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INTEREST RATE VARIABILITY AND INVESTMENT FLUCTUATION IN NIGERIA

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Abstract: This study examines interest rate variability and investment fluctuation in Nigeria. In carrying out this research, the study examines the causal and dynamic short-run nature of relationship between interest rate variability and investment fluctuation in Nigeria, using annual time series data spanning between 1980 and 2019. Following the lacuna from earlier studies in Nigeria on the impact of interest rate on economic growth or investment, without considering the causal and dynamic short-run nature of the relationship simultaneously in the literature, an econometrics technique of Ordinary Least Square (OLS), Johansen Co-integration and Pair-wise Granger causality were adopted to achieve the objectives of the study. Basically, Correlation Matrix and Descriptive Statistics were also used to assess the degree of association among the variables as well as to examine the nature of the data distribution. Thereafter, the researchers ascertained the stationary of the time series properties of the research variables, using Phillips-Perron (PP) unit root test. Besides, Johansen Co-integration test reveals that the variables for the model is not co-integrated and thereafter accepted at 5% significance level, which implies that there is no co-integrating vector among the variables of interest. This further led to the adoption of conventional Pair-wise Granger causality approach for the study. The short-run coefficients result showed that interest rate (INT), exchange rate (EXR) and output growth (GDP) impacted positively while inflation (INF) exhibited negative impact on investment respectively in the country. The Pair-wise relationship result indicates that investment fluctuation would do more to improve output growth and development of the economy in Nigeria. Based on the findings, it is recommended that since there is a direct relationship between INT, EXR, GDP; and INV, relevant authorities should consider economic policies that will further increase INT, EXR and GDP in the country in order to mobilize for more investment. Hence, the Nigerian government and policymakers should take cognizance of these variables during policy formulations.

Keywords: Financial Indication, Fluctuation, Indication of Interest, Interest, Variability, Investment

1.0 Introduction

The debate on interest rates and investment in developing country for development especially Nigeria is not a new issue, it has been examined by others researchers, theorists, policy makers, economists etc. Over the years in Nigeria, the problem of making an appropriate interest rate policy that could sufficiently sustain investment has been the major problem. We are also familiar with the fact that interest rate is one of the major determinants of investment in Nigeria and without increases in investment; development in employment and output is unlikely but the empirical situation examined that Investment plays a very important role in economic growth in a country. Countries rely on investment to solve economic problems such as poverty, unemployment etc. (Muhammad 2004 as cited by Davies & Emerenini,

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2015). Therefore, the issue of investment has been of particular interest to economists, theorists, researchers, policy makers' etc in Nigeria as such determinants of level of investment become paramount in an economy.

Interest rate policy like the privatization policy is among the emerging issues in current economic policy in Nigeria in view of the role it is expected to play in the deregulated economy policy like inducement of savings, which can be channeled to investment and thereby increasing employment, output and efficient financial resources utilization among others.

It is of paramount importance to know that interest rate helps to mobilize financial resources and ensure the efficient utilization of such resources in the promotion of economic growth and development. The roles of interest rates have been emphasized because of the string impacts they have on the volume and productivity of investment (Acha & Nsien, 2016). In general, interest rates are useful in gauging financial market conditions and they are major tool of monetary policy.

Despite the changes in interest rate policies in Nigeria, Nigeria industries have not recover from past bad economy policies. Hence, there is need to call for a policy that would boost the development of the ailing sector, since investment is engine of economic growth and development.

As mentioned earlier, interest rate is one of the major determinants of investment in Nigeria. But the empirical situation examined so far in Nigeria have shown that no time has the country been able to attain stable level of interest rate that will boost saving and subsequently increase the level of investment. It was observed that when interest rate was administratively fixed very low, saving was seriously impaired. (IMF, 1983) Also, when interest rate was allowed to determine by the market forces of demand and supply, interest rate want up and this has negative effects on investment (IMF, 1983).

As a result of the above scenario, we need to know while previously recommended policies are not yet working and what needs to be added to them to complement the previous efforts made in the past.

Also, there is no consensus in the literature on the impact of interest rate on investment. In fact, before McKinnon (1973) the conventional view was that low interest rates will be necessary to promote investment (Molho, 1988). But the MaKinnon – Shaw (1973) hypothesis, to the fact that high interest rate may actually encourage rather than discourage private investment, became a challenge to the conventional view.

From the foregoing, there is still a gap in our understanding to the relationship between interest rate and investment in Nigeria that need to be filled.

This study is therefore justified in a view of the fact that it intended to take a fresh look at the relationship between the rate of interest and investment in Nigeria. Also, with the alarming increase in output falling, unemployment etc, due to high cost of borrowing to finance investment over the recent years, the situation calls for greater attention.

2.0 Literature Review

2.1.1 Concepts of Interest rates

The primary role of interest rates is to help in the mobilization of financial resources and to ensure the efficient utilization of such resources in the promotion of economic growth and development. Interest rates, as crucial as they are, affect both the level of consumption and the level and pattern of investment, they are very important in financial intermediation, which as we all know, involves transferring funds from units in an economy to deficit units. Generally speaking, interest rates are useful in gauging financial market conditions and they are major tool of monetary policy. It has been found that whenever the structure of interest rates is changed, the resulting rates of return will induce shifts in the asset portfolio of both banks and non-public. Obute, Adyorough, and Itodo (2012) defined interest rate deregulation as an economic term used to refer to a situation whereby forces of demand and supply are

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allowed to determine the value of interest rates rather than its value being administered directly by monetary authorities. Interest rate policy in Nigeria is a major instrument of monetary policy with regards to the role it plays in the mobilization of financial resources aimed at promoting investment, economic growth, and development. The interest rate is the price paid for the use of money. It is the opportunity cost of borrowing money from a lender. It can also be seen as the return being paid to the provider of financial resources and thus an important economic price.Interest rates are rental payments for the use of credit by borrowers and return for parting with liquidity by lenders. Like other prices, interest rates perform a rationing function by allocating limited supply of credit among the many competing demand on it. It can also be defined as the borrower's cost on a loan and the lender's regard on the investment. Interest rates affect individual's decisions' about whether to spend more or save to buy a house.

