DETERMINANTS OF PRIVATE INVESTMENT IN NIGERIA

AN ECONOMETRIC ANALYSIS

Osmond Chigozie Agu

Economics and Development Studies Department

Federal University, Oye-Ekiti, Nigeria

ossydevine@yahoo.com

Abstract

This paper discusses the determinants of private investment in Nigeria from 1970 – 2012. It x-rays the trend in Nigerian investment behaviour and reviews policy options to increase Private domestic investment. The structure for analysis involves the estimation of an investment rate function derived from the Life Cycle Hypothesis while taking into account the structural distinctiveness of a developing economy. The study employs the Error-Correction modeling procedure which minimizes the likelihood of estimating spurious relations, while at the same time retaining long-run information. The results of the analysis show that the investment rate is positively correlated with both the growth rate of disposable income and the real interest rate on bank deposits. We discovered that investment has been slowed down in Nigeria as a result of increased lending rate, reduced public expenditure, reduced savings, political instability and inadequate infrastructure. We recommend among others things 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 and reduce unemployment. For this to be achieved, a diversification of the country's resource base is indispensable.

Keywords: Private investment, disposable income, Life cycle hypothesis, productivity, infrastructure

INTRODUCTION

Investment can be defined as the outlay of money for future use. It is a venture in real asset; real assets consist of physical things such as factories, land, capital goods, infrastructure, inventories etc. Over the years, development economists have been apprehensive about the critical role of domestic investment saving mobilization in the sustenance and strengthening of the saving investment- growth chain in third world economies. The relationship among saving, investment and growth has historically been very close; hence, the unsatisfactory growth performance of several developing countries has been attributed to poor saving and investment. This poor growth performance has generally 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 (Tochukwu, 2012; Khan and Villanueva, 1991).

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 (Agu, 2012b).

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. Investment plays a crucial role in models of economic growth. 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 as regards the aggregate domestic investment income. The strong positive correlation which exists between saving, investment and growth is well established in the literature. The dismal growth record in most African countries, relative to other regions of the world has been of concern to economists. This is because the growth rate registered in most African countries is often not commensurate with the level of investment (Tochukwu, 2012; Agu et al, 2013a). In Nigeria for instance, the economy witnessed tremendous growth in the 1970s and early 1980s as a result of the oil boom. Following the oil boom, there was investment boom especially in the public sector. However, with the collapse of the oil market in the 1980s, investment fell, thereby resulting in a fall in economic growth.

Problem Statement

The success of any programme in bringing about a sustainable recovery in economic activity in an economy depends crucially on the behavior of investment in the aftermath of the reform process. In Nigeria, many reform programmes have been undertaken with little or no impact on the investment behaviour. The behaviour of private investment has been identified as a factor for assessing the reform outcome. The existing evidence in Nigeria, points to a decline or stagnation of private investment during the immediate past reform years (World Bank, 1988 Harriggen and Mosley, 1991, Green Way and Morrissey 1992; Gunning; 1994, Dehn, 2000; Lomi and Sisay, 2001).

Econometric evidence (Beddies 1999, Ghura and Hadjimicheal 1996, Ghura 1997) indicates that private investment has a stronger, more favorable effect on growth rather than government investment; probably because private investment is more efficient and less closely associated with corruption. 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. Empirical studies (Blejer and Khan 1984, Greene and Villanueva 1991) on 23 countries have shown that public investment in physical infrastructure is complementary to private investment. 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.

Objectives of the study

This article has two objectives. First is to provide stylized facts about the trend of investment and its key determinants in Nigeria. Second, is to evaluate the impact of the main determinants of investment identified in the literature on private domestic investment in Nigeria. This 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's 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 available ones are mired in controversy with regard to the magnitude and sign of the coefficients of the variables of interest.

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 Error-Correction Methodology which has the ability to 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.

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. It is an investment in real asset; real assets consist of physical things such as factories, land, capital goods, infrastructure and inventories.

Investment climate and private investment in Nigeria

Investment environment has equally been identified as a factor that can determine private investment. In the -sub-Saharan countries, the reverse was the case; investment environment was negatively related to private investment. 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.

Thus, investment climate constitutes a good indicator for current 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 to 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

Electricity as a source of energy is vital to the growth and development of any economy. Every economy depends on the electricity to function effectively. Private investment will flourish in a supportive environment of cost reduction in power, transport and communication. They are often provided through public investment. Empirical studies (Blejer and Khan 1984, Greene and Villanueva 1991) on 23 countries have shown that public investment could be crowded out by the public investment. The private investors in Nigeria have to power their plants themselves which eats further into 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 in Nigeria

User's cost of capital is an indispensable factor in any investment decision of the private sector. 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.

The Keynesian investment theory and the Mckinnon-shaw (1973) savings and investment hypothesis constitute the theoretical basis for the use of interest rate policy in stimulation of the economy via investment. 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. Mckinnon 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 could be infrastructure or non-infrastructure this particular aspect is meant to capture the non-infrastructure investment of the public. This is consistent, with Blejer and Khan (1984) they decomposed public investment into infrastructural and non-infrastructural investment, government investment in infrastructure is complementary to private investment whereas other types of government investment are not. (Balasa 1988) in the study of 30 countries showed the presence of a negative relationship between private investment and public investment. The negative relationship could probably be as a result of reduced access to funds in the capital market on the part of private domestic investors. Competition between the public domestic investors and private domestic investors in the market for finished products is another problem. 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.

METHODOLOGY

There is the need to incorporate the modified life- cycle model in this analysis in order to accommodate the peculiarities of a developing country. Existing cross-country literature on saving and investment shall also be built upon which quantifies the effects of a variety of policy and non-policy variables on private investment. Its flexibility makes it possible for other relevant theoretical considerations to be incorporated, thus forming an integrated analytical framework, without altering its fundamental 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 1970 and 2012. It does this while explicitly addressing some of the econometric problems arising from the use of time-series data.

This study will employ the Cointegration and Error-Correction Methodology. This process 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. It achieves this by placing the relationship being investigated within a sufficiently complex dynamic specification. 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. 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. The ECM is made up of models in both levels and differences of variables and is compatible with long-run equilibrium behaviour. The steps that were followed are:

i) Augmented Dickey-Fuller and the Phillips-Perron tests were used to test for unit roots for all time series variables in the model. This was done by studying the temporal characteristics of the variables in the investment function. 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.

ii) The next process was to formulate the static (long-run) theoretical relationship and test for stationarity among non-stationary series of the same order. We explored the Johansen cointegration procedure, while relying on both the Trace and Maximum-Eigen statistics to determine the cointegration 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. 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.

Drawing from the analysis above, the following model was specified:

PDIV = (interest rate, infrastructure proxy by electricity, public investment, political stability, and Savings Rate)

Where:

PDIV= Private Domestic Investment

IntRat. = Interest Rate

Infr. = Infrastructural facilities proxy by electricity

Pub iv= public Investment

Pol. Sta= political Stability

SavRat= Savings Rate

$PDIV = \beta_0 + \beta_1 IntRat + \beta_2 Infr + \beta_3 Pub\ inv + \beta_4 Pol\ Sta + \beta_5 SavRat + U$………..(1)

The parameter estimates is supposed to follow this apriori expectation

$\beta_1, \beta_2, \beta_3,$ *and* $\beta_5 > 0$ *while* $\beta_4 < 0$

The investment equation was estimated using annual data for the period 1970 - 2012. The estimation period was determined largely by the availability of adequate data on all variables. Private Domestic Investment, Interest rate, Infrastructure, public investment and savings Rate are seen from Central Bank of Nigeria Statistical Bulletin 2012, CBN Annual Report and

Statement of Accounts 2012 and International Financial Statistics Year book 2011 and 1999 published by the IMF. While political stability is used as a dummy variable. If the year under consideration has an instability we put 1(one) and 0(zero) if there was no political instability.

EMPIRICAL 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 political stability. On the contrary, the null hypothesis of normal distribution is accepted for degree of interest rate, infrastructure and private investment.

The statistic for Kurtosis shows that growth of interest rate is normally distributed. Lastly, the statistic for Skewness shows that interest rate, public investment and political stability are positively skewed, implying that these distributions have long right tails. On the other hand, the infrastructure is negatively skewed, meaning that the distributions have long left tails.

Table 1: Summary of the Descriptive Statistics of the Variables

	IntRat	Infr	Pub Inv	Pol Sta	SavRat
Mean	14.26	-5.49	4.00	48.67	-7.38
Median	36.00	-3.50	5.00	38.00	-0.60
Maximum	65.00	7.80	75.00	78.00	68.00
Minimum	23.00	-41.50	-45.00	-3.60	-62.60
Std. Dev.	3.42	5.59	07.84	42.79	66.01
Skewness	0.57	-0.07	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	367.00	-127.99	74.70	1061.40	-196.40
Sum Sq. Dev.	1572.81	627.12	3259.88	5656.52	93229.21
Observations	42	42	42	42	42

RESULTS OF STATIONARITY TESTS

Augmented Dickey-Fuller and Phillips-Perron tests results are presented in Tables 2 and 3, respectively.

The results show that while Interest Rate (**IntRat.**), Infrastructural facilities proxy by electricity(**Infr**) and political Stability (**PolSta**) are I(0) variables (stationary before differencing), the public Investment(**PubInv**) and the Savings Rate(**SavRat**) are I(1) variables (stationary after first differencing). This is deduced from the fact that the absolute values of both the ADF and PP test statistics of **IntRat , Infr and Pol Sta** before differencing are greater than the absolute value

of the critical values at the 1 percent significance level. For the other variables, this is the case after differencing once.

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

Variable	ADF Value before Differencing	ADF Value After Differencing	Critical Value	Level of Integration
IntRat.	-4.546*	n.a	4.621	I(0)
Infr	-6.177*	n.a	4.627	I(0)
Pub Inv	-2.204	-4.275*	4.621	I(1)
Pol Sta	-3.540*	n.a	4.621	I(0
SavRat	-1.778	-4.784*	4.621	I(1)

Notes: * *denotes significant at 1 percent; the null hypothesis is that there is a unit root.*

n.a = not applicable

Table 3: Results of Phillips-Perron (PP) Unit Root Test

Variable	PP Value Before Differencing	PP Value After Differencing	Critical Value	Level of Integration
IntRat	-4.546*	n.a	4.621	I(0)
Infr	-6.177*	n.a	4.627	I(0)
Pub inv	-3.540	-4.275	4.621	I(1)
Pol Sta	-3.540*	n.a	4.621	I(0)
SavRat	-2.047	-4.784*	4.621	I(1)

Notes: Same as Table 2 above

Cointegrated Models

It makes a lot of sense to check if the investment equation is cointegrated, for this to be done, Johansen's test was carried out. Table 4 shows that both the Trace and Maximum Eigen statistics rejected the null hypothesis of no cointegration at the 5 percent level; while Trace test indicated that there are two cointegrating equations at the 5 percent level; Maximum Eigen test indicated only one cointegrating equation at the 5 percent level. The implication is that a linear combination of all the five series was found to be stationary and thus, are said to be cointegrated.

In other words, there is a stable long-run relationship between them and so we can avoid both the spurious and inconsistent regression problems which otherwise would occur with regression of non-stationary data series.

Table 4: Johansen's Cointegration Test Results

Maximum Eigen value Test					Trace Test			
Null Hypothesis	Alternative Hypothesis	Eigen value	Critical value		Alternative Hypothesis	LR Ratio	Critical value	
			95%	99%			95%	99%
$r = 1$	r=1	34.79*	24.52	42.36	$r \geq 1$	114.64**	77.31	84.58
$r \leq 1$	r=2	33.30	41.46	2.65	$r \geq 2$	114.64**	62.91	57.05
$r \leq 2$	r=3	24.04	35.54	34.34	$r \geq 3$	37.60	39.34	52.45
$r \leq 3$	r=4	13.08	8.96	26.65	$r \geq 4$	19.58	25.32	34.45
$r \leq 4$	r=5	3.50	2.25	4.26	$r \geq 5$	3.49	2.25	6.26

Notes: * *denotes significant at the 5% level, ** denotes significant at the 1% level*

Long-Run Model

We now present the results for the long run relationship.

PDIV = +0.4013 +0.5016 **IntRat.** + 0.028 **Infr** -0.0190 **Pub inv** +0.1226 **SavRat**

(3.346)**   (2.233)*   (3.769)**   (0.459)

As postulated by our modified version of the lifecycle hypothesis, The result for the real interest rate variable (**IntRat**) 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 (**IntRat**) is associated with a 0.5016 percentage point increase in the private investment rate. 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 saving rate is to achieve any measure of success.

