FISCAL DEFICIT AND INVESTMENT IN NIGERIA

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Abstract

Investment has been identified as a major factor in the economic growth and development, and by extension, contributes to high rate of employment, productivity, capital formation, and improved technology and poverty reduction. This study generally investigates the effect of fiscal deficit on investment in Nigeria, and specifically, determines the effect of fiscal deficit on private domestic investment, foreign direct investment and the causal relationship between private domestic investment and public investment in Nigeria for a period of 1980-2015. The study adopts neoclassical theory of investment of Dale Jorgenson's approach, using macroeconomic data. It employs Dickey Fuller Generalized Least Square (DFGLS) and Autoregressive Distributed Lag Bounds testing approach of cointegration as estimation techniques. The results obtain indicate that fiscal deficit has a negative effect on private domestic investment in the short-run and a positive effect on foreign direct investment in the long run. Public investment and private domestic investment are autonomous in Nigeria. Following the findings, the study recommends that more emphasis of governments' expenditure should be on infrastructures that help on capital formation which will inturn increase private domestic investment, instead of reccurent expenditures that have no effect on private domestic investment.

Keywords: Fiscal Deficit, Investment, Nigeria.

JEL Classification: E22, E62, F21, H3, H54, H62.

Introduction

The trend in aggregate investment in Nigeria has been erratic since Nigeria gained her independence in 1960. Comparing both slow and fast-growing economies, Nigeria's investment-GDP ratio lags behind the required minimum level of an average of about 20 percent of GDP annually that propelled the growth rate of those other economies (World Bank, 2012). For instance, investment-GDP ratio has never gone below 20 percent in some Asian countries that are experiencing growth at present. Nigeria was only able to meet the minimum investment-GDP ratio of 20 percent for just thirteen (13) years between the period 1980-2017 (IMF, 2015). Whereas Malaysia and Singapore were below the required minimum for just a year(2009 – 19 percent , and 2003 – 17.6 percent respectively) while China, Korea and Thailand have never gone below the required minimum (IMF, 2015). This could perhaps explains the high growth rate of the Asian Tigers.

Many factors have been advanced for low investment in Nigeria which include low level of investible funds, excessive government capital expenditure that are in most cases not channeled to adequate infrastructural development and productive sector of the economy, credit to government which is believed to have a potential crowding out effect on credit to private sector, complex and inconsistence regulatory frameworks and policies, high inflation rate, high lending rate, and high rate of foreign exchange depreciation that affects importation of manufacturing inputs and political instability (Uwakaeme, 2017).

The focus of this study therefore is on the effect of fiscal deficit on investment because in less developed countries including Nigeria, fiscal deficits have been blamed for much of the economic crises that beset them since the 1980: over indebtedness and debt crises, high inflation rate, poor investment performance and sluggish growth (Easterly & Schmidt-Hebbel, 1993). Regrettably, Nigeria's fiscal plans, despite several years of bountiful oil revenue, were

predicated on increasing level of projected deficits since the colonial era, into independence till present day (Oluwabukola & Eniola, 2013).

As of 1980, the federal nominal fiscal deficit stood at ₦1.98 billion equivalents to 3.98 percent of GDP. The fiscal deficit-GDP was 8.2 percent in 1981 but reduced by 50 percent to give 6.3 percent in 1983. In 1993, it rose to 15.75 percent. However, in 1995 and 1996 the nation recorded budget surplus to the nominal value of ₦1 billion and ₦32.05 billion respectively, but in 1997 fiscal deficit resurfaced, and went as high as 8.9 percent of GDP and since then, the ratio started declining and it got as low as 0.2 percent in 2008. The fiscal deficit-GDP ratio picked up again in 2009 which recorded 3.3 percent and 2015 that recorded 2.2percent of GDP (BOF, 2016).

The consequences of fiscal deficit depend on how it is financed. Fischer and Easterly (1990) identify four ways of financing fiscal deficit: printing money (seigniorage) which leads to inflation; domestic borrowing which leads to a credit squeeze – through higher interest rates or, when interest rates are fixed, through credit allocation and ever more stringent financial repression – and the crowding out of private investment and consumption; external borrowing which leads to a current account deficit and appreciation of the real exchange rate or an external debt crisis (if debt is too high) (Easterly & Schmidt-Hebbel, 1993); and the use of foreign reserve which has a clear limit – the private sectors expectation that the limit is about to be reached can provoke capital flight and a Balance of Payment crisis, since exhausion of reserves will be associated with currency devaluation (Fischer & Easterly, 1990).

In the light the of above discussion, this study identifies three investments: public investment, private domestic investment and foreign direct investment. The broad objective of this study is to determine the effect of fiscal deficit on investment in Nigeria. Specifically, the study seeks to:

i. Determine the effect of fiscal deficit on private domestic investment and Foreign Direct Investment in Nigeria.
ii. Find out the nature of relationship between public investment and private domestic investment in Nigeria.

Although various studies exist on effect of fiscal deficit, either by testing for Neoclassical proposition or Keynesian proposition or Ricardian equivalent hypothesis. Majority of these studies use one of the investment components (Asogwa & Okeke, 2013; Ezeabasili & Nwakoby, 2013; Oluwabