WHAT INFLUENCES PRIVATE INVESTMENT IN NIGERIA AND ITS RELEVANCE TO GROWTH OUTPUT

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ABSTRACT

This paper assesses the trends and behavior of investment in Nigeria. It determined the main factors that influence private investment in Nigeria using data sets from 1980 – 2018. It also estimated the relationship between the main investment determinant and economic growth in Nigeria within the period under review. The structure for analysis involves the estimation of an investment rate function derived from the Life Cycle Hypothesis using autoregressive distributed lag (ARDL) model while taking into account the structural distinctiveness of a developing economy. The distinctive feature of this study is to test the significant role played by these determinants in explaining the long term pattern of private domestic investment vis a vis its effects on economic growth in Nigeria. The results of the analysis show that the interest rate is positively correlated with both investment and economic growth in Nigeria. We discovered that investment has been slowed down in Nigeria as a result of increased lending rate, reduced public expenditure, political instability and inadequate infrastructure. We recommend that the focus of development policy in Nigeria should be to increase the productive base of the economy in order to promote real income growth through enhancing private investment and reduce unemployment. For this to be achieved, a diversification of the country's resource base is indispensable. Policy thrusts should include revitalizing a comprehensive energy policy to enhance electricity supply, to encourage small and medium scale industries and to moderate the interest rate in order to encourage private investment which has the capacity of promoting economic growth.

Keywords: ARDL, investment, economic growth productivity, Life cycle hypothesis.

Jel classification: E22, R15, D91, E63

I. INTRODUCTION

For decades, development economists have been concerned about the crucial role of domestic investment saving mobilization in the sustenance and reinforcement of the saving investment-growth chain in developing economies. Historical data has shown that the three variables; savings, investment and growth are closely linked. Therefore, that lays credence to abysmal performance of many developing countries because they have records of poor savings and investment which eventually negatively affect their growth rate. This poor growth performance has led to a dramatic decline in investment. Saving rates have not fared better, thus worsening the already precarious balance of payments position. In the same vein, attempts to correct external imbalances by reducing aggregate demand have led to a further decline in investment expenditure, thus aggravating the problem of sluggish growth and declining saving and investment rates (see Khan and Villanueva, 1991, Tochukwu, 2018).

Nigeria is reputed to be buoyantly blessed with enormous mineral and human resources. Nevertheless, the country has been known to be high risk market for investment. Empirical evidence has revealed that investment is one of the sustainable factors of major long-term economic growth. Recently many researches were carried out on the importance of domestic investment, especially in the developing economics.

According to World Bank (1991), the level of domestic saving and investment is inadequate to fuel the growth needed to raise living standards and generate sufficient productive employment. The importance of investment in to improve economic growth cannot be over emphasized. It is an essential component of aggregate demand and fluctuations in investment have considerable effect on economic activity and long-term economic growth. A few basic trends have emerged over the past few years with regards to the aggregate domestic investment income. This is because the growth rate registered in most African countries is often not commensurate with the level of investment (Agu 2015). Nigeria witnessed an economic boom in the 70s and 80s due to the boom in oil sector. This oil boom equally led to a boom in the investment more especially in the public sector. Nonetheless, with the failure of oil market in the 80s, the investment rate equally flopped which led to fall in economic growth.

Nigeria has adopted many economic programmes to boost the investment climate in the economy. However, the success of any programme in revitalizing the economy depends on the effectiveness of the programme in bringing the desired result to the economy after the reform process.nIn Nigeria, many reform programmes have been undertaken with little or no impact on the investment behaviour. World Bank, 2015 and Sissay, 2001 insisted that there is a stagnation of private investment in Nigeria after the reform years (see also Gunning, 1994)

Econometric evidence indicates that private investment has a stronger and more favorable effect on growth rather than government investment; probably because private investment. on this note, Beddies 1999 suggested that private investments are distantly related to corruption and that may account for reason. The trends of private investment in the country have been worrisome. The much awaited impact of the private sector as an engine of growth has not yet materialized. Most researchers have focused on the impact of governance, credit availability, exchange rate and interest rate on private investment in Nigeria, without much emphasis on the infrastructural facilities in the country. However, Blejer and Khan 1984 investigated 23 economies and concluded that private investment and public investment complement each

other to bring about economic growth. The private investors will flourish only in a supportive environment of cost reductions in power, transport and communications. The huge money spent on the generation of power by the private domestic investors in Nigeria, would escalate the prices of their products. Many private domestic investors have closed down and many have relocated to other investment friendly areas, because of the high cost of generating power in the country.

This article has two objectives. First is to determine the variable among the chosen variables that most affects investment in Nigeria Second, is to evaluate the impact of the main determinant of investment identified and its relationship with economic growth in Nigeria. These objectives can only be achieved through a thorough time-series analysis of the determinants of investment through an appropriate interplay of qualitative and quantitative analysis of Nigeria policies and performance, with the view to building a strong empirical basis for informing policy debate. Country-specific studies of this sort are however few. Besides, the extant literature on the topic is riddled with inconclusive arrangements in terms of the size and signs of the co-efficients of the chosen variables.