According to Wuhan (2015), the influence of interest rate on investment scale is operate as the opportunity cost of investment on total investment, Under the condition of unchanged in investment income, the rising interest rates increase the cost of investment and then inevitably cause lower income investors to withdraw from the area of investment, so that the demand for investment is reduced. However, falling interest rates means that investment costs decline, thereby stimulating investment and the total social investments increase.

In addition to the above, interest rates is the price paid for the right to borrow and the use of loanable funds, at the cost of holding money. put differently, it is the price that must be paid to get people forgo willingly the advantages of liquidity, if the price paid on money is low, it will encourage people to borrow money for investment which implies that there is a negative relationship between interest rate and investment, with respect to saving, if the rate of interest is high people will be willing to save their money instead of preferring liquidity, hence there is a direct positive relationship between the rates of interest and savings.

In every economy, where individual economic decisions play a major role, interest rate performs several important functions in which they influence a broad range of economic decisions.

Interest rates serve as a reward for accumulating financial assets and postponing current consumption, they also influence the willingness to save currently earned income. In addition, they influence the demand for and allocation of loanable funds.

Therefore, a change in interest rates is one of the main factors to judge the macroeconomic situation and the interest rate trend analysis is the main method to predict the macroscopic economic situation.

2.1.3 Determinant of Interest rates in Nigeria

Determining the most adequate interest rate level is not a simple task, since there is no clear-cut method of assessing its appropriateness. However, there are a number of indications that together can help the policy maker judge whether the prevailing interest rate is grossly at equilibrium. In practice, the form of interest rate observed and recorded in the economy is the nominal interest rate, which incorporates monetary effects. Nominal interest rate is normally equal to or greater than real interest rate. According to Olubanjo (2015), the factors that underlie interest rate decisions across the range of real-world financial market, given the underlying level of interest rate are explained below:

(i) Inflation Rate: The first factor that affects interest rates is the actual or expected inflation rate in the economy. Specifically, the higher the level of actual or expected inflation, the higher will be the level of interest rates. If inflation is expected to increase, the nominal interest rates need to adjust to induce positive real interest rates, which will not render savers worse-off. In other words, lenders/savers will want to be compensated for inflation (for loss of purchasing power) and will push the nominal interest rate up to get the desired real rate of

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interest. If the rate of inflation is expected to increase, the nominal interest rate needs to be sufficiently high to induce positive real interest rates, so that there is an incentive for savings.

(ii) Monetary Policy Actions: The Central Bank's interest-rate policy most directly underlies the level and movement of interest rates that, in turn, affects financial institutions cost of funds. Since the Central Bank can control short-term interest rates by setting the Monetary Policy Rate that determines the rate at which banks can borrow overnight, it also controls the rate at which an investor can borrow. Through its daily open market operations, such as buying and selling treasury bills, the Central Bank seeks to influence the money supply, inflation, and the level of interest rates (particularly short-term interest rates). In turn, changing interest rates impact economic decisions, such as whether to consume or save.

(iii) Fiscal Policy Stance: Other things being equal, an increase in the government budget deficit will raise interest rates. The loanable fund framework approximates increase in government borrowing to imply a rightward shift in the demand curve for loanable funds. Moreover, announcement of a larger budget deficit arouses inflation expectation, which stimulated inflation expectations, pulling up interest rates via the Fisher effect. Furthermore, government fiscal deficits financed by the banking system crowd out the private sector. Real interest rates rise as the government attracts funds away from the private sector.

(iv) Risk Profiles: Borrowers"(including sectoral)'' risk profile and the pricing of risks by the deposit money banks play an important role in determining the level of interest rates charged by banks. Where a borrower/sector or project is assessed to be high risk, a higher than "normal" nominal interest rate is charged. This explains why some customers are charged a higher interest rate than others under similar conditions.

(v) Term to Maturity: Another factor that could influence changes in interest rates is the maturity period of the financial instrument and perception of the risks associated with the instrument. Those with longer-term maturity and higher probability of incurring loss carry higher interest rates.

(vi) Domestic Savings: Mobilization Higher volumes of savings drive down interest rate and promote investment. Conversely, lower volume increases interest rate and lowers investment. The domestic interest rates and the rate of return on foreign financial assets, as well as the expected change in exchange rate determine the allocation of accumulated savings among domestic financial assets, foreign assets and goods that are hedged against inflation. Raising the levels of long-term savings is therefore, vital for achieving the desired level of interest rates as well as sustaining high investment and output growth.

2.1.5 Determinants of Investment in Nigeria

The low level of investment has appeared to be the major problem facing the economy. Despite policies made by the government of Nigeria at different times to tackle the problem, the menace still persists. Successive governments have implemented policies and strategies to raise the level of investment but these policies so far have been erratic. It is based on this fact that one of the principal objectives of the Nigeria government is fostering sustained economic growth through the promotion of enabling investment environment. Stimulation of sustained economic growth requires a balance between investment and such factors that affect investment.

The determinants of investment are those factors that influence how much a firm is willing to spend in procuring investment goods. These determinants are many but those factors considered to be most important will be isolated for discussion.

(i) User Cost of Capital: The user cost of capital is obtained as the sum of the interest rate (implicit or explicit) paid on funds used in procuring investment goods and the depreciation, being the wear and tear of a

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piece of machinery resulting from usage. These calls for its periodic maintain and repair for it to stay in good working order. The life span of a piece of machine is estimated and the annual depreciation rate is calculated from the estimate.

(ii) Interest Rate: This moves inversely with investment rate that is to say that the higher the interest rate, the less investment is induced. On the other hand, if interest rate is low, the inducement to invest is always high. This is because if the cost of obtaining capital is high, potential investors will back investment because it will reduce the return on investment (Anyanwu, 1997).

(iii) Stock of capital: Private investment can never be successful if the capital stock is very low. This has been one of the problems shrinking private investment (domestic) in Nigeria. This is a result of poverty which also decreases domestic savings. Therefore for investment to grow there are need to upgrade the level of capital stock in Nigeria (Kharkate, 1988).

(iv) Inflation Rate: Is the persistent rise in the prices of goods and services. When there is mild inflation, it increases FDI and it was said by Keynes in his works.

(v) The marginal efficiency of capital (MEC): is the highest rate of return expected from an additional unit of capital asset over its cost. It is the ratio between the prospective yield of additional capital goods and their supply price. This prospective yield is the aggregate net return from an asset during its life time while the supply price of its capital assets is the cost of producing this asset (Jhingan, 2006).

(vi) The Rate of Government Expenditure: There is a strong and positive relationship between government expenditure and rate of investment. Government autonomous expenditure on different sectors of the economy stimulates employment as well as income of the public. The increase in income will also increase in disposable income of the masses and will increase consumption as well as private investment.

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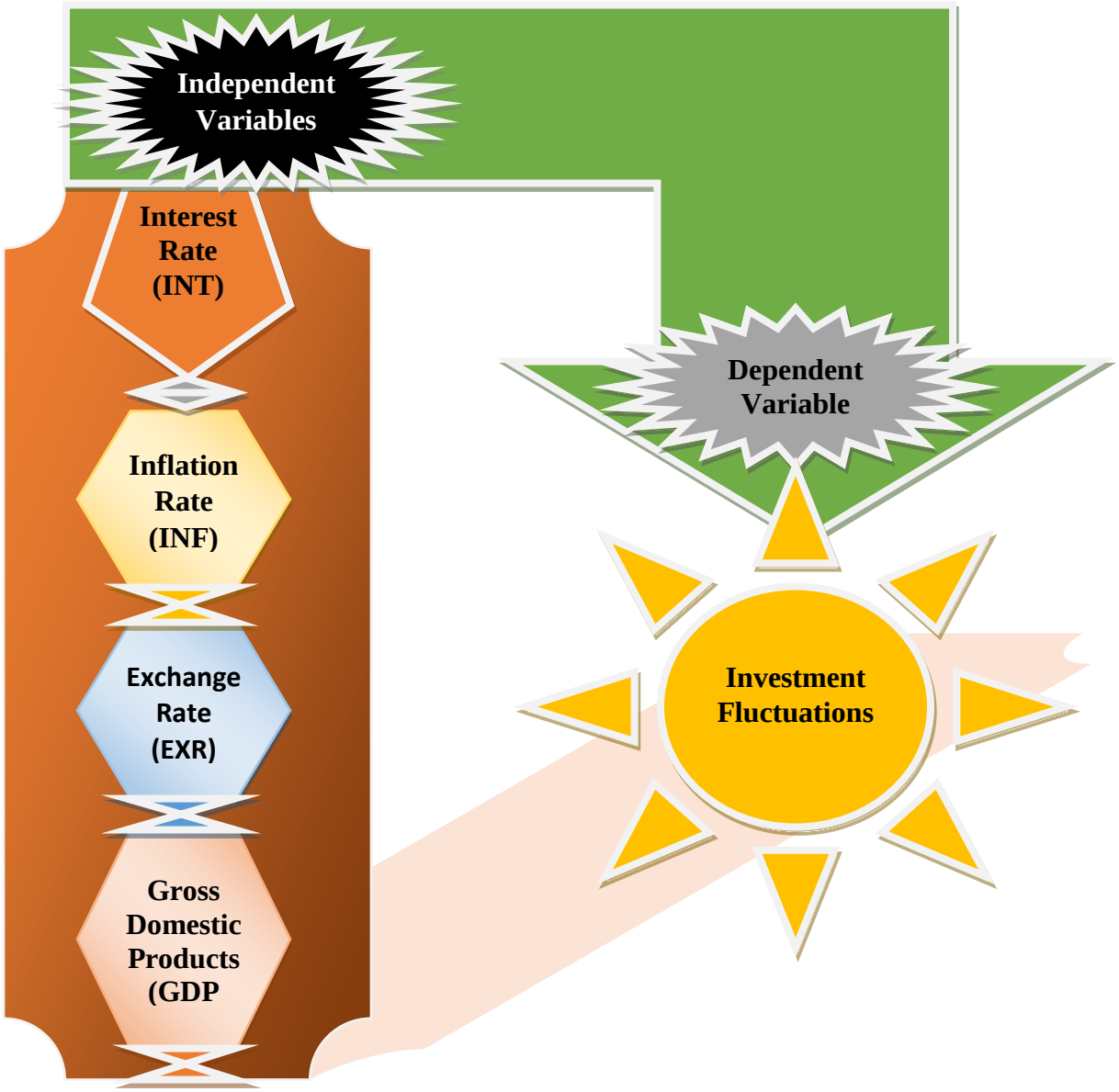
2.1.6Conceptual framework of interest rate variability and investment fluctuations in Nigeria



