Modeling the Determinants of Private Investment in Nigeria: 1980-2015

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Abstract

The main objective of the study is to develop a model to empirically investigate the determinants of private investment in Nigeria. The study which spans the period between 1980 and 2015 used the co integration technique and the Error Correction Mechanism. The ADF result shows that all the variable are I(1) and the Johansen co integration test result indicates a long run equilibrium relationship among the variables. The parsimonious ECM result indicates that the previous level of private investment, aggregate demand, savings, and electricity generation have positive and significant impact on current level of private investment. Interest rate has a negative and significant impact on private investment while inflation rate has an insignificant and negative impact on private investment. The result recommends improvement in aggregate demand and a reduction in interest rate to private investors amongst others.

Keywords: Private investment, FDI, aggregate demand, cointegration,

1. Introduction

Investment which is the outlay of money for future use (Osunoud, 2015) is crucial for the macroeconomic performance of Nigeria. Countries in the world have paid more attention to the expansion of private investment than public investment since private investment is less prone to corruption than public investment. Private investment is also more efficient than public investment (Servitor and Jay Aranan, 2001). The private sector is key to the boosting of manufacturing which is a key to any meaningful development since the private sector is key to increasing aggregate demand, the government of Nigeria has introduced various policy initiatives to boost the private sector. They include the introduction of the Structural Adjustment Programme (SAP) in 1986 and the National Economic Empowerment and Development Strategies (NEEDS) in 2004.

These efforts seem not to have produced the desired result due to a mixture of factors. Some of such factors are the low level of saving which has hindered the ability of commercial banks to lend to the private sector. Another facture that has hindered private investment in Nigeria has been the high lending rates charged by commercial banks coupled with high demand for collateral securities. This has reduced investment expenditure by the private sector which has reduced the level of economic growth in Nigeria. The declining level of private investment has limited the ability of the Nigerian productive system to exploit abandoned natural resources in Nigeria. This has increased the level of unemployment, deteriorated the exchange rate and caused persistent deficits in Nigeria's Balance of Payments coupled with high level of both domestic and external debts. This has also reduced the level of technological development (Muhdi, 2016). Commitment to structural diversification which is lacking in Nigeria is a key obstacle in generating the desired level of private investment (Sackey, 2007).

The paucity of private investment in Nigeria partly contributed to the inability of Nigeria to achieve the Millennium Development Goals (MDGs) and this will hinder the chances of attaining the sustainable Development Goals (SDGS). This could be evidence in the declining trend of private investment in Nigeria. For example, the share of private investment in Gross Domestic Product (GDP) fell from 14.6 percent in 1973 to 5.9 percent in 1980 and 2.0 percent in 1985.

In 1994, the share of private investment in GDP reduced to less than O.5 percent. The coming of a new civilian administration in 1999 saw a minimal improvement in private investment contributions to CDP to 13.0 percent in 1999 and 16.2 percent in 2002. However there has been a steady decline in the contribution of private investment to GDP since then. For example, it was 12.0 percent in 2005 (Ekpo, 2016). The overall objective is thus to develop a model to empirically investigate the determinants of private investment in Nigeria. Such determinants as inflation rate, electricity generation, exchange rate, etc will be considered. The second part of the paper is the theoretical underpinnings and empirical review which is closely followed by the third section which is on the econometric procedure while the fourth section is on the materials and methods. The fifth section is on the empirical results and discussions. The sixth section is the conclusion and recommendations.

2. Theoretical and Empirical Review

The study draws from the accelerator theory of investment which analyzed the connection between aggregate demand (output) and capital investment. The theory suggests that an increase or reduction in demand for consumer goods will lead to a greater increase or reduction in the machines needed to produce those commodities. Thus output is positively related to investment in capital goods. The theory stated that a change in the stock of capital (C_t- C_t– 1) that business sector desire is proportional to change in output (ΔQ_t) he need to produce. Q_t- Q_{t-}1 = BΔY_t. This is the fixed accelerator model. Clarke's view was later modified by Chenery who developed the flexible accelerator theory and noted that the reactions of investors to alteration in output may not be automatic but follows a partial adjustment process to eliminate the gap between actual and desired capital stock. He added that in the long run that change in the desired capital stock (Q_t) is also a function of the level of sales (T). He thus created a distinction between the short run accelerator (YB) and the long run acceleration (B). Ayeni (2014) investigated the macroeconomic determinants of private sector investment in Nigeria. He used the Autoregressive. Distributed Lag Model. The result shows that the determinations of private investment which include economic growth, real interest rate, real exchange rate, inflation and credit to the private sector has not contributed meaningfully to private investment in Nigeria.