To begin with, our question is inherently a time series one: how did investment change when each of its determinants changed? In addition, given that the variables of interest vary significantly over time, their time series provide a considerable wealth of information which is lost in cross-sectional averages. This article takes into cognizance the fact that the use of time series presents some problems for investment regressions. The effects of these variables on investment are likely to exhibit complicated dynamics, which may be obscured by temporal effects arising, for instance from the business cycle. For this reason, it employs the Autoregressive Distribute Lag (ARDL) model as opposed to Error-Correction Methodology most authors used in the past (see for example Agu, 2015, Adeleke, 2016, Amassoma et al., 2015). The ARDL methodology has the ability handle the series that are integrated both at levels 1(0) and those that integrated at the first difference i(1) and also integrate short-run dynamic and long-run equilibrium models in a unified system while at the same time ensuring theoretical rigor and data coherence and consistency.

II. LITERATURE REVIEW

Investment has been identified as key to economic growth, given the egregious nature of Nigeria economy. Private domestic investment can be seen as a propeller that can move the Nigeria economy from a poverty ridden state to a state of buoyancy. Investment can be defined as the outlay of money for future use. Investment in this study focuses on those on real assets; namely, land, infrastructure capital goods and so on.

Investment climate in Nigeria

Environment has been seen as one of the main motivators and determinants of private investment in Nigeria (see Agu, 2015). However, it was found by some researchers that investment environments do not affect private investment in sub Saharan countries (see Balassa (1988). Political instability has made the climate for private saving and investment hostile in Nigeria. Political upheavals in the country from independence till now contributed to the reduction of people's confidence in the country. A lot of bombing attacks, stampede, explosions, fighting are discouraging private investment in recent times, (Agu et al, 2013b). The confidence of people must be rebuilt by putting a lasting solution to the political upheaval in the country so as to give room for more investment opportunities in the country. This analysis is also in line with econometric results obtained in Ghana by (Asante yaw,

2000). He opined that military takeovers have created a hostile climate to private investment where the lagged private investment- GDP ratio was found to be positive and highly significant. The implication is that the consideration of investment climate cannot be neglected while making an investment decision.

Though there was no strong support by the survey resulted only 22% of the investors claimed that political instability act as a major constraint to their investment. The various stabilization programs varying from the introduction of national economic empowerment and development strategy (NEEDS) in 2004 and banking recapitalization by Soludo and Sanusi administrations, and effort in sanitizing the financial sector and the peaceful resolution between the federal government and the Niger Delta peoples, the country is yet to witness massive investment climate.

Electricity and Private Investment Nexus

Energy (electricity) has been identified as the main intermediate input for production of goods and services. Consequently, it is key growth in any economy. Every economy depends on the electricity to function effectively. Greene and villanueva 1991 observed that private investment thrives in any economy with lower power (energy) cost, communication and transportation costs which are often made available through public investment.

Blejer and Khan 1984 studied 23 countries and concluded that low and insufficient electricity generation and supply has the tendency to crowd out private investment. Agu, 2015 claimed that many investors in Nigeria generate their own electricity with power generating sets that run on fuel. This private provision of electricity is usually not cost effective. The study maintained that this has a negative implication on their profitability. Some of the private investors have been frustrated out of business, when they could no longer cover the cost of production(Balassa, 1988).

Interest Rate and Private Investment nexus

In any private investment decision, the consideration of user's cost is paramount. Any increment in user's cost of capital will bring about a decline in investment Agu, (2013b). Interest rate can have a substantial effect on the rate and pattern of economic growth by influencing the volume of productivity, disposition of saving as well as volume and productivity of investment (see Adeleke et al.,, 2019, Kutu and Ngalawa 2017). The interest rate policy in stimulating investment has been supported by the Keynesian theory of investment and Mckinnon-shaw (1973) savings and investment hypotheses. The Keynesian theory implies that low interest rate, as a component of cost of funds, encourages borrowing for investment. Some empirical findings are inconsistent with the fact. (Green and Villanueva 1991, negative relationship between interest rate and investment, studies by others (see Serven and Solimano 1993,) have shown that in repressed financial markets, credit policy affects investment in a distorted manner. Skully (1997) also in his study on Fiji and other countries in the region stressed that the availability of finance was a constraint for private investment in Fiji. Mcknnon and Shaw are of the view that low interest rates are detrimental to increased savings which can be channeled into investment while phenomenon of negative real interest over a prolonged period of time results in negative consequences of which include discouragement of savings, misallocation of resources, credit rationing by government and the promotion of financial or market dualism and capital flight (Onyido, 1997).

Public Domestic Investment and Private Investment

Public investments can be seen as an impetus for total investment. Public investment can be subdivided into infrastructural and non-infrastructural. However, our study focuses on the public non-infrastructural investment. This study is in line with Blejer and Khan (1984) who disaggregated the two public investments. They claimed that only public investment in infrastructure complements private investment.