Source: Researchers' interest rate variability and investment fluctuations in Nigeria Model, (2020)

2.2 Theoretical Framework

The theoretical base of this study is rooted on the following empirical theories;neo classical loanable fund theory and the Neoclassical Investment Model

2.2.1 The Neo Classical Loanable Funds Theory

The neo classical loanable funds theory is the theory of interest rates that explained variable which determined interest rates. Basic tenets of the neo classical loanable fund theory of interest rate propounded by Dennis

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Robertson, advocate that savings and investment are responsible for determination of interest rate in the long run. The rate of interest is the price that equates the demand for and supply of loanable funds (Jhingan, 1997). The demand for loanable fund for investments such as purchase of capital goods, constructions etc, depends on the expected rate of profit as compared with the rate of interest. This demand is met by past savings or through dis-saving and are interest elastic. The loanable fund regards the rate of interest as a function of four variables: savings, investment, the desire to hoard and the money supply.

2.2.2 The Neoclassical Investment Model

The neoclassical model of investment behavior, originally developed by Jorgensen (1963), refined by Hall and Jorgensen (1967) and further refined by Jorgensen and Silbert (1968) in based on the neoclassical theory of the firm which states that "the demand for capital (optimum level of` capital stock) is determined in the process of maximizing the present value of the firm subject to a variety of market and non-market constraints? They defined the present value of the firm as the firm's stream of` net proceeds. Under the assumption of unconstrained access to the capital markets they assert that firms "could borrow or lend to achieve the desired time distribution of income to owners and by doing this, they maximize utility", this assertion is tantamount to stating that firms maximize the present value of the flow of net proceeds, being the excess of gross revenue over cost of labour, rental price of capital goods and taxes.

A variant of this model, developed by hall and Jorgensen (1967) allows for partial adjustment with appropriate lag within the context of the neoclassical investment model. They hypothesized net investment to be a function of a weighted average of all past changes in capital stock.

3.0 Methods

This study used ex-post facto research design which also known as after-the-effect research using panel data analyses of Central Bank of Nigeria (CBN), Statistical Bulletin and World Bank, World Development Indicator (WDI) various issues. The study used annual time series data spanning from the period 1980 to 2019. Panel data analysis enabled the simultaneous analysis of two dimensions (temporal and spatial), that made it possible to successfully analyze cross-sectional data and also offers two advantages over traditional least-squares models by allowing for unobserved factors and allows to control for other variables that varied through time but not across institutions. It is a quasi-experimental study which is used to examine how an independent variable, present prior to the study, affects a dependent variable. It is a category of research design in which the investigation starts after the fact has occurred without interference from the researcher and test hypotheses about cause and effect relationship.Descriptive and inferential statistics is used to analyze the results and findings from the data which is presented in tables. Ordinary Least Square Regression **(**OLS) regression is used to reveal the predictive ability of the model as well as the relative statistics of the variables of the short-run relationship between the explained variable-investment fluctuation and the explanatory variables in the model as shown in equation (2) of this study. In addition, test for the presence of long-run equilibrium relationship is carried out based on the multivariate co-integration technique, to ascertain the co-movement among the variables for the study.

3.1 Model Specification

Following the extant literature as rightly adopted by Davies and Emerenini (2015) and as well Keynesian theory (1936) that shown low interest rate as a component of cost administered is detrimental to increase savings and hence investment demand.On this premises, this study thus used econometric technique using the OLS method to estimate the relationship between selected variables subject to modification of earlier studies. They are in implicit form:

$INV = f(INT, INF, EXR, GDP)$ ... ...(1)

Econometrically, this can be stated thus;

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$INV = \pi_0 + \pi_1 INT + \pi_2 INF + \pi_3 EXR + \pi_4 GDP + \varphi$ ... ...(2)

Where:

INV = Investment Fluctuation;

INT = Interest rate;

INF = Inflation rate;

EXR = Exchange rate;

GDP = Output Growth;

φ = stochastic error term

a-priori theoretical expectation are: $\pi_1 > 0;\ \pi_2 < 0; \pi_3 > 0; \pi_4 > 0$

4.0 Results

4.1 Correlation Matrix and Descriptive Statistics of Data Set

The purpose of the correlation matrix in this study is to assess the degree of association among the variables while the descriptive statistics using mean and standard deviation (SD) are to have the summary of data and other basic characteristics for regression analysis in the model prior to some objectives of the study. The annualised summary statistics for the main variables in the study (in term of the means and standard deviation distributions) are reported in Table 4.1 as presented.

Table 1: Correlation matrix, Mean and Standard Deviation (SD)in the Model

Variable	INV	INT	INF	EXR	GDP	MEAN	SD
INV	1.000					258.0	234.0
INT	0.302	1.000				19.87	6.11
INF	-0.386	0.201	1.000			19.86	17.76
EXR	0.863	0.353	0.324	1.000		83.83	93.69
GDP	0.374	0.142	0.147	0.244	1.000	194.2	129.0

Note: INV = investment; INT = interest rate; INF = inflation; EXR = exchange rate;
GDP= Gross domestic products.