Hazeam, Grassan and Samer (2013) analyzed the economic determinants of domestic investment in Nigeria. The study which covered 1980 to 2010 period adopted the cointegration technique. The result shows that the growth rate of GDP stimulated domestic investment in Jordan. Private investments in Nigeria and the manufacturing sector was the focus of the study by Kalu and James (2012). The Vector Error Correction model was used. The result revealed that manufacturing output significantly responded to the contemporaneous perturbation in the values of nominal exchange rate, lending rate and cooperate income tax. The trends and dynamics of the determinants of investment in Nigeria constitute the study by patience and Osaro (2010). The study covered the period between 1970 and 2008. The study adopted the cointegration technique. It was shown that previous values of the exchange rate had stronger effects on the level of domestic investment. Osmond (2015) studied the determinants of private investment in Nigeria between the 1970 and 2012 period. The study adopted the Error Correction Modeling. The result revealed that the rate of investment is positively correlated with both the growth rate of disposable income and real interest rate on banks.

The result also revealed that increased lending rate has slowed the pace of investment in Nigeria. Muhdin (2016) examined the determinants of private investment. The results revealed that national income, public investment and exchange rate are the critical variables affecting the performance of private investment. Interest rate, inflation rate and money supply are also important determinants of private investment. Ekpo (2016) evaluated the determinants of private investment in Nigeria. The study adopted the descriptive statistics. The study identified the determinants of private investment rate to include piscal deficit, public investment rate, poor provision of infrastructure and political and social stability. The role of governance on private investment in Nigeria forms the focus of the study by Kazeem (2013). The study adopted the Autoregressive Distributed Lag (ARDL) bound testing framework with data spanning the period between 1970 and 2010.

The result revealed that degree of openness, previous value of inflation rates and governance indicators are important determinants of private investment. Mgbemena, Nwogwugwu and Kah (2015) assessed the determinants of private investment in Nigeria's manufacturing sub-sector. The study which covered the 1975 to 2013 period used the Error Correction Mechanism. The findings show that the major determinants of manufacturing sub sector performance in Nigeria are interest rate, exchange rate and public sector investment. Atoyebi et al assessed the determinants of domestic private investment in Nigeria. The study which covered 1970 through 2010 used the cointegration test.

The result revealed that the growth in private investment was hindered by macroeconomic instability, and political situation in Nigeria. Erden and Hocokombe (2005). Assessed the impact of public investment on private investment. The study covered the period between 1980 and 1997. The study revealed that public investment crowd out private investment Lintel and Movrotas (2005) studied private investment heterogeneity. The study used a panel of 24 low income and middle income countries. The research covered the period between 1981 and 2000. The study showed that standard macroeconomic determinants of private investment were significant in explaining changes in private investment behavior. Chete and Akpokodje (1998) studied macroeconomic determinants of domestic private investment in Nigeria. .The result showed that private investment in Nigeria is influenced by public investment, inflation rate, real exchange rate and domestic credit to the private sector in addition to the private foreign capital inflow. Obaseki and Onwioduokit (1998) investigated public and private investment and economic growth in Nigeria. The findings indicate that private investment, public and imports are determinants of output growth in Nigeria.

3. Econometric Procedure

The design used for the study is the ex-post facto research design. This is because the research used historical data. Time series data and the cointegration technique togheher with the Error Correction Mechanism were used to analyze the data. The ADF unit root test was used to test whether the varoables are stationary or not.. The next stage involves an estimation of the overparameterize Error Correction Model(ECM). The parsimonious ECM was deduced from the overparameterize ECM by eliminating insignificant variables from the overparameterize ECM. The impact and patterns of shocks will be assessed using the variance decomposition and impulse response. Annual time series data covering the period between 1980 and 2015 were used. The research adopts 4 possible determinants of private investment in Nigeria. The modified accelerator theory was used for the study. The model thus has private investment as the dependent variables and savings, interest rate, inflation rate, aggregate demand and electricity generation as independent variables. The model is unique since apart from the conventional determinants. It also included electricity generation which has been ignored by other researchers. The model is thus specified linearly as:

$PINV = b_o + b_1 INF + b_2 INTR + b_3 RGDP + b_4 SAV + b_5 EG + u_t$

Where:

PINV = private investment
INF   = inflation rate
INTR = interest rate
RGDP = Aggregated demand proxieded by Real Gross Domestic Product
SAV   = Savings
EG   = Electricity generation
UT   = Error term

Aggregate demand was proxied by Real Gross Domestic Product and it is expected to have a positive impact on private investment. Electricity generation is also expected to have a positive impact on private investment because a stable power supply is necessary for improving the level of private investment in Nigeria. Lending rate is expected to have a negative impact on private investment since a high lending rate is expected to reduce the availability of funds to private investors. Inflation is expected to have an inverse relationship with private investment. The level of savings is expected to have a positive relationship with private investment because more savings means more funds for private investments.