(Balasa 1988) investigated 30 countries and found that private investment is indirect related with public investment. The study admitted that the negative relationship was due to the inability of the private domestic investor to access funds from the capital market. The study equally blamed the inverse relationship to rivalry that exists between the public domestic and private investors over finished products. This competition could be as a result of the heavy tax levied on the income of private investors which could escalate the prices of the product of the private investors because consumers will only patronize the product with moderate prices.

IIII. METHODOLOGY

The framework for this analysis is derived from the life-cycle model which is appropriately modified to accommodate the peculiarities of a developing country. It also builds on the existing cross-country literature on saving and investment which quantifies the effects of a variety of policy and non-policy variables on private investment. the life cycle model is flexible enough to accommodate other relevant theories thereby a comprehensive analytical framework without changing Its flexibility makes it possible for other relevant theoretical considerations to be incorporated, thus forming an integrated analytical framework, without varying its essential structure. This framework makes a new contribution to the literature by employing time series data in evaluating the determinants of private investment in Nigeria between 1980 and 2018. It does this while explicitly addressing some of the econometric problems arising from the use of time-series data.

The Autoregressive Distributed Lag (ARDL) is used in this study. This procedure involves first estimating the investment function in an unrestricted form, after which it is progressively simplified by restricting statistically insignificant coefficients to zero, until a parsimonious representation of the data generation process is obtained. The aim is to minimize the possibility of estimating spurious relations, while at the same time retaining long-run information. The major advantage of this methodology is that it yields an equation with a stationary dependent variable which also appropriately retains long-run information in the data. It can also conveniently handle I(0) and I(1) series. In applying this estimation technique, we set the initial lag length on all the variables in the unrestricted equation at one period. This is the maximum we can go given the need to preserve degrees of freedom.
We will also obtain the ECM coefficient to correct any envisaged errors and make the model co-integrate in the long run.
The steps that were followed are:
i) We studied the temporal characteristics of the variables in the investment function. This involved testing for unit roots for all-time series variables in the model. The presence of a unit root implies that the series under investigation is non-stationary; while the absence of a unit root shows that the stochastic process is stationary. We employed both the Augmented Dickey-Fuller and the Phillips-Perron tests for this purpose.
ii) We went on to formulate the static (long-run) theoretical relationship and tested for stationarity among non-stationary series of the same order. We explored the Johansen co-

integration procedure, while relying on both the Trace and Maximum-Eigen statistics to determine the co-integration rank.
iii) We estimated the Error-Correction or Dynamic (short-run) representation of the relationship and tested for the adequacy of the resulting equation. This short-run equation includes the lagged error term as a regressor. This acts to correct any deviations from long-run equilibrium. This ECM estimates normalizes the model. It lowers the high equilibrium value and raises the low equilibrium value.

From the discussion above of the life cycle framework we form the model thus for both objectives thus:

$$PIV_t = \alpha_0 + \alpha_1 \text{INTR}_t + \alpha_2 INFS_{t-1} + \alpha_3 PUBIV_t + \alpha_4 POLS_t + \alpha_5 MS \ldots\ldots\ldots\ldots (1)$$

PIV = f(interest rate, infrastructure, public investment, political stability, and Savings Rate)

Where:

PIV= Private Domestic Investment

IntRat. = Interest Rate

Infs. = Infrastructural facilities proxy by electricity

Pubiv= public Investment

Pols= political Stability

MS= Money Supply

The parameter estimates is supposed to follow this apriori expectation

$\boldsymbol{\beta}_1, \boldsymbol{\beta}_2, \boldsymbol{\beta}_3$, *and* $\boldsymbol{\beta}_5 > 0$ *while* $\boldsymbol{\beta}4 < 0$

for objective two which is to determine the relationship between interest rate and economic growth in Nigeria, we use model (2)

$$GDPGR_t = \alpha_0 + \alpha_1 \text{INTR}_t + \alpha_2 INFR_{t-1} + \alpha_3 PUBIV_t + \alpha_4 POLS_t + \alpha_5 MS \ldots\ldots\ldots\ldots (2)$$

Where

GDPGR= Growth rate of GDP

INTR=Interest rate

INFR= Inflation Rate

PUBIV= Public Investment

MS= Money Supply

The equations (1) and (2) lead to ARDL models used for to achieve objectives one and two respectively. They are specification as follows:

$$lnpiv_t = C_0 + \sum_{j=1}^{n} \beta_{1j}\, lnpiv_{t-1} + \sum_{j=1}^{n} \beta_{2j} \Delta lnintr_{t-1} + \sum_{j=1}^{n} \beta_{3j}\, \Delta lninfs_{t-j} + \sum_{j=1}^{n} \beta_4\, \Delta lnpubiv_{t-j} + \sum_{j=1}^{n} \beta_{5j}\ \Delta lnms_{t-1} + \sigma_1\, piv_{t-1} + \sigma_2\, intr_{t-1} + \sigma_3\, infs_{t-1} + \sigma_4\, pubiv_{t-1} + \sigma_5\, ms_{t-1} + \mu_t \ldots\ldots\ldots (3)$$