Source: Researchers' computation extracted from regression output, (2020)

Table 1 shows correlation matrix, mean and standard deviation (SD) statistics of the variables employed in the analysis. The correlation results reveal that the degree of association between most of the variables is weak since the correlation coefficients among the variables is less than maximum value of 0.90 as suggested in the literature, except the correlation between investment fluctuation and exchange rate that nearly stood at 0.86. This possibly could be the reason that increase in investment in the country is much associated with a fall in exchange rate, which eventually will results in investors investing more money into the economy. Obviously from the study and as well in addition to the weak signs, a negative correlation also exists between investment and inflation in Nigeria. Nonetheless, the correlation coefficients between investment fluctuation and the independent variables of interest are admissiblein the midst ofweak signs. Thus, there is little risk of multi-collinearity problem with the data. in time series data, a consequence of variables having a large variance. The treatment requires dropping one of the variables with high correlation coefficient. However, considering the conceptual framework this study intends to test, these variables are relevant for the analysis, thus, dropping one of the variables would lead to variable bias and, if such action is taken, it would bias the estimates of the regression parameters which is more severe than existence of collinearity in the model (see Studenmund, 2005; Radosevic and Yoruk, 2013; Adedeji, Sidique, Rahman & Law, 2016).

Interestingly, the descriptive statistics result indicates that, all the variables shows a strong relative importance as the mean values of all the variables including investment, interest rate, inflation, exchange rate and

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output growth are greater than standard deviation distributions, and further implying that the variables exhibit significant variation in terms of magnitude and have stable time-series movements. To be precise on the actual results of the mean and standard deviation, the results of the estimated mean value which is used to examine the nature of the data distribution, recorded the highest mean value of 258.0 for investment fluctuation while inflation has the lowest mean value of 19.86. A critical examination of standard deviation of variable of interest showed that interest rate (6.11) and inflation (17.76) has low standard deviation values. This is an indication that these variables showed very low variability performance in the Nigeria investment fluctuation. However, the other variables including investment (234.0), output growth (129.0) and exchange rate (93.69) exhibited very high variability performance in the investment fluctuation in the country, judging by their standard deviation values.

4.2 Analyses and Discussion of Results

In the process of carrying out the specific objectives of this study, the results of various tests for the study are analyzed in this section. The stationary property of the variables were confirmed and presented in 4.2.1

4.2.1 Unit Root Tests

Tables 2 succinctly summarize the results of the unit root tests for this study using Phillip-Perron (PP) technique. The PP tests are more comprehensive theory of unit root non-stationarity. Gujarati (2004) stated that the PP use non-parametric statistical methods to take care of the serial correlation in the error terms without adding lagged difference terms. According to Brooks (2008), the tests are similar to Augmented Dickey-Fuller (ADF) tests, but they incorporate an automatic correction to the DF procedure to allow for auto correlated residuals.

Table 2: Phillip-Perron (PP) Unit Root Test Results

Variables	**PP Test H_o: Variable is not Stationary**	**Order of Integration**
INV	-0.719251	-
Δ(INV)	-21.32976*	I(1)
INT	-3.031391**	I(0)
INF	-3.119560**	I(0)
EXR	1.859229	-
Δ(EXR)	-6.095952*	I(1)
GDP	-5.848475*	I(0)
Asymptotic Critical Values		
1%	-3.621023	
5%	-2.943427	
10%	-2.610263	

***, **, ***, implies significant @ 1 per cent, 5 per cent and 10 per cent levels respectively,**

Δ, represents first and second differences respectively

Source: Researchers' computation extracted from regression output, (2020)

From Table 2, the result shows that all variables have unit root process but are all stationary at level I(0) including INT, INF and GDP while other variables were stationary at first difference 1(1) like, EXR and GDP.

4.2.2 Short-Run Ordinary Least Square Test

The Ordinary Least square regression method was used to test for the short-run relationship between the explained variable-investment fluctuation (INV) and the explanatory variables in the model. The OLS regression result is reported in Table 3. The short run OLS test result is analyzed in two parts. The global utility of the model and the relative statistics of the estimated model in 4.2.3

4.2.3 Utility of the Model

The econometric property of the estimated equation shows that the global utility or the overall goodness of fit is high with an F-statistics of 29.83303 and probability value of 0.0000. From OLS regression result, R^2 is 0.783or 78.3 per cent and the adjusted R^2 is 75.71. This

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implies that, at level series about 76 per cent of the total variations in the decision level of investment fluctuation (INV) are explained by the changes or adjustments in the interest rate (INT), inflation (INF), exchange rate (EXR) and output growth in the country.

Table 3: Ordinary Least Square Estimated Coefficients

Variable	Coefficient	t-stat
C	81382.82 (652.52)	1.248040
INT	1106.56 (356.95)	0.310398
INF	-1537.18 (121.77)	-1.265412
EXR	1936.31* (242.46)	7.986159
GDP	0.115803*** (0.059)	1.936186
$\bar{R}^2$= 76%		
DW = 1.69		
F-stat = 29.83		
Obs = 38		
Serial Correlation LM test 3.506 [0.0424]		
Heteroskedasticity Test 5.778 [0.0012]		
RamseyRESET Test 29.522 [0.000]		
Jacque-Bera 2.416 [0.2987]		

t-stat = t-statistics; Coefficient is significant at: *1, **5 and ***10 percent; Standard error are in parentheses ( ); p-values are in brackets [ ].

Source: Researchers' regression output, (2020)

Table 3 contains ordinary regression results for investment fluctuation (INV) and interest rate variability and other intervene variables (inflation, exchange rate and output growth) in Nigeria. Quite insightful result emanated in this study. The result indicates that the coefficient of exchange rate (EXR) is positively related to investment fluctuation (INV) and statistically significant at 1 per cent level in conjunction with a-priori expectation of the study. This shows that exchange rate (EXR)is a crucial determinant of Nigerian investment within the study period for now, this may likely accounted for current economic recession in the country. Based on this finding, on average, a 10 per cent point increase in Nigerian exchange rate performance may likely promote investment increase in the country by 19.36 per cent. This result contradicts previous studies of (Davies & Emerenini, 2015) who reveal that as investment increases, exchange rate declines. Meaning that a fall in exchange rate results in investors investing more money within the economy, which will also give values to the local currency to be very high as against foreign currencies as well as Obadan (2006) also revealed that the naira exchange rate devaluation or depreciation (i.e. naira rising) will encourage export which will encourage investment so as to produce exportable goods.

A proper examination of the study shows that short-run coefficient of output growth exhibited positive significant and as well statistically significant at 10 per cent in line with theoretical expectation of the study, which imply that Nigerian output growth strongly drive to influence investment increase in the country. Accordingly, on average, for every 10 per cent increase in output growth may likely to lead to 11.58 per cent increase in investment fluctuation. This further implies that improvement of Nigerian output growth is necessary condition towards facilitating investment, in line with empirical study of (Eregba, 2010).

The coefficient of interest rate (INT) exhibited positive impact on investment determination but statistically insignificant at the conventional level contrary to theoretical expectation of the study. This means that a unit increase in INT will leads to increase in investment by 11.06 per cent in the country. This result was not in conformity with the work of Davies and Emerenini(2015) in line with Keynesian theory that implies low interest rate as a component of cost administered is detrimental to increase savings and hence investment demand. They argue that increase in the real interest rate will have

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strong positive effects on savings which can be utilized in investment, because those with excess liquidity will be encouraged to save because of the high interest rate, thus banks will have excess money to lend to investors for investment purpose thereby raising the volume of productive investment.

Finally, the short-run coefficient of inflation is correctly signs but statistical insignificant with negative impact on investment in Nigeria. To be factual, on average, a 10 per cent point increase ininflation rate may likely leads to reductions in the volume of money in circulations as disposable income falls in the country by 15.37 per cent. This result was in concordance with empirical studies of Davies & Emerenini (2015) who claimed that, as inflation declines more money is invested into productive activities to boost economic growth and development. Thus, as more money goes into investible activities, the volume of money in circulations reduces as disposable income falls.

The R^2 which is a show of the goodness of fit of the model is 76 per cent which means that 76 per cent of variation in INV was explained by the regressors and about 23 per cent of the relationship is explained by factors not captured by the model.

The F-statistics of 29.83, P-value = 0.000 at a critical value of 0.05 shows that the overall regression is significant and can be used for meaningful analyses. The Durbin Watson statistics (DW) value of 1.69 shows that there is no evidence of a first order serial autocorrelation AR(1). By rule of thumb, if the DW statistics is approximately equal to 2, it is evidence against the existence of a first order serial correlation.This further justifies the basis for unit root testing in Table 2 of the study.

4.2.4 Johansen Co-integration Test for Long- Run Relationship

Following the properties exhibited by the time series variables above, a co-integration test was carried out to examine the long-run relationship among the variables. The framework established by Johansen and Juselius (1990) was employed to carry out the test. That is, using two likelihood ratio test statistic-the trace and maximum eigen value statistics. There is growing evidence in favour of the robustness of the trace statistic (Hassan &Hisham 2010). However, we accept the trace test result as presented in Table 4.

Table 4: Johansen Unrestricted Co-integration Test

No. of CE(s)	Eigen Value	Trace Stat.	0.05 Critical Value	Prob.**
None*	0.551261	61.67234	69.81889	0.1876
At most 1*	0.400185	32.82503	47.85613	0.5665
At most 2*	0.233596	14.42420	29.79707	0.8160
At most 3*	0.104424	4.846532	15.49471	0.8249
At most 4	0.024044	0.876175	3.841466	0.3493

Decision: Trace test indicates no co-integration at the 0.05 level

*denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) P-values.

Source: Researchers' computation extracted from regression output, (2020)

The result of the trace test statistic from Table 4 indicates that there is no co-integrating equation among the variables and the acceptance of the null hypothesis of no co-integration at 5 per cent level. Both the maximal eigen

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value and trace statistics indicates that the hypothesis of no co-integration among the variables are accepted at the 5 per cent significance level, as there is no co-integrating vector among the variables of interest. It therefore concludes that there is no long run relationship between investment fluctuation and interest rate variability indicators in Nigeria; this implies that the result is not good. However, we can proceed to apply the alternative approach in line with the literature, which is conventional Granger causality technique between the explained and explanatory variables in 4.2.5.

4.2.5 Granger-Causality Test

Following the acceptance of null hypothesis of no long-run relationship among the variables, we examine the direction of causality between investment fluctuation and explanatory variables. We employed Granger-Causality framework to determine the short-run causality and to further establish the direction of causality relationship among the variables in congruity with the specific objectives of this study. The Granger test examines whether including lags of one variable have predictive power or content for another variable according to Granger's causality test (1969). It is also preferred to traditional correlation which measures only relationship without direction. Establishing which variable causes or promotes the other, will further promote investment determination especially in determining interest rate variability in achieving sustainable economic growth and development in the country, while causality tests are generally sensitive to lag structure. In order to minimize this sensitivity, as pointed out by (Gujarati, 2012), a Pair-wise Granger-Causality test that shows probability of causal link of endogenous variables was considered. A lag length of 2 was chosen as per Akaike Information Criterion (AIC). The results are presented in Table 5.