4. Empirical Results and Discussion

The analysis commenced with the descriptive statistics. The result of the skewness which is greater than 0 in most of the cases indicates that most of the variables have values greater than 0 in most of the cases which indicates the series is skewed to the right. An indication that the series has a long right tail. The kurtosis which measures the degree of asymmetry of the series indicates that private investment and interest rate satisfy the conditions. The Jarque-bera normality test indicates that except for electricity generation all the other variables are normally distributed.

The Augmented Dickey Fuller (ADF) unit root yest which assessed the order of integration of the variables is shown in the table below:

Table1: summary of ADF unit root yest result

variables	Level Data	First difference	Order of integration
PINV	1.24	4.81*	I (I)
RCDP	2.24	6.24*	I (I)
SAV	0.82	3.98*	I (I)
INTR	1.42	4.22*	I (I)
EG	0.64	4.42*	I (I)
INF	0.24	2.74***	I (I)

NB: (1). * and *** indicates significance at the 1 percent and 10 percent level
    (2) I (1) means integrated after the first difference was taken.

The ADF result suggests that the variables are integrated of order 1. This indicates that they were stationary after the first difference was taken. The result shows further that except for inflation rate which was stationary at the 10 percent level, the others were stationary at the 1 percent level.

The result of the Johansen multivariate co integration test is shown in the table below:

Table 2: summary of Johansen co integration test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.711624	108.9617	94.15	103.18
At most 1	0.584602	67.92648	68.52	76.07
At most 2	0.450737	38.93536	47.21	54.46
At most 3	0.306667	19.16248	29.68	35.65
At most 4	0.188433	7.076401	15.41	20.04
At most 5	0.005632	0.186377	3.76	6.65

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None *	0.711624	41.03523	39.37	45.10
At most 1	0.584602	28.99112	33.46	38.77
At most 2	0.450737	19.77288	27.07	32.24
At most 3	0.306667	12.08608	20.97	25.52
At most 4	0.188433	6.890024	14.07	18.63
At most 5	0.005632	0.186377	3.76	6.65

The result of the Johansen test indicates one co integrating equation in both the trace statistic and the Max-Eigen statistic. This suggests a long run equilibrium relationship among private investment, aggregate demand, savings interest rate, and electricity generation and inflation rate. This allows the estimation of the over parameterize

ECM and parsimonious ECM. The overparametenize ECM is shown in the appendix. The parsimonious or preferred ECM was formulated by eliminating insignificant variables from the over parameterize ECM.

The criteria used in selecting the lag length are the Akaike information criterion (AIC), schwarz criterion (SC) and economic theory. The preferred ECM result is shown below:

Table 3: parsimonious ECM Result Dependent variables: LPINV

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPINV(-1)	0.794500	0.197815	4.016370	0.0003
LRGDP(-1)	0.804358	0.089032	9.034514	0.0000
LSAV(-1)	0.543836	0.059050	9.209750	0.0000
LINTR(-2)	0.047666	0.013673	3.486251	0.0031
LEG	0.653086	0.079786	8.185426	0.0000
INF(-1)	2.740856	2.321597	1.180591	0.2561
ECM(-1)	0.257759	0.047305	5.448906	0.0001
C	-15.12476	17.27860	-0.875347	0.3897

$R^2 = 0.74$, AIC = -4.14, SC = -4.54, DW = 2.09

The preferred ECM result indicates that 74% of the total variation in private investments has been explained by the aggregate demand represented by Real Gross Domestic Product, Savings, Interest rate, electricity generation and inflation rate taken together. This is a good fit since the unexplained variation is only 26%. The result indicates that aggrgate demand has a positive impact on the level of private investment in Nigeria. An increase in aggregate demand in the immediate past period by 1percent increased the level of private investment by 0.79 percent. The one period lagged value of total savings has a positive impact on private. An increase in the total savings by 1 percent increased private investment by 0.45 percent. The result shows that the two period lagged value of interest rate has a negative impact on private investment. The result indicates that an increase in interest rate lagged by two period by 1 percent reduce private investment by 0.05%. The result showed further that electricity generator has a positive impact on private investment. An increase in electricity generation by 1 percent increased private investment by 0.65%. The result shows further showed that the inflation rate has a negative impact on private investment. An increase in inflation rate by 1 unit reduced private investment by 2.74 units. The parsimonious ECM result further showed that the immediate past level of private investment, the immediate past level of aggregate demand, the immediate past level of savings, the two period lagged interest rate and the current level of electricity generator with the values of 4.02, 9.03, 9.21, - 3.41 and 8.19 with the probabilities of 0.0003, 4.40, 0.40, 0.2031 and 0.40 are statistically significant in explaining the changes in private investment. A indication that the immediate past value of private investment, immediate past level of aggregate demand, immediate past level of savings and the current level of electricity generations are determinants of private investments in Nigeria. The result indicates that inflation rate with a value of -2.74 and probability of 0.26 is not statistically significant in explaining changes in the level of private investment in Nigeria. This indicates that contrary to expectations, inflation rate is not a determinant of private investment in Nigeria. The statistical significance of the ECM indicates a satisfactory speed of adjustment. It indicates that about 26 percent of the errors are corrected in each period. The diagnostic checks result is shown below.

