange rate must be depreciated in order to return to PPP. The basis of PPP is 'the law of one price'. In the absence of transportation and other transactional costs, competitive market will equalize the price of an identical good in two countries when the prices are expressed in the same currency. In its version the purchasing power parity (PPP) doctrine equates the equilibrium exchange rate of the ratio of domestic to foreign price level (Lyon, 1992). The PPP is long-term approach used in the determination of equilibrium exchange rate. It is often applied as a proxy for the monetary model in exchange rate analysis. This theory could be of absolute or relative and could be short-term or long-term oriented.

2.3. Empirical Evidence

On the empirical side, the controversy of the effect of exchange rate variation is equally not resolved. Although many researchers found evidence for contractionary effect of depreciation for example Diaz-Alejandro (1963), Pierrer-Richard (1991) and Kandil (2004), Yaqub (2010), Bakare (2011) Adelowokan, Adesoye and Balogun, 2015. Also a pocket of studies found evidence for expansionary effects of exchange rate depreciation for example Fry (1976), Edwards (1992), Lyons (1992), Adewuyi (2005) and Bahmani-Oskooee & Kandil (2007), Opaluwa, & Ameh (2010), Ehinomen, and Oladipo (2012)

Dixit and Pindyck (1994) suggested that increased uncertainty caused by exchange rate variations reduces investment given the irreversibility of investment projects and, hence, in-creases the value option of delaying expenditures.

Jayaraman (1996) in his cross-country study on the macroeconomic environment and private investment in six Pacific Island countries observed a statistically significant negative relationship between the variability in the real exchange rate and private investment.

Thomas, (1997) in his study of 86 developing countries examined data on terms of trade, real exchange rates, and property rights and concluded that while factors including credit availability and the quality of physical and human infrastructure are important influences, uncertainty in the foreign exchange rate was negatively related to private investment in sub-Saharan countries.

Gómez (2000) in a study titled exchange rate volatility effects on domestic investment in Spain argue that there is no unique expected exchange rate effect on investment, its sign and importance remaining as a mainly empirical question.

Bakare (2011) carried out an empirical analysis of the consequences of the foreign exchange rate reforms on the performances of private domestic investment in Nigeria adopting the ordinary least square multiple regression analytical method. The multiple regression results showed a significant but negative relationship between floating foreign exchange rate and private domestic investment in Nigeria. The findings and conclusion of the study support the need for the government to dump the floating exchange regime and adopt purchasing power parity which has been considered by researchers to be more appropriate in determining realistic exchange rate for naira and contribute positively to macroeconomic performances in Nigeria.

Kanagaraj and Ekta (2011) examined the level of foreign exchange exposure and its determinants in Indian firms and it was found that only 16 percent of the firms had exchange rate exposure at 10 percent level of significance. About 86 percent of the firms are negatively affected by an appreciation of the rupee which confirms that Indian firms are net exporters. On the determinants of exchange rate exposure, the study reveals

that export ratio is positively and hedging activity is negatively related to the exchange rate exposure of pure exporter firms.

Nazar and Bashiri (2012) investigates the relationship between real exchange rate uncertainty and private investment in Iran for the period of 1988 to 2008 by using quarterly data and applying bivariate generalized autoregressive conditional heteroskedasticity (Bivariate GARCH) model in the Iranian economy. The study reveal that real exchange rate uncertainty significantly influences private investment and has a negative effect on it and that private investment uncertainty affects the level of private investment, negatively.

Fapetu, and Oloyede (2014) examined foreign exchange management and the Nigeria economic growth from 1970 to 2012 using the ordinary least square estimation techniques within the error correction model (ECM) framework. The study reveal that managing the economy's foreign exchange rate does affect quite a number of economic variables, which in turn affects growth in the economy.

Unfortunately the literature is still unclear about the direction of effects of exchange rate variability on the pattern and flow of investment. In fact, the nature of the effect of exchange rate volatility on investment 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.