$$lngdpgr_t = C_0 + \sum_{j=1}^{n} \beta_{1j}\, lngdpgr_{t-1} + \sum_{j=1}^{n} \beta_{2j} \Delta lnintr_{t-1} + \sum_{j=1}^{n} \beta_{3j}\, \Delta lninfr_{t-j} + \sum_{j=1}^{n} \beta_4\, \Delta lnpubiv_{t-j} + \sum_{j=1}^{n} \beta_{5j}\ \Delta lnms_{t-1} + \sigma_1\, gdpgr_{t-1} + \sigma_2\, intr_{t-1} + \sigma_3\, infr_{t-1} + \sigma_4\, pubiv_{t-1} + \sigma_5\, ms_{t-1} + \sum_{j=1}^{n-s} \lambda_j\, D_{jt} + \mu_t + \mu_t \ldots\ldots\ldots (4)$$

In this models (3) and (4), *js* proxy the lag numbers. Δs stand for the first difference operators. C_0 represents the constant term. while, *n* stands for the optimal lag length. $\beta_{1j} - \beta_{5j}$ proxy the short run coefficient, while μ_t is the stochastic. $\sum_{j=1}^{n-s} \lambda_j\, D_{jt}$ stands for the naitation for structural effect in the model. $\sigma_1 - \sigma_5$ stand for the elasticity coefficients used to proxy the long-run relationship. Therefore for us to properly estimate the long run relationship, we use the null hypothesis and the application of bound testing, such that;

$$H_0: \sigma_1 = \sigma_2 = \sigma_3 = \sigma_4 = \sigma_5 = \sigma_6 = 0$$

and the alternate hypothesis:

$$H_1: \sigma_1 = \sigma_2 = \sigma_3 = \sigma_4 = \sigma_5 = \sigma_6 \neq 0$$

The investment equation was estimated using annual data for the period 1980 - 2018. The Below are the sources of each variable:

Private Domestic Investment, Interest rate, Infrastructure, public investment and money supply are sourced from Central Bank of Nigeria Statistical Bulletin 2018, CBN Annual Report and Statement of Accounts 2018 and International Financial Statistics Year book 2018 and 2018 published by the IMF. Political stability is a dummy variable. If there if political instability we use 1 otherwise, we use 0.

IV. RESULTS AND DISCUSSION
DESCRIPTIVE STATISTICS

The characteristics of the distribution of the variables are presented in Table 1 below. Evidently, the Jarque-Bera statistic rejects the null hypothesis of normal distribution for the interest rate. On the contrary, the null hypothesis of normal distribution is accepted for degree of political stability, infrastructure and private investment.

The statistic for Kurtosis shows that growth of income is normally distributed. Lastly, the statistic for skewness shows that interest rate, infrastructure, public investment, political

stability are positively skewed, implying that these distributions have long right tails. On the other hand, the interest rate is negatively skewed, meaning that the distributions have long left tails.

Table 1: Summary of the Descriptive Statistics of the Variables

	Intr	**Infs**	**Pubiv**	**Pol Sta**	**Ms**
Mean	24.24	-3.46	2.02	28.69	-5.31
Median	24.00	-3.50	3.00	26.00	-0.60
Maximum	35.00	9.80	45.00	65.00	18.00
Minimum	12.00	-11.10	-31.00	-0.60	-52.60
Std. Dev.	6.39	4.29	17.84	12.79	16.01
Skewness	-0.07	0.52	0.48	0.56	-1.05
Kurtosis	2.009	4.01	3.33	4.05	3.74
Jarque-Bera	1.54	3.24	1.61	3.65	7.61
Probability	0.46	0.20	0.45	0.16	0.02
Sum	897.00	-127.99	74.70	1061.40	-196.40
Sum Sq. Dev.	1472.81	661.12	11459.88	5886.52	9229.21
Observations	37	37	37	37	37

RESULTS OF STATIONARITY TESTS

The stationarity tests are presented in Tables 2. The results show that while Interest rate (**Intr.**), Infrastructural facilities(**Infs**) and political Stability (**Pols**) are I(0) variables (stationary before differencing), the public Investment(**Pub iv**) and the money supply (Ms) are I(1) variables (stationary after first differencing

Table 2: Results of Augmented Dickey Fuller (ADF) Unit Root Test

Dickey Fuller (DF)			**Philips-Perron (PP)**		
Variables	Order of Integration	P-Value	Order of Integration	Integration P-Value	Most Consistent results
Piv	I(1)	0.0000***	I(1)	0.0000***	I(1)
infs	I(0)	0.0049***	I(0)	0.0000***	I(0)
intr	I(0)	0.0123***	I(0)	0.0005***	I(0)
Pubiv	I(1)	0.0000***	I(1)	0.0000***	I(1)
MSGR	I(0)	0.0580	I(1)	0.0000***	I(0)
Ms	I(1)	0.0000***	I(1)	0.0000***	I(1)

Source: Author's Computation, 2019 *, ** and * represent statistical significance at 1%, 5%, and 10%, respectively.**

Test for Structural Breaks

Bai and Perran (2003) claim that time series data often have parameters that have sudden changes. This test enables us to see the date of the break and to correct the outliers in the series.

Table 3: Test for Structural Breaks Result

Break test options: Trimming 0.15, Max. breaks 5, Sig. level 0.05	
Sequential F-statistic determined breaks:	5

We therefore proceed to test for the significance of the breakpoints thus:

Table 4: Dummy Significance Result.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	9.739470	1.393998	6.986716	0.0000

Since the probability value of the dummy variable coefficient is significant at 5% significant level, we reject the null hypothesis and accept that the breakpoints are significant. We then proceed to use dummy in our regression analysis.

The ARDL Lag Determination

Table 5 Lag Order Selection Result

VAR Lag Order Selection Criteria						
Endogenous variables: D(EXCHR) GDPGR D(INFR) D(INTR) D(K) MSGR D(OILPVOL) D(POVR)						
Exogenous variables: C						
Date: 08/08/19 Time: 17:34						
Sample: 1980Q1 2018Q4						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-3000.883	NA	82984364	40.93718	41.09992	41.00330
1	-2504.786	931.4470	232470.8	35.05831	36.52301*	35.65343
2	-2422.857	144.9082	183446.5	34.81438	37.58104	35.93850
3	-2403.488	32.14911	342933.8	35.42161	39.49023	37.07473
4	-2229.516	269.8349	79586.51	33.92539	39.29596	36.10751
5	-2007.394	320.3388	9823.092*	31.77407*	38.44660	34.48519*
6	-1960.577	62.42318	13584.36	32.00785	39.98233	35.24797
7	-1946.573	17.14791	30560.00	32.68806	41.96451	36.45718
8	-1868.227	87.40586*	30151.07	32.49289	43.07129	36.79101

Source: Author's 2019

Table 5.9 above shows the ARDL optimal lag result. We obtained 5 lag lengths. We therefore use 5 lags in our regression.

Table 6: ARDL ERROR CORRECTION RESULT

ARDL Error Correction Regression				
ECM Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECM(-1)	-0.372245	0.117559	-3.16645	0.0020
Cointeq = D(EXCHR) - (0.0347*GDPGR + 0.1132*D(INFR) + 0.5860 *D(INTR) -0.2335*D(K) -0.1028*MSGR -0.6694*D(OILPVOL) + 0.6002 *D(POVR) + 4.3347)				

Source: Author's Computation, 2019

Pesaran and Chudik, 2013 noted that for the model be fit and stable, the coefficient of the ECM must be negative, less than unity and the probability value must be significant. The result fits the specifications above. We can therefore assume that the model if fit and stable. This result implies that 37 % of the disequilibrium in the model can revert to equilibrium in the current year and that it takes about two years, few months for the shock to be come back to equilibrium.

Table 7: ARDL COINTEGRATION (BOUND TEST) RESULT

F-Bounds Test Null Hypothesis: No levels relationship				
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.1865	10%	2.08	3
K	5	5%	2.39	3.3

Source: Author's Computation 2019

Since the F-Statistics is above upper bounds then we conclude that there is co-integration. We then proceed to run our regression using ARDL estimating technique.

LONG-RUN MODEL

Table 8: SHORT RUN AND LONG RUN Result

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY	0.157555	0.466222	0.337940	0.7360
INTR	0.501612	0.042377	3.346512	0.0002
INFS	0.002823	0.031939	-2.233337	0.0878
PUBIV	-0.030697	0.043915	-0.699005	0.0458
MS	-0.122644	0.243536	-1.647101	0.1019
POLS	-0.115726	0.208953	-0.553840	0.0806
C	0,401321	0.023939	0.208953	0.5840
R-squared	0.940588	Mean dependent var		63.29428
Adjusted R-squared	0.989213	S.D. dependent var		10.53112
S.E. of regression	1.093786	Akaike info criterion		3.140732
Sum squared resid	155.5277	Schwarz criterion		3.542150
Log likelihood	-215.5549	Hannan-Quinn criter.		3.303816

F-statistic	720.1287	Durbin-Watson stat	2.198786
Prob(F-statistic)	0.000000		

the long run relationship becomes:

PIV = +0.4013 +**0.5016 Int.** + 0.0028 **Infs** -0.0190 **Pubiv** -0.1226 **Ms** - 0.1157**Pols**
(3.346)*** (2.233)* (3.769)** (0.459) (1.647)

As postulated by our modified version of the lifecycle hypothesis, the income growth variable (**Intr**) is an important determinant of the private investment rate. The coefficient of **Intr** is both positively signed and statistically significant at the 1 percent level. An increase in the growth rate by one percent leads to a long-run increase in the investment rate by 0.5 percent. These results are in line with those obtained by Modigliani (1970), Maddison (1992), Bosworth (1993) and Carroll and Weil (1994). Thus, as the incomes of private agents grow faster, their investment rate increases. This result is in line with the consumption habits.

This infers that any policy that boosts income growth in the long run is expected to have a strong influence on private investment saving rate. Given the historical close link between saving and investment rate, a rise in growth rate will lead to a virtuous cycle of higher income and saving rates.