Table 4: Diagnostic Checks

Jarque-Bera	Breusch- Godfrey Serial Correlation LM Test
F statistic 0.51	F statistics 0.07
Probability 0.78	Probability 0.93
White heteroskedastcity text	
F statistics 0.56	
Probability 0.87	

The result of the Jarque- Bera normality test indicates that the residuals are normally distributed. The result of the Breusch Godfrey Serial Correlation LM test indicates that the residuals are not serially correlated. The white heteroskedasticty test shows characteristics of most time series variables which are homoskedastic. The result of the Cumulative Sum of Recursive Residual (CUSUM) and the Cumulative Sum of Squares of Recursive Residuals (CUSUMQ) are shown in the figures below;

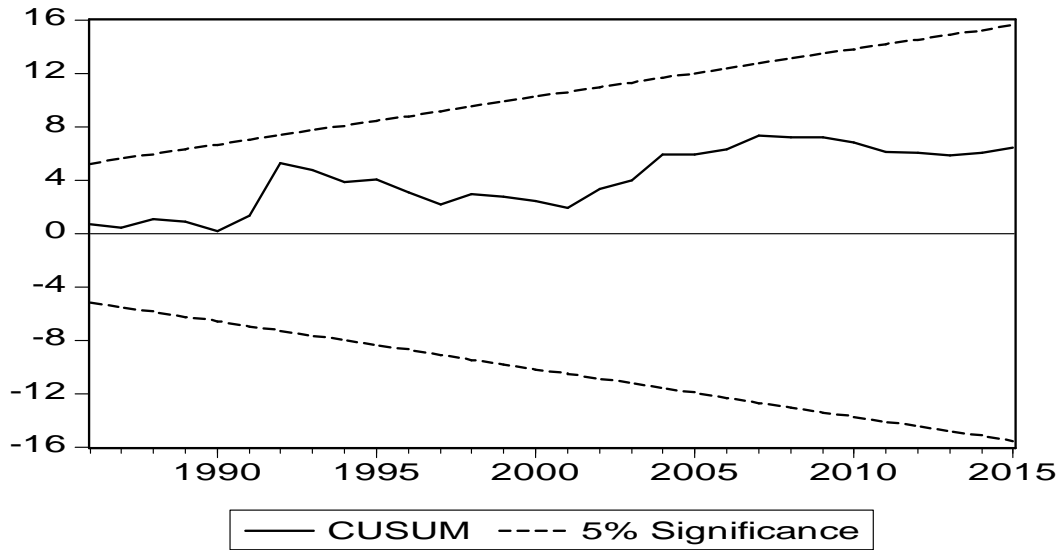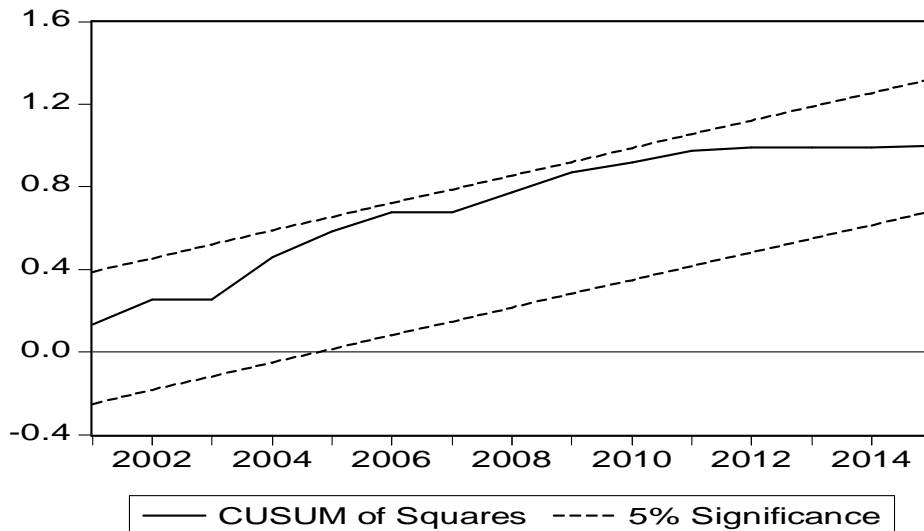**Figure 1:** CUSUM stability test.

Figure 2: CUSUM stability test.

The results of the CUSUM and CUSUMQ stability tests indicate that the residuals are stable. The results of the variance decomposition are shown below:

Table 5: Variance Decomposition of Lpinv

Period	S.E.	LPINV	LRGDP	LSAV	LINTR	LEG	INF
1	1.783875	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	2.290772	83.27168	2.710912	5.814490	3.870039	1.753942	2.578933
3	2.609243	79.11938	3.777131	4.948474	4.423724	5.522447	2.208840
4	2.918329	70.08495	6.299653	5.366538	3.624157	8.833988	5.790715
5	3.243361	68.76074	7.297391	4.654919	3.918123	8.615684	6.753147
6	3.515722	68.90442	7.524513	5.635198	4.119150	7.607720	6.208999
7	3.723256	69.19701	7.462148	6.668223	3.682160	7.410709	5.579751
8	3.894416	68.25759	7.729690	7.783092	3.392673	7.706224	5.130729
9	4.052033	67.34804	8.150797	7.775236	3.163432	8.357228	5.205262
10	4.252784	66.97431	8.355266	7.801600	3.155450	8.223320	5.490051

Shocks to private investment explained 100 percent of changes in itself in the first period and this reduced to 67 percent in the last period. Shocks in aggregate demand explained 3 percent of changes in private investment in the second period and this increased to 8 percent in the last period. The results showed further that shocks to savings explained 6 percent of changes in private investment in the second period and this increased to 8 percent in the last period. Shocks to interest rate explained 4 percent of changes in private investment in the second period and this reduced to 3 percent in the last period. Shocks to electricity generation explained 2 percent of changes in private investment in the second period and this increased to 8 percent in the last period. Shocks to inflation rate explained 3 percent of changes in private investment in the second period and this increased to 5 percent in the last period.

Table 6: Variance Decomposition of Lrgop

Period	S.E.	LPINV	LRGDP	LSAV	LINTR	LEG	INF
1	0.087030	1.049990	98.95001	0.000000	0.000000	0.000000	0.000000
2	0.122924	0.556129	85.65364	0.834943	8.563424	4.289062	0.102803
3	0.164568	1.957117	75.35336	2.207335	9.299402	5.580591	5.602197
4	0.188351	1.500343	75.23681	6.207848	7.105419	5.105812	4.843764
5	0.206023	1.509419	75.07720	7.891668	6.686698	4.751151	4.083862
6	0.226169	1.436006	74.19528	9.566141	5.559945	5.834939	3.407686
7	0.244684	1.550080	74.11345	10.78654	4.787277	5.845879	2.916772
8	0.263051	1.419516	73.18111	12.49130	4.324979	6.048138	2.534962
9	0.279467	1.698101	72.80515	13.08211	3.941827	6.182740	2.290077
10	0.295108	1.683229	72.77865	13.66493	3.583063	6.227071	2.063052

The result shows that shocks to aggregate demand explained 99 percent of changes to itself in the first period and this reduced to 73 percent in the last period. Shocks to private investment explained 1 percent of changes in aggregate demand in the first period and this increased to 2 percent in the last period. Shocks to savings explained 1 percent of changes in aggregate demand in the second period and this increased to 14 percent in the last period. Shocks to interest rate explained 9 percent of the changes in aggregate demand in the second period and this reduced to 4 percent in the last period. Socks to electricity generation explained 4 percent of changes in aggregate demand in the second period and this increased to 6 percent in the last period. Shocks to inflation rate explained 6 percent of changes in aggregate demand in the third period and it reduced to 2 percent in the last period.

=VARIANCE DECOMPOSITION OF LSAV

Period	S.E.	LPINV	LRGDP	LSAV	LINTR	LEG	INF
1	1.027848	19.52418	0.001767	80.47405	0.000000	0.000000	0.000000
2	1.119877	19.81259	0.772110	75.87190	0.246114	0.667081	2.630204
3	1.202830	18.99451	0.791359	76.55517	0.781210	0.593020	2.284730
4	1.307444	18.53951	0.726262	76.15153	1.298717	0.960576	2.323404
5	1.393288	21.42783	0.659590	73.86720	1.143690	0.849307	2.052389
6	1.474517	21.37989	0.593954	73.36603	1.577460	0.903301	2.179363
7	1.568393	22.25450	0.529518	72.25207	1.790829	0.847163	2.325919
8	1.631258	22.04770	0.514794	72.19580	1.974991	0.989504	2.277212
9	1.701443	22.73635	0.483809	71.64328	1.991495	1.022690	2.122375
10	1.767104	23.04063	0.476179	71.42781	1.976346	1.017621	2.061414

Shocks to savings explained 80 percent of changes in iself in the first period and this reduced to 23 percent in the last period. Shocks to aggregate demand explained 1 percent of changes in total savings in most of the study period. Shocks to interest rate explained 2 percent of changes in total savings in most of the study period. Shocks to inflation rate explained 2 percent of the total changes in savings in most of the study period.

Table 8: Variance Decomposition of Lintr

Period	S.E.	LPINV	LRGDP	LSAV	LINTR	LEG	INF
1	0.188816	18.26880	9.420701	0.420891	71.88961	0.000000	0.000000
2	0.254314	17.90781	5.335527	0.446405	71.50247	0.693017	4.114766
3	0.313894	27.41472	3.720889	6.554850	55.80546	2.089195	4.414891
4	0.362393	30.27312	2.803019	5.070227	54.70554	3.175681	3.972413
5	0.401900	34.73162	2.280071	5.134048	51.54857	3.054501	3.251184
6	0.432430	35.68667	1.974079	4.940893	50.63546	3.552145	3.210749
7	0.467183	36.84891	1.691445	4.505391	50.22422	3.899834	2.830199
8	0.492549	37.72990	1.524380	4.498036	49.57526	3.991024	2.681398
9	0.519562	38.58252	1.374188	4.485151	48.77876	4.165804	2.613580
10	0.545748	39.53878	1.245572	4.229280	48.36596	4.175824	2.444582

Shocks to interest rate explained 72 percent of changes in itself in the first period which reduced to 48 percent in the last period. Shocks to private investment explained 18 percent of the total changes in interest rate in the first period and it increased to 40 percent in the last period. Shocks to aggregate demand explained 9 percent of changes in interest rate in the first period which reduced to 1 percent in the last period. Shocks to savings explain 7 percent of changes in interest rate in the first period and it reduced to 4 percent in the last period. Shocks to electricity generation explained 1 percent of changes in interest rate in the second period which increased to 4 percent in the last period. Shocks to inflation rate explain 4 percent of changes in interest rate in the second period which reduced to 2 percent in the last period.

TABLE 9: VARIANCE DECOMPOSITION OF LEG

Period	S.E.	LPINV	LRGDP	LSAV	LINTR	LEG	INF
1	0.072724	12.61032	9.176797	30.50802	16.14146	31.56340	0.000000
2	0.121488	13.71355	7.951437	44.27224	15.09401	18.96775	0.001014
3	0.170376	10.63653	6.049650	52.57071	14.77990	15.87646	0.086750
4	0.211062	14.07082	5.484671	51.29248	14.63358	14.45876	0.059691
5	0.249458	13.65179	5.493386	51.37778	15.26793	14.06880	0.140310
6	0.282948	13.96026	5.348140	51.60766	15.13639	13.83750	0.110055
7	0.313157	13.79994	5.463083	51.56310	15.03715	14.04314	0.093587
8	0.340902	14.12962	5.495578	51.76385	14.66385	13.86541	0.081697
9	0.365839	14.19469	5.531795	51.88027	14.51446	13.80779	0.070996
10	0.389463	14.36918	5.520983	51.80188	14.50122	13.74279	0.063953

Shocks to electricity generation explained 32 percent of changes to itself in the first period and it reduced to 14 percent in the last period. Shocks to private investment explained 13 percent of changes in electricity generation in the first period which increased to 14 percent in the last period. Shocks to aggregate demand explained 9 percent of changes in in electricity generation in the first period which reduced to 6 percent in the last period. Shocks to savings explained 31 percent of changes in electricity generation in the first period which increased to 52 percent in the last period. Shocks to interest rate explained 16 percent of changes in electricity generation in the first period and this reduced to 15 percent in the last period. A shock to inflation rates explains below 1 percent of changes in electricity generation in most of the study period.

TABLE 10: Variance Decomposition of Inf

Period	S.E.	LPINV	LRGDP	LSAV	LINTR	LEG	INF
1	15.34405	24.04614	1.456561	1.550390	28.30613	0.794240	43.84654
2	22.23889	36.12584	3.024849	1.132206	24.69590	0.491525	34.52968
3	25.58553	41.63446	3.507188	1.813075	24.98212	0.506225	27.55693
4	27.53063	41.11436	3.749077	2.736082	25.20914	0.647287	26.54406
5	30.07792	38.94781	4.238777	3.225457	24.96570	0.974954	27.64730
6	33.12186	36.11737	4.540855	2.887067	27.00448	0.868242	28.58198
7	36.09394	35.58307	4.371532	2.851715	28.36654	0.731337	28.09581
8	38.17190	36.19642	4.360703	3.416600	28.52799	0.655398	26.84288
9	39.71883	36.27828	4.416023	3.730627	28.68183	0.621083	26.27215
10	41.48284	35.61942	4.484604	3.829130	28.83522	0.642970	26.58866

Shocks to inflation rate explain 44 percent of changes to itself in the first period and it reduced to 27 percent in the last period. Shocks to private investment explained 24 percent of changes in inflation rate in the first period which reduced to 36 percent in the last period. Shocks to aggregate demand explained 1 percent of changes in inflation rate in the first period and reduced to 4 percent in the last period. Shocks to savings explained 2 percent of changes in inflation rate in the first period which reduced to 4 percent in the last period. A shock to interest rate explains 28 percent of changes in inflation rate in the first period and it increased to 29 percent in the last period.

The result of the impulse response is shown in the figure below:

Figure 3: Impulse Response

Response to Cholesky One S.D. Innovations
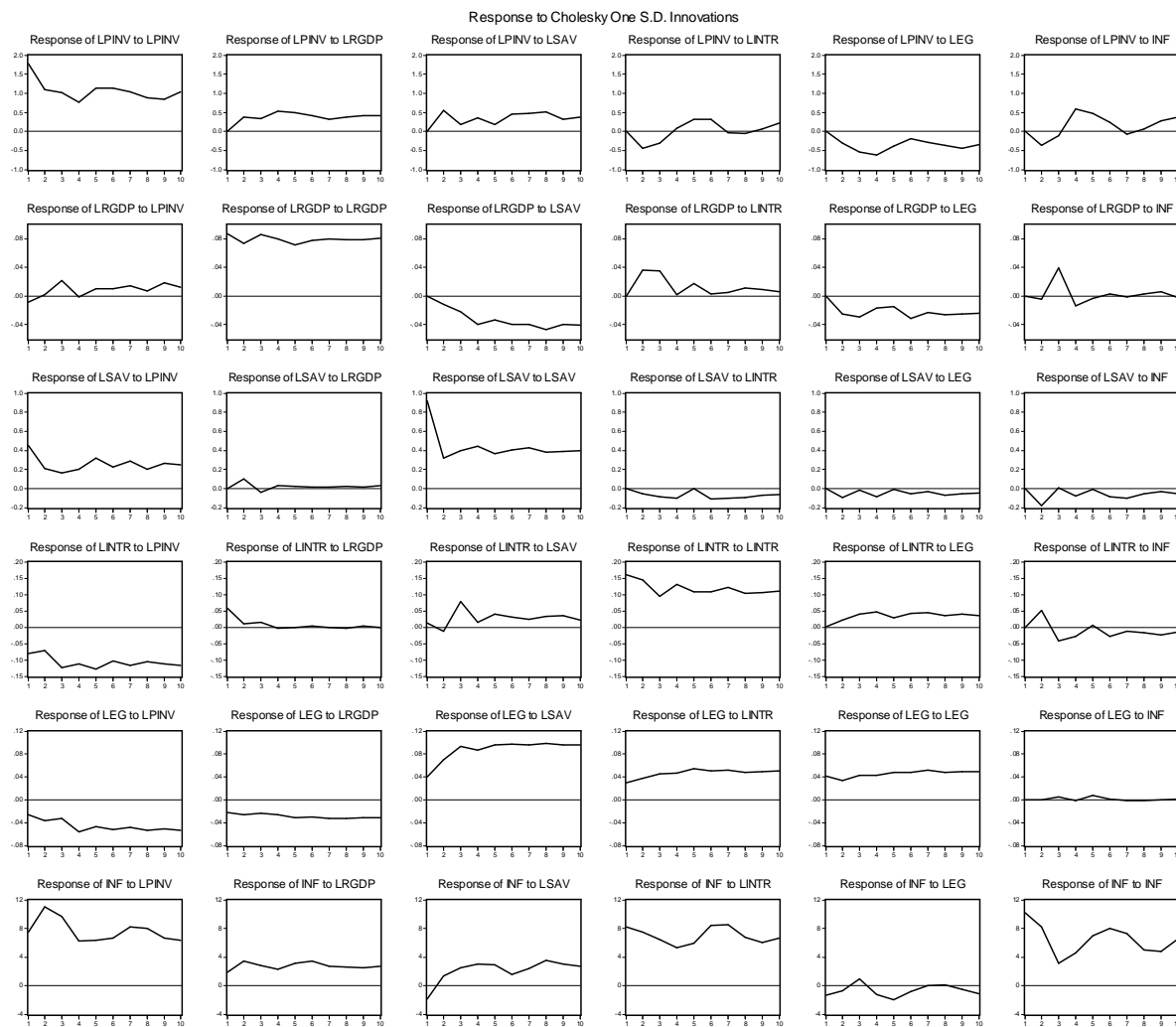
The results indicates that an unanticipated increase in expected private investment, aggregate demand, savings, interest rate, electricity generation, and inflation rate have positive impact on actual private investment, aggregate demand, savings, interest rate, electricity generation and inflation rate. The results show that unanticipated changes in expected aggregate demand have positive impact on actual private investment. An unanticipated increase in expected savings has a positive impact on actual private investment. An unanticipated increase in expected interest rate has positive impact on actual private investment. Unanticipated increase in expected electricity generation has a negative impact on actual private investment. Unanticipated increase in expected inflation rate has a negative impact on actual private investment.

5. *Conclusion and Recommendation*

This paper examines the macroeconomic factor that affects the behavior of private investment in Nigeria. Private investment has been seen as the most efficient when compared to investment in the public sector.

This is why government in most part of the globe thrive to create the desired environment that ensures efficiency in the private sector. Such efforts in Nigeria have not produced the desired results. Thus the need for this study. Time series data covering the period between 1980 and 2015 were used. The co integration technique was used. The result shows that the immediate past level of private investment is a determinant of the current level of private investment. The result indicates further that aggregate demand, total savings, interest rate and electricity generation ar important determinants of private investment in Nigeria. The inflation rate was found not to be major determinants of private investment in Nigeria.

The result also revealed that the high level of interest rate and inflation rate have hindered the activities of private investment in Nigeria. The result recommends a further improvement in aggregate demand in Nigeria for the products of the private sector. Also concessionary interest rate on loans to the private sector is seen as important in improving the expansion of the private sector. The result recommends further that inflation targeting policy should be adopted which will cut down the cost of production of the private investors. The government should improve the generation of electricity which is a basic infrastructure needed in the development of the private sector.

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Appendix 1: Over parameterized ECM Result

Dependent Variable: LPINV
Method: Least Squares
Date: 02/23/17   Time: 18:02
Sample(adjusted): 1982 2015
Included observations: 34 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPINV(-1)	0.181737	0.076316	2.381369	0.0221
LPINV(-2)	-0.238432	0.223639	-1.066148	0.3032
LRGDP	-0.468947	3.466608	-0.135275	0.8942
LRGDP(-1)	0.208332	0.058935	3.534919	0.0013
LRGDP(-2)	-0.740498	1.153723	-0.641833	0.5307
LSAV	0.522341	0.433665	1.204479	0.2471
LSAV(-1)	-0.454316	0.167069	-2.719327	0.0105
LSAV(-2)	0.046968	0.486675	0.096509	0.9244
LINTR	-3.662101	2.838643	-1.290089	0.2166
LINTR(-1)	0.453695	0.077109	5.883822	0.0000
LINTR(-2)	-0.032162	0.014401	-2.233269	0.0371
LEG	-1.141466	6.325785	-0.180447	0.8592
LEG(-1)	14.00940	12.99412	1.078134	0.2980
LEG(-2)	2.226852	5.161816	0.431409	0.6723
INF	0.064293	0.026203	2.453619	0.0268
INF(-1)	-0.396659	0.141286	-2.807485	0.0109
INF(-2)	0.025765	0.029969	0.859710	0.4035
ECM(-1)	-0.396659	0.141286	-2.807485	0.0109
C	-66.67512	57.57233	-1.158110	0.2649

R-squared	0.886329	Mean dependent var		8.982345
Adjusted R-squared	0.749923	S.D. dependent var		2.913395
S.E. of regression	1.456921	Akaike info criterion		3.889864
Sum squared resid	31.83927	Schwarz criterion		4.742830
Log likelihood	-47.12769	F-statistic		16.97752
Durbin-Watson stat	2.347658	Prob(F-statistic)		0.000000

Appendix2: Jarque-bera normality test result

Series: Residuals	
Sample 1980 2015	
Observations 36	
Mean	-1.14E-14
Median	-0.083573
Maximum	3.565113
Minimum	-3.437354
Std. Dev.	1.447229
Skewness	-0.059504
Kurtosis	3.569329
Jarque-Bera	0.507448
Probability	0.775906