III. Analytical Framework

3.1. Theoretical Framework and Model Specification

The theoretical framework adopted for this work is the traditional flow model which was further extended by Campa &Goldberg (1999). The model states that exchange uncertainty affect firm's output and investment behaviour. The model is being extended by decomposing firms output. The firm's production function is given as:

$$Q_t^s = A_1 L_1^{\alpha} K_t^{1-\alpha} \quad \text{----------} \quad (1)$$

$$Q_t^s = Q^T + Q^N \quad \text{----------} \quad (2)$$

Q represents good produced which can be divided into tradable and non-tradable goods, *K and L* is capital and labour inputs respectively, *A* is an arbitrary function representing managerial skills. It is further assumed that exchange rate is the source of uncertainty in the model, Exchange rate affected non tradable goods through the procurement of input from abroad while its effect on tradable is through import of raw materials and export. In addition, the representative firm faces product demand curve given as:

$$Q_t^d = A_2 (P_T / P_N)^{-N} \quad \text{----------} \quad (3)$$

Where Q_1^d denote goods demanded and P_T and P_N denote the prices of traded and non-traded goods respectively. A_2 is a function of internal and external functions (such as firm size, government policy and exchange rate policy). The parameter $-N$ stands for the price elasticity of demand for traded goods. Since we are interested in examining the impact of exchange rate variations on the performance of private domestic investment in Nigeria, we determine the possible links between foreign exchange rate variations and the performance of private domestic investment and lay emphasis on exchange rate parameter i.e.

$$PDI = F(REXR) \quad \text{----------} \quad (4)$$

Where: PDI = Private Domestic Investment, REXR = Real Exchange Rate and F = Functional Relationship.

To grasp the relevance of this specification to the objective proposed in this paper, we incorporate some four other variables that determine investment performances such as infrastructure, interest rate, government size and macroeconomic instability proxied as inflation rate. Thus, the specified equation for estimation is:

$$PDI = \beta_0 + \beta_1 REXR + \beta_2 INFRAS + \beta_3 GOVSIZE + \beta_4 INFR + \beta_5 INTR \quad \text{----------} \quad (5)$$

Where:

PDI = Private Domestic Investment, REXR = Real Exchange Rate, INFRAS = Infrastructures (proxied by power supply), GOVSIZE = Government size proxied by the ratio of government spending to Gross Domestic Product, INF = Inflation rate which is used to capture the general price level, In = Natural logarithm, β_0 = the intercept or autonomous parameter estimate, $\beta_1 to \beta_5$ = Parameter estimate representing the coefficient of REXR, INFRAS, GOVSIZE, INFR and INTR respectively, and μ = Error term (or stochastic term).

A positive relationship is expected between government size and private investment. Thus, an expansion of government size is expected to have a positive impact on the level of private investment. An increase in the level of economic growth is an indication of an increase in real income and hence aggregate demand. An expansion of aggregate demand has the potential of increasing the level of private investment. High

rate of inflation and high interest rate are expected to reduce the level of private investment. The impact of the real exchange Rate on private investment is expected to be positive, all things being equal since a depreciation of the real value of the naira increases the competitiveness of the products of private investment abroad (Oriavwote and Oyovwi, 2013). Also, government investment in infrastructures is expected to boast private investment. The log transformation of all the variables allows us to interpret the coefficients as elasticities.

Data Description and Source of Data

Variable	Definition	Source
Private Domestic Investment	This is composed of all domestic investment in Nigeria. It excludes foreign direct investment	World Bank
Real Exchange Rate	This is the relative price of foreign goods in term of domestic goods. In other word, it is the exchange rate adjusted for price. It is denoted as; e = Ep*/p	CBN
Infrastructures	This is proxied by electric power consumption (kwh per capita) which measures the production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants	World Bank
Government Size	Government size proxied by the ratio of government spending to Gross Domestic Product.	CBN
Inflation Rate	This is used to capture the general price level	CBN
Interest Rate	This is the commercial bank lending rate to private investors	CBN

3.2. Estimation Technique and Procedure

In analyzing our data, both descriptive statistics and econometric method were employed. Descriptive statistics is the statistics that involves organizing, summarizing and presenting data in a meaningful form. Thus, tables, graphs, and simple averages of descriptive statistics were employed to analyze the various trends in the data. Also, the Error Correction Model (ECM) technique within the Ordinary Least Square estimation is employed in this study. The choice of the ECM is to account for the explanatory potent of the regressors in both the short run and long run as well as ascertaining the dynamics of attaining long run equilibrium, an issue, which is key to studies related to macroeconomic variables one of which is the exchange rate.

IV. Empirical Results

4.1. Descriptive Analysis

The empirical section will begin by analyzing the summary statistics of all the variables in the model. The summary statistics is presented below

Table 4.1: Summary Statistics Results

	PDI	REXR	INFRAS	GOVSIZE	INFR	INTR
Mean	12.47059	75.55059	101.3235	4.600000	19.22706	17.63059
Std. Dev.	6.267933	61.92534	28.08183	2.252823	6.637141	4.897818
Skewness	1.826445	-0.044448	0.657112	1.083207	0.409694	0.159751
Kurtosis	6.654205	1.352415	2.650301	4.511591	2.726090	3.281978
Jarque-Bera	37.82050	3.856788	2.620091	9.885865	1.057434	0.257258
Probability	0.000000	0.145382	0.269808	0.007134	0.589361	0.879300
Observations	34	34	34	34	34	34

Source: Researcher's computation (2016)

Table 4.1 shows the summary of descriptive statistics of the variables included in the model. It shows the existence of wide variations in the variables as depicted by the mean values during the 1981 to 2014 study period. The analysis carried out in the above table shows that the standard deviation of the exchange rate has been unusually high. This depicts a high degree of volatility in the exchange rate during the period under investigation. The analysis was also fortified by the value of the skewness and kurtosis of all the variables involved in the model. All the distributions are positively skewed with the exception of REXR that is negatively skewed. Variables with value of kurtosis less than three are called platykurtic (fat or short-tailed) and REXR, INFRAS & INFR variables qualified for this during the study period. On the other hand, variables whose kurtosis value is greater than three are called leptokurtic (slim or long tailed) and PDI, GOVSIZE & INTR variables qualified for this during the study period. Jarque-Bera test shows that the residuals are all normally distributed but with the exception of PDI and GOVSIZE since the probability values of all the variables exceed 5%. In summary, the descriptive statistics revealed that most of the data sets are normally distributed. This is so because the probability values of the variables exceed 5%.

4.2. Time Series Properties of the Variables

The analysis is based on time series data. This requires some preliminary tests on the data to determine its reliability for econometric analysis. Thus, this study seeks to avert the occurrence of spurious results. To do this, Phillips-Perron tests was used. The Phillips-Perron test was adopted because it is a robust test for serial correlation and time dependent heteroskedasticities. Table 4.2 presents the results of PP test statistics for the levels and first differences of the annual time series data for the period, 1981-2014.

Table 4.2: PP Unit Root Test (Trend & Intercept)

Variables	PP	Critical Values	Order of Integration
PDI	-3.379	-3.553**	I(0)
REXR	-5.754	-4.273*	I(1)
INFRAS	-8.232	-4.273*	I(1)
GOVSIZE	-5.571	-4.273*	I(1)
INFR	-9.025	-4.273*	I(1)
INTR	-9.519	-4.273*	I(1)

Note: * Indicates stationary at the 1% level, and ** Indicates stationary at 5% level.
Source: Researcher's computation (2016)

The result of the PP unit root test suggests that all the variables except PDI were non-stationary. They however became stationary after the first difference was taken. However, following Harris (1995) and Gujarati (2009), both I(1) and I(0) variables could be carried forward to test for co-integration which forms the basis of the next section.

The Johansen co-integration test was used to test for the existence or not of a long run relationship among the variables. The Johansen methodology was preferable for the study because it has the advantage amongst others of allowing for more than one co-integrating vector. The result of the Johansen co-integration test is shown in table 4.3 below:

Table 4.3: Johansen Co-integration Test Result

Trace Test k = 2				Maximum Eigenvalues Test k = 2			
H_0	H_A	(λ trace)	Critical Values (5%)	H_0	H_A	(λ Max)	Critical Values (5%)
$r \leq 0$	$r > 0$	103.6680*	95.75366	$r \leq 0$	$r > 0$	42.11113*	40.07757
$r \leq 1$	$r > 1$	61.55691	69.81889	$r \leq 1$	$r > 1$	31.43336	33.87687
$r \leq 2$	$r > 2$	30.12355	47.85613	$r \leq 2$	$r > 2$	13.05005	27.58434
$r \leq 3$	$r > 3$	17.07350	29.79707	$r \leq 3$	$r > 3$	9.604039	21.13162
$r \leq 4$	$r > 4$	7.469461	15.49471	$r \leq 4$	$r > 4$	5.715274	14.26460
$r \leq 5$	$r > 5$	1.754187	3.841466	$r \leq 5$	$r > 5$	1.754187	3.841466

Note: r represents number of co-integrating vectors and k represents the number of lags in the unrestricted VAR model. * denotes rejection of null hypothesis at the 5% (1%) level
Source: Researcher's computation (2016)

The results reveal one co-integrating vector based on the trace and maximum eigenvalue statistics at 5% level for the model. Since the variables are co-integrated, there is, therefore, a long run relationship among the variables. It also means that the study can proceed to estimate the Error Correction Model.

4.3. Lag Order Selection Criteria

The lag order selection criteria were adopted to obtain optimal lag length for the model. All information criteria suggested a lag of one except the Akaike Information Criterion (See table 4.4)

Table 4.4: Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-644.9625	NA	1.88e+10	40.68515	40.95998	40.77625
1	-545.1931	155.8896*	3.65e+08*	36.69957	38.62335*	37.33725*
2	-506.0960	46.42785	3.88e+08	36.50600*	40.07873	37.69026

Source: E-views Output. Note: LR is the modified LR test statistic; FPE is the Final Predictor Error; AIC is Akaike Information Criterion; SC is the Schwarz Information Criterion; HQ is the Hannan-Quinn Criterion.
Therefore, a lag length of one (1) was used in building the short-run model

Error Correction Model

The error correction modelling involves three steps. The first is to estimate a long-run model; the second is to include the error term from the long-run model in a dynamic over-parameterized model and the third is to work on this model until one obtains the parsimonious model which is then interpreted. Considering our earlier stated equation, the error correction model is specified below:

$$\Delta InPDI = \beta_0 + \beta_1 \sum_{t=1}^{n} \Delta InREXR_{t-1} + \beta_2 \sum_{t=1}^{n} \Delta InINFRAS_{t-1} + \beta_3 \sum_{t=1}^{n} \Delta InGOVSIZE_{t-1} + \beta_4$$

$$\sum_{t=1}^{n} \Delta InINFR_{t-1} + \beta_5 \sum_{t=1}^{n} \Delta InINTR_{t-1} + \delta ECM(-1) + \mu_t \text{ ---------- (6)}$$

Where:

μ_t = Error term

ECM (-1) = Error Correction Mechanism

δ = a term, capturing the long run impact

The short run effects are captured through the individual coefficients of the differenced terms Δ, while the coefficient of the ECM variable contains information about whether the past values of variables affect the current values.
The result of the analysis is presented below starting with the over-parameterize model.

Over-parameterize and Parsimonious ECM Models

Table 4.5: Summary of Over-parameterize ECM Result

Variables	Coefficients	t-values	p-values
C	-0.031643	-0.485925	0.6323
DLOG(REXR)	-0.006365	-0.038495	0.9697
DLOG(REXR(-1))	-0.005399	-0.034035	0.9732
DLOG(INFRAS)	0.335223	0.801928	0.4320
DLOG(INFRAS(-1))	0.055296	0.153198	0.8798
DLOG(GOVSIZE)	0.022853	0.223605	0.8253
DLOG(GOVSIZE(-1))	-0.008926	-0.060697	0.9522
DLOG(INFR)	-0.165319	-0.529721	0.6021
DLOG(INFR(-1))	0.368556	1.223933	0.2352
DLOG(INTR)	-0.020181	-0.066252	0.9478
DLOG(INTR(-1))	-0.237247	-0.775522	0.4471
ECM(-1)	-0.412370	-2.002296	0.0590

R^2 = 0.29, SC = 1.07, HQ = 0.69, and DW = 1.5
Source: Researcher's computation (2016)

Over-parameterize and parsimonious ECM provides a solution to the problem of spurious or non-sense regression associated with estimating models involving time series variables and also to reflect the dynamic adjustment to the long run, Patterson (1990). Thus, we adopted the general to specific framework developed by Hendry (1986). The uniqueness of ECM is that it provides the framework for establishing the link between the long and short run approaches to economic modelling Enang (2010). With the ECM, no first difference information is lost because the ECM incorporates both the short run dynamics and long run information in the error correction term.

The above table also includes the one period lagged value of the ECM whose coefficient is negative and statistically significant to support the existence of co-integration. The result of the over-parameterize ECM in Table 4.5 include one lags of each variable. The parsimonious ECM model was obtained by deleting the insignificant variables from the Over-parameterize ECM model. The result of the parsimonious or preferred ECM model is shown below in Table 4.6.

Table 4.6: Summary of Parsimonious (Preferred) ECM Result

Variables	Coefficients	t-values	p-values
C	-0.027568	-0.544259	0.5911
DLOG(REXR)	-0.007342	-0.050477	0.9601
DLOG(INFRAS)	0.333938	0.910914	0.3710
DLOG(GOVSIZE)	0.019142	0.218156	0.8291

DLOG(INFR(-1))	0.421987	1.782482	0.0868
DLOG(INTR(-1))	-0.271926	-1.210348	0.2375
ECM(-1)	-0.361448	-2.092547	0.0467

R^2 = 0.26, SC = 0.56, HQ = 0.34, and DW = 1.6
Source: Researcher's computation (2016)

As expected, the lagged error correction term is negative and statistically significant at 5 percent level. Since, the coefficient of the lagged error correction term is negative and significant; the coefficient reveals the speed at which the entire system adjusts towards long-run equilibrium. The coefficient of ECM is (-0.36) which shows speed of adjustment from short run fluctuations to long run equilibrium (36% discrepancy is corrected each year) approximately 36 percent of disequilibrium from the previous year's shock convergence back to the long run equilibrium in the current year. Bannerjee, Dolado., and Mestre (1998) asserted that a highly significant lagged error correction term further prove the existence of long-run relationship between the variables.

All the variables are correctly signed except real exchange rate that is indirectly related to private domestic investment in Nigeria. An increase in real exchange rate by 1% led to a decrease in private domestic investment by almost 0.07% in Nigeria. This implies that depreciation of the currency in Nigeria does not stimulate private domestic investment activities. This finding is in line with the time trend result on Figure 1 above showing a declining trend in private domestic investment between 1986 and 2010. The figure also reveals that the naira maintained upward trend throughout the study period with little variations here and there. This is a strong indication of the un-abating depreciation and instability of the naira exchange rate. This finding is also in line with Osagie (2016) who argued that continued devaluation of the Naira has invariably worsened external balance, unemployment rate and intensified the incidence of poverty in Nigeria. Similarly, Dixit and Pindyck (1994) suggested that increased uncertainty caused by exchange rate variations reduces investment given the irreversibility of investment projects and, hence, in-creases the value option of delaying expenditures. The coefficient of infrastructures (INFRAS) shows a positive relationship with private domestic investment. This implies that a percentage increase in infrastructures proxied as electric power consumption will lead to an increase in private domestic investment by 0.33% in the short run. Similarly, government size measured as the ratio of government spending to Gross Domestic Product depicts a direct relationship with private domestic investment as a unit increase in government spending will led to 0.02% in private domestic investment. We also find that one period lagged inflation rate had a positive and statistically insignificant effect on private domestic investment in the short-run. Specifically, a one per cent increase in INFR will cause 0.42 percent increase in private domestic investment. Also, one period lagged interest rate had a negative and statistically insignificant effect on private domestic investment in the short-run. Specifically, a one per cent increase in INTR will cause 0.27 percent decrease in private domestic investment

Finally, the D-W test (D-W ≈ 2) suggests that autocorrelation is unlikely to be a problem. Consequently, the estimated model can be confidently relied upon for making inferences and for prediction purpose

V. Concluding Remarks And Policy Options

Our empirical estimates, using available time series data over a period of 34 years, 1981 to 2014 suggest that, that depreciation of the currency and interest rate does not stimulate private domestic investment activities in Nigeria. On the other hand, infrastructures, government size and inflation rate had a positive effect on private domestic investment in Nigeria.

Based on the findings from this research, it is necessary to provide a set of policy recommendations that would be applicable to the Nigerian economy. The research therefore suggests the following policy options:

First, since the estimation results in this study revealed that depreciation of the currency has a negative impact on private domestic investment activities, that is, an increase in real exchange rate by 1% led to a decrease in private domestic investment by almost 0.07% in Nigeria. Therefore, monetary authorities should adopt appropriate policy in appreciating the value of the naira as devaluation has been a mistake since 1986.

Second, interest rate variable has shown insignificant and negative relationship with private domestic investment. Therefore, government should reduce borrowing and lending charges to boast the performance of private domestic investment

Third, infrastructures, government size and inflation rate had a positive effect on private domestic investment in Nigeria. But there should still be provision for proper physical, technological and financial infrastructure by the government. This can be achieved through stable macroeconomic environment.

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