The result for the real interest rate variable suggests that the real rate of return on bank deposits has a statistically significant positive effect on investment behaviour in Nigeria. A one percent increase in **Infr** is associated with a 0.003 percentage point increase in the private investment rate. This finding is consistent with the McKinnon-Shaw proposition which states that, in an economy where the investment behaviour is highly intensive in money and near-money assets, the direct incentive effect of high real interest rates on saving behaviour (i.e. the income effect) generally overwhelms the substitution of other assets for financial assets in response when faced with such interest rate changes (i.e. the substitution effect). The implication is that government should find an effective mechanism for increasing the abysmally low interest rate on bank deposits if the present crusade to increase the private investment saving rate is to achieve any measure of success.

DYNAMIC ERROR-CORRECTION MODEL

Having identified the co-integrating vector using Johansen, we proceed to investigate the dynamics of the investment process. In terms of the Chow test for parameter stability conducted by splitting the total sample period into 1980-1986 and 1987-2018 there is no evidence of parameter instability.

The results show that the coefficient of the error-correction term for the estimated investment equation is both statistically significant and negative. Thus, it will rightly act to correct any deviations from long-run equilibrium. Specifically, if actual equilibrium value is too high, the error correction term will reduce it, while if it is too low, the error correction term will raise it. The coefficient of -0.372245 denotes that 37 percent of any past deviation will be corrected in the current period. Thus, it will take more than three years for any disequilibrium to be corrected.

Furthermore, it is only the income growth variable that is statistically significant at the 1 percent level, indicating that in the short run, it is only growth in income that has a relationship with the private investment rate. The implication is that short run changes in private investment rate that correct for past deviations emanate principally from changes in income growth. The coefficient estimate shows that a unit change in income growth will

bring about a 0.3 percent change in private investment. The other four explanatory variables (**PIV**(-1), **Infr**, **Pubiv** and **Pols** do not have any short run impact on the private investment rate. This result is in keeping with the long run relationship where over 50 percent of changes in private investment are explained by changes in income growth.

Table 9: Estimated Short Run Regression.
Dependent Variable: DPIV.
Included observations: 35 after adjusting endpoints

Variable	Coefficient	T-Statistic	Probability
C	0.1137	2.9728	0.0063
DPIV(-1)	0.0303	0.1952	0.8467
D **Int**	-0.3047	3.5435	0.0015
DInfr(-1)	-0.0016	-1.6013	0.1214
D **Pubiv**	-0.0054	-1.2194	0.2337
D **(Pols)**	0.8020	1.6733	0.1063
ECM(-1)	-0.4415	-3.3118	0.0027
Adjusted R-squared	0.3356	S.D Dependent Var.	0.1064
S.E of regression	0.0867	F-Statistic	3.6936
Durbin-Watson stat	2.2200	Prob. (F-statistic)	0.0087

JBN - $\chi^2(1) = 0.33$
Probability (JBN) = 0.85

LM - $\chi^2(1) = 1.92$
Probability (LM) = 0.18

ARCH - $\chi^2(1) = 1.0$
Probability (ARCH) = 0.32

CHOW - $\chi^2(1) = 1.6$
Probability (CHOW) = 0.20

Since we have ascertained that interest rate in Nigeria determines to a large extent the rate of private investment in Nigeria, we then go ahead to determine the relationship between interest rate and economic growth in Nigeria thus:

THE SECOND MODEL

3.12 THE RELATIONSHIP BETWEEN INTEREST RATE AND ECONOMIC GROWTH IN NIGERIA

Table 10: DESCRIPTIVE STATISTICS

	GDPGR	INTR	INFR	PUBIV	MS
Mean	3.611683	19.98257	3.850829	3.350312	2.976128
Median	4.279277	12.20000	3.966400	3.376030	3.158553
Maximum	33.73578	72.81000	4.404434	3.916014	5.358067
Minimum	-13.12788	4.670000	3.031221	2.520877	-0.736776
Std. Dev.	7.524867	17.96966	0.387018	0.298786	1.923240
Skewness	1.195286	1.548270	-0.730620	-0.883075	-0.273458
Kurtosis	8.795104	4.129674	2.411533	4.178952	1.668901
Jarque-Bera	60.58452	16.74978	3.825672	6.951702	3.192701
Probability	0.000000	0.000231	0.147661	0.030936	0.202635

Sum	133.6323	739.3551	142.4807	123.9615	110.1167
Sum Sq. Dev.	2038.450	11624.71	5.392194	3.213827	133.1587
Observations	37	37	37	37	37

Source: Author's Computation, 2019

Table 10 above shows summary statistics of the variables engaged on the effects of oil price movement D(PIV) on economic growth (GDPGR) in Nigeria. The mean distribution of all the variables was presented on the second row of the table. The third row presents the maximum while the fourth row shows the minimum value for all the variables. Row five presents the standard deviation result. The GDPGR is the dependent variable has a maximum of only 33.7358 and the minimum is as low as -13.12788 with a mean of 3.611683 which is closer to the minimum than the maximum. This result strongly confirms the extant a priori expectations that real GDPGR is low in Nigeria.