The result for the real infrastructure (**Infra**) variable suggests that the more infrastructure is built and maintained, it has a statistically significant positive effect on investment behaviour in Nigeria. A one percent increase in **Infra** is associated with a 0.03 percentage point increase in the private investment rate. The implication is that government should find an effective mechanism for increasing the abysmally low infrastructure (which electricity was a proxy) in the country if the present crusade to increase the private investment rate is to achieve any measure of success.

Dynamic Error-Correction Model

We shall carry on investigating the dynamics of the investment process using Johansen, having identified the cointegrating vector. Table 5 reports the final parsimonious estimated equation together with a set of diagnostic statistics. The estimated investment function performs well by the relevant diagnostic tests. In terms of the Chow test for parameter stability conducted by splitting the total sample period into 1970-1989 and 1990-2012 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 -0.4415 denotes that 44 percent of any past deviation will be corrected in the current period. Thus, it will take more than two years for any disequilibrium to be corrected.

Furthermore, it is only the real interest variable that is statistically significant at the 1 percent level, indicating that in the short run, it is only interest in savings 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 interest rate. The coefficient estimate shows that a unit change in interest rate will bring about a 0.3 percent change in private investment. The other four explanatory variables (**PDIV**(-1), **Infr**, **Pub inv** and **Pol Sta**) 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 interest rate.

Table 5: Estimated Short Run Regression Results for the Private Investment Model

Dependent Variable: DPDIV.

Included observations: 42 after adjusting endpoints

Variable	Coefficient	T-Statistic	Probability
C	0.1337	2.5728	0.0063
DPDIV(-1)	0.0403	0.1952	0.8467
D **IntRat**	0.3047	3.5435	0.0015
DInfra(-1)	-0.0016	-1.3013	0.1214
D **Pub inv**	-0.0054	-1.2194	0.2337
D **Pol Sta**	0.8020	1.6533	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 - $\chi^2(1) = 0.33$ LM - $\chi^2(1) = 1.92$

Probability (JBN) = 0.85   Probability (LM) = 0.18

ARCH - $\chi^2(1) = 1.0$ CHOW - $\chi^2(1) = 1.6$

Probability (ARCH) = 0.32   Probability (CHOW) = 0.20

CONCLUSIONS AND RECOMMENDATIONS

This paper has investigated the determinants of private investment in Nigeria for the period between 1970 and 2012. The estimation results for the long run model point to infrastructure 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. Our results help to understand the effectiveness of policy variables in raising the investment rate in Nigeria in terms of their magnitude and direction.

Some major recommendations for policy can be drawn from the analysis. First, the focus of development policy in Nigeria should be to increase the productive base of the economy in order to promote real income growth and reduce unemployment. For this to be achieved, a diversification of the country's resource base is indispensable. This policy thrust should include a return to agriculture; the adoption of a comprehensive energy policy, with stable electricity as a critical factor; the establishment of a viable iron and steel industry; the promotion of small and medium scale enterprises, as well as a serious effort at improving information technology.

Second, a stronger policy framework is imperative in bringing about improved macroeconomic performance. The government should sustain its Vision 20: 2020 programme which is partly responsible for the increasing diversification emerging in the economy. The growing contribution of non-oil sectors in GDP growth in recent years is a positive development and should be encouraged. Agriculture has grown strongly in recent years and had the largest industry contribution to GDP from 2010 to 2012. With about 70 per cent of the working population employed in the agricultural sector, the strong agricultural contribution to GDP is a panacea for employment. More importantly, government's efforts to diversify the economy appear to be yielding results and should be sustained.

Third, Nigeria government should make the investment climate conducive for private domestic investors. The political environment should be friendly to the investors. Security of life and properties should be paramount in their policies statements to encourage private investors invest in Nigeria rather than looking out for other more stable countries to invest their funds.

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.

The dearth of information on the political stability as a variable posed a challenge to the researcher coupled with the nature of the environment that information on security issues are not easily released. The determinant of private investment is highly researched. So other

scholars interested in development and monetary Economics should re-investigate the causality and long-run effects of interest rate and exchange rate in using the "Bound Testing Approach".

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