Table 5: Pair-wise Granger Causality Tests

Null Hypothesis:	Observation	F-Statistic	Prob.
INT does not Granger Cause INV INV does not Granger Cause INT	36	1.06531 0.14203	0.3569 0.8682
INF does not Granger Cause INV. INV does not Granger Cause INF	36	0.09078 1.58834	0.9135 0.2204
EXR does not Granger Cause INV. INV does not Granger Cause EXR	36	1.12708 0.05742	0.3369 0.9443
GDP does not Granger Cause INV. INV does not Granger Cause GDP	36	0.00224 3.20626	0.9978 0.0542
INF does not Granger Cause INT. INT does not Granger Cause INF	36	6.64479 0.70161	0.0040 0.5035
EXR does not Granger Cause INT. INT does not Granger	36	0.23433 0.71154	0.7925 0.4987

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Cause EXR			
GDP does not Granger Cause INT. INT does not Granger Cause GDP	36	0.71490 0.99963	0.4971 0.3796
EXR does not Granger Cause INF. INF does not Granger Cause EXR	36	1.56999 0.14123	0.2241 0.8688
GDP does not Granger Cause INF. INF does not Granger Cause GDP	36	0.18774 0.51486	0.8298 0.6026
GDP does not Granger Cause EXR. EXR does not Granger Cause GDP	36	0.35913 1.99366	0.7011 0.1533

Source: Researchers' regression output, (2020)

The results of Pair-wise Granger-Causality tests are contained in Table 4.5. A critical examination of this test revealed that Pair-wise Granger-Causality between investment fluctuation (INV) and output growth (GDP) existed. This causation moves from INV to GDP with a low probability value of 5 per cent and not the other way around.

In the case of Pair-wise relationship between INT rate and inflation, the null hypothesis that ''inflation does not Granger cause interest rate'' is the acceptable one-way causation between the two variables, because it has a low probability of 1% in comparison with the high probability of above 50% of the otherwise null hypothesis that INT rate does not Granger cause INF. This implies, therefore, that INF Granger cause INT rate, and not the other way round. However, further noticeable from this result revealed that a no causation existed between INV, and some variables including INT rate, INF and EXR. This implies that INV has no predictive power or content on INT rate, INF and EXR in the country, due to very high probability values against these variables. In summary, this Pair-wise relationship result showed that investmentfluctuation would do more to improve output growth and development of the economy in the country.

4.2.6 Policy Implications of the Results

The following policy implications are drawn from the result

(i) The results showed evidence for strong and positive correlation between EXR and INV in the short run. The policymakers should fashion out appropriate policies that will enhance the bi-directional flow of influence between the two variables (exchange rate and investment) because as showed in this study, an increase in investment in the country is much associated with a fall in exchange rate, which eventually will results in investors investing more money into the economy, leading to economic growth and development.

(ii) Result from the short-run coefficient of inflation indicates negative impact on investment, which implies that, as inflation declines more money is invested into productive activities to boost economic growth and development of Nigerian economy, thus, as more money goes into investible activities, the volume of money in circulations reduces as disposable income falls. Furthermore, the coefficient of interest rate (INT)

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exhibited positive impact on investment determination, meaning that low interest rate as a component of cost administered is detrimental to increase savings and hence investment demand in Nigeria. However, policymakers should take cognizance of these variables during policy formulations in the country.

(iii) Pair-wise relationship result showed that investment fluctuation would do more to improve output growth and development of the economy in the country. This further implies that relevant stakeholders and authorities most especially the policymakers should consider economic policies that will increase the level of output growth in order to mobilize more investment for the country.

5.0 Conclusion

The findings of this study leads to various conclusive remarks. The results showed evidence for strong and positive correlation between EXR and INV in the short run. The study recommends that stakeholders and policymakers should fashion out appropriate policies that will enhance the bi-directional flow of influence between the two variables (exchange rate and investment) because as showed in this study, an increase in investment in the country is much associated with a fall in exchange rate, which eventually will results in investors investing more money into the economy, leading to economic growth and development. Also, the result from the short-run coefficient of inflation indicates negative impact on investment, which implies that, as inflation declines more money is invested into productive activities to boost economic growth and development of Nigerian economy, thus, as more money goes into investible activities, the volume of money in circulations reduces as disposable income falls. Furthermore, the coefficient of interest rate (INT) exhibited positive impact on investment determination, meaning that low interest rate as a component of cost administered is detrimental to increase savings and hence investment demand in Nigeria. However, policymakers should take cognizance of these variables during policyformulations in the country. In addition, Pair-wise relationship result showed that investment fluctuation would do more to improve output growth and development of the economy in the country. This further implies that relevant stakeholders and authorities most especially the policymakers should consider economic policies that will increase the level of output growth in order to mobilize more investment for the country. Lastly, the study found that coefficient of interest rate (INT) exhibited positive impact on investment determination, as an increase in interest rate by 1 per cent reduced investment by 11.06 per cent. Obviously, there exist a direct relationship between investment and interest rate in Nigeria. Interest rate here is the prime lending rate. In line with the important role investment plays in stimulating economic growth through diversification of the economy, job creation, economy self-reliance, policies to improve investment should be enacted in the economy. Such policies include but not limited to:

(i) Monetary authorities should make policies which would help to improve the saving culture of the people such as increase in the deposit rate which would lure the people to deposit their money in banks thereby increasing the supply of loanable funds. This would lead to a fall in interest rate and eventually rise in investment.