Moreover, the results for all the independent variables, namely, intrest rate, inflation rate pubiv and money supply follow a similar maximum and minimum trends with GDPGR.

Table 11: CORRELATION MATRIX

	GDPGR	INTR	INFR	PUBIV	MS
GDPGR	1	0.0646	-0.2368	-0.2267	-0.3524
INTR	0.0646	1	-0.05099	0.0755	-0.0229
INFR	-0.2368	-0.0509	1	-0.0603	0.1104
PUBIV	-0.3524	-0.0229	0.1104	0.2970	1
DMS	-0.3342	0.0281	0.2529	0.1306	0.1758

Source: Author's Computation, 2019

Table 11 depicts the correlation matrix adopted for the variables in this model. The variables show different associations with one another. Nevertheless, we show particular interest in the association between dependent variable (GDPGR) and the variable of interest. The interest rate has a positive relationship with gdpgr.

Table 12 LAG LENGTH CRITERIA

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-475.5497	NA	2228.838	27.57427	27.88534	27.68165
1	-328.4559	226.9447	8.682506	21.96891	24.45746*	22.82796*
2	-267.5744	69.57883*	6.289373*	21.28997*	25.95601	22.90068
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						

AIC: Akaike information criterion SC: Schwarz information criterion		
HQ: Hannan-Quinn information criterion		

Source: Author's Computation 2018

OPTIMAL LAG LENGTH SELECTION

The optimal lag length was obtained for the regression estimates of the variables under study. This study tested for various lag lengths selection criteria and we chose 2 lag lengths since three (3) out of the five (5) criteria were chosen by LR, FPE and AIC at 5% level each. Hence, this forms the optimal lag length.

Table 13 ERROR CORRECTION RESULT

ARDL ERROR CORRECTION RESULT

ARDL Error Correction Regression				
ECM Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECM(-1)	-0.23169	0.160080	-6.05248	0.0000

Source: Author's Computation, 2019

They asserted that the coefficient of the ECM must be negative, less than unity and that the probability value must be significant. Therefore we can confidently say that our result meets all the above conditions since the coefficient is negatively signed and less than one (1) the coefficient is (-0.231692) and the probability value is 0.0000.

Table 14: ARDL COINTEGRATION (BOUND TEST) RESULT

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.433531	10%	1.99	2.94
K	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99

Source: Author's Computation, 2018

Conditions for ARDL co-integration test result by Passaran (1956). (See also Ali & Ali, 2008 and Raza et al., 2015).

Ho: No co-integration exists among the regressors and the dependent variable if the F statistic falls within the upper and the lower bounds.

H1: *C*o-integration exists among selected regressors and the dependent variable if the F statistic falls above the upper and the lower bounds.

We reject the null hypothesis and accept the alternative hypothesis that there is a long run co-integration among the variables. Since the F-statistic (5.433531) is greater than upper bound (3.99) at the 5% significant levels.

Table 15: LONG RUN AND SHORT RUN ESTIMATES

SHORT RUN ESTMATES				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.152082	1.808882	3.401041	0.0024
GDPGR(-1)	-0.759983	0.155536	-4.886209	0.0001
D(INTR, 2)	-0.950900	0.122211	-7.780806	0.0000
D(INFR, 2)	-0.013279	0.019856	-0.668763	0.5048
DUMMY	-14.67824	8.464600	-1.734073	0.0957
D(PUBIV)	41.29354	12.78583	3.229632	0.0036
D(MS)	20.626583	4.781477	-0.131044	0.0968
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LONG RUN ESTIMATAES				
GDPGR(-1)	-0.011160	0.080984	-0.137804	0.8915
INTR	-0.401128	0.243536	-1.647101	0.1019
INFR	-0.030697	0.043915	-0.699005	0.4858
DUMMY	-19.31389	11.51633	-1.677088	0.1065
PUBIV	54.33479	16.94600	3.206349	0.0038
C	8.095021	2.306578	3.509537	0.0018
EC = GDPGR - (0.0003*D(INTR) -0.0112*D(INFR) + 9.7523*D(PUBIV) + 5.1471*D(MS)				
R-squared	0.878070	Mean dependent var	4.000021	
Adjusted R-squared	0.848139	S.D. dependent var	7.160042	
Akaike info criterion	6.411643			
Sum squared resid	446.0999	Schwarz criterion	7.211537	
Log likelihood	-94.20376	Hannan-Quinn criter.	6.687766	
F-statistic	2.907311	Durbin-Watson stat	2.192116	
Prob(F-statistic)	0.016987			

Source: Author's Computation 2018

Table 15 above shows the summary results of the long-run and short-run relationships between gross domestic product growth rate (GDPGR) and other independent variables as it relates to the relationship between interest rate and Nigeria economic growth.

The results indicate that interest rate is negatively related with economic growth both in the short run and in the short run. Albeit, while interest rate is highly significant in the short run it

is non-significant in the long run. This implies that a percentage change in interest rate will bring about a decrease in economic growth in tune of 0,95 percent. The implication is that high interest rate discourage investors from assessing funds from the banks. This has a repercussion in the economy as seen from the result. These results do not support the claims of (Babayev, 2010) and (Chang and Wong 2003). Nonetheless, these results corroborate the studies by Federer (1996), Olomola et al; (2006), (Eltony et al:, 2001) and (Iwayemi, 2011). However, Iwayemi (2011) concluded that in the long run, oil price movements do not have a major effect on most macroeconomic variables in Nigeria.

Inflation rate to is negatively signed in relation with the economic growth in both long run and short run. In both the long run and short run, inflation rate is insignificant. The short-run and the long-run values of the coefficient show that 1% increase in INFR will decrease increase GDPGR by 0.030% and 0.13% respectively. This this negative relationship between inflation rate and economic growth is in line with a priori expectation. These results are in support of the studies by (Evan and Fisher, 2011), (Hooker, 2002), and (World Bank, 2011). However, (Radnia, 2013) attributed the negative relationships between inflation and economic growth to the hyperinflation in Saudi Arabia that ate into the Real GDP in the period under investigation. (Radnia, 2013) claimed that moderate inflation rates encourage the businesses and increase economic growth, but when inflation rises beyond a certain threshold, it tend to harm economic growth. Nevertheless some studies such as (Cologni and Manera, 2008) and (Chen, 2010) found a positive relationship between inflation rate and economic growth in some OECD countries.

DIAGONISTIC TESTS

Table16: **Breusch-Godfrey Serial Correlation LM Test**

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.483172	Prob. F(2,15)	0.6261
Obs*R-squared	2.118334	Prob. Chi-Square(2)	0.3467

Source: Author's Computation 2018

This section tests the presence of serial correlation in the model with a null hypothesis of absence of serial correlation among the variables.

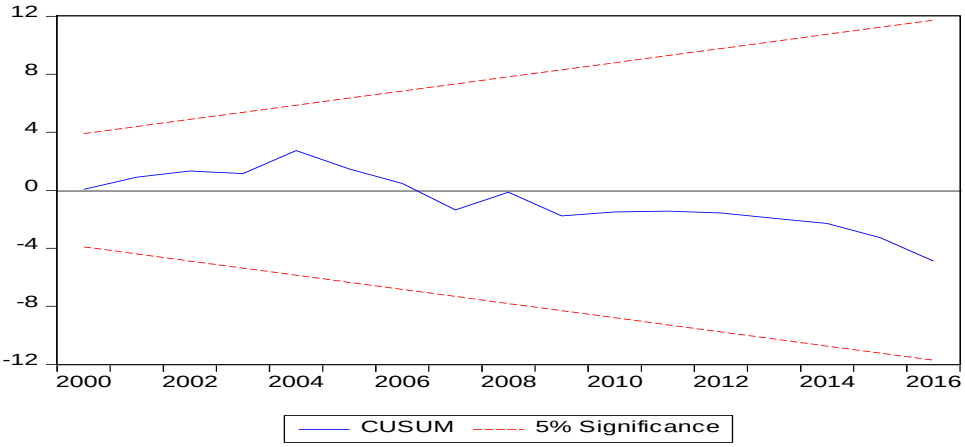
H_0: There is no serial correlation among explanatory and outcome variable.

H_1: There is serial correlation among the explanatory and outcome variable.

The decision rule: Accept null hypothesis (H_0) when P-Value is greater than 5%

Reject null hypothesis (H_0) when P-Value is less than 5%.The result shown on table 16 shows that the probality value of the F-statistics is not significant at 5% level. Hence, H_o is accepted, and the alternative hypothesis is rejected, indicating that there is absence of serial correlation between the dependent and the independent variables.

Figure 1: STABILITY TEST (CUSUM TEST)



Source: Author's Computation, 2018

The condition for the CUSUM test stability criterion is: The blue line represents the model while the two red lines indicate the boundary within which the model has to be for the model to be stable. Since the blue line lays within the two the two red boarder lines, we conclude that the model is stable.

V. CONCLUSIONS AND RECOMMENDATIONS

This paper has investigated the factors that influence private investment in Nigeria for the period between 1980 and 2018. The estimation results for the long run model point to the growth in income and the real interest rate as having statistically significant positive influences on domestic private investment. There is also a clear role for fiscal policy in increasing total investment in the economy, with the private sector considering public investment as an imperfect substitute for its own investment. We have established from our result how effective government policy is in promoting investment in Nigeria as regards the size and signs of the variables.

We recommend that the focus of development policy in Nigeria should be to increase the productive base of the economy in order to promote real income growth through enhancing private investment which has the tendency of reducing unemployment. For this to be achieved, a diversification of the country's resource base is indispensable. Policy thrusts should include revitalizing a comprehensive energy sector to enhance electricity supply, to encourage small and medium scale industries and to moderate the interest rate in order to encourage private investment which has the capacity of promoting economic growth.

Lastly, it is pertinent to note that even though this paper has concentrated on Nigeria, its results can be applied to other African countries not previously studied. They contain some valuable lessons for informing policy measures in the current thrust towards greater mobilization of private investment in the African continent.

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