(ii) A reduction in the prime lending rate to investors so as to encourage investors to borrow more and increase investment

Flowing naturally from the summary of this study, the following policy recommendations are made:

(i) Since there is a direct relationship between INT, EXR, GDP; and INV, relevant authorities should consider economic policies that will further increase INT, EXR and GDP in the country in order to mobilize for more investment. Hence, the Nigerian government and policymakers should take cognizance of these variables during policy formulations.

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(ii) Government should appropriately regulate interest rate with the ultimate aim of using it to drive more investment for the country in a bid to strive economically.

(iii) Lastly, government should also encourage investors to borrow moneyso as to increase investment through reduction in prime lending rate to investors.

References

Acha, I., Ikoh, I. & Nsien, C. (2016). The Efficacy of Nigeria Monetary Policy: A Comparative Analysis. Scholedge International Journal of Business Policy & Governance, 03(04): 51-62.

Adedeji, A. N., Sidique, S. F., Rahman, A. A. & Law, S. H.(2016). The role of local content policy in local value creation in Nigerian oil industry: A Structural Equation Modeling (SEM) approach. Resources Policy 49, 61-73.

Anyanwu, J. C. (1997). "An Econometric Investigation of Determinants of Foreign Direct Investment in Nigeria." Investment in the Growth Process: Proceedings of the Nigerian Economic Society Conference 1998, 219 - 40. Ibadan, Nigeria

Brooks, C. (2008). Introductory Ecnometrics for Finance. New York: Cambridge University Press.

CBN, (2017). Statistical Bulletin, Abuja, Nigeria.

CBN, (2016). Statistical Bulletin, Abuja, Nigeria.

CBN, (2015). Statistical Bulletin, Abuja, Nigeria.

Davies, O. &Emerenini, F. M. (2015).Impact of Interest Rate on Investment in Nigeria.Developing County Studies, 5(3): 103-109.

Duruechi, A. H. & Ojiegbe, J. N. (2015). Determinants of Investments in the Nigerian Economy: An Empirical Approach (1990 – 2013). International Journal of Financial Research, 6(4): 217-227.

Eregha, P. B. (2010). Interest Rate Variation and Investment Determination In Nigeria, International Business Management, 4 (2): 41-46

Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross spectral methods, Econometrica, 37, 424- 438.

Gujarati, D. N. (2004). Basic econometrics (4th ed.). The McGraw-Hill Company.

Hall, R. E. & Jorgenson, D. W. (1967). "Tax policy and investment behavior". In: The American Economic Review 57(3): 391–414.

Hassan, G. & Hisham, A. (2010). Can Macroeconomic Factors Explain Equity Returnsin the Long Run? The Case of Jordan, MPRA Paper 22713, University Library of Munich, Germany.

International Monetary Fund (IMF), (1993). Annual Report of the executive board for the year.

Jhingan, M. L. (2006). "Macroeconomic Theory", New Delhi: Vrinda Publishers.

Jhingan, M. L. (1997). Macro-Economic Theory, 10threvised enlarged edition. Vrinda Publications (P) Ltd India.

Johansen, S. & Juselius, K. (1992). "Testing Structural Hypothesis in A Multivariate Cointegration Analysis of The PPP and UIP for UK," Journal Of Econometrics, 53, 211-244.

Jorgenson, D. (1963). "Capital theory and investment behavior". In: American Economic Review, 52(2).

Keynes, J. Md (2007) [1936]. The General Theory of Employment, Interest and Money. Basingstoke, Hampshire: Palgrave Macmillan. ISBN 978-0-230-00476-4.

Kharkhale, L. (1988). "Financial Depending in Economic Development" New York: Oxford University Press

MacKinnon, J. G., Haug, A. A. & Michelis, L. (1999). "Numerical distribution functions of likelihood ratio tests for cointegration," Journal of Applied Econometrics, 14, 563–577.

McKinnon, R. I. (1973). "Money and Capital in Economic Development" Brookings, Washington D. C.

Molho, L. E. (1986). "Interest Rates, Savings and Investment in Developing Countries: A Re-Examination of the McKinnon-Shaw Hypothesis", IMF Staff papers, 33(1): 90-116.

Obadan, M. I. (2006). Overview of exchange rate management in Nigeria from 1986 to date. [online]. CBN publication, 30(3): 1-9.

Obute, C., Adyorough, A. & Itodo, A. I. (2012). An assessment of the impact of interest rate deregulation on economic growth in Nigeria (1964-2009). Journal of Business and Organizational Development, 4(1): 12-19.

Olubanjo, T. A. (2015). Factors that influence interest rate decisions in Nigeria. Central Bank of Nigeria, Understanding monetary policy series No 47.

Radosevic, S. & Yoruk, E. (2013). Entrepreneurial propensity of innovation systems: Theory, methodology and evidence. Research Policy. 42: 1015– 1038.

Shaw. E. S. (1973). Financial deepening in economic development. Oxford University Press, New York (NY).

Studenmund, A. H. (2005). Using Econometrics: A practical guide. Pearson Education, Inc.

Wuhan, Li Suyuan, Adnan Khurshid (2015). "The effect of interest rate on investment; Empirical evidence of Jiangsu Province, China", Journal of International Studies, 8(1): 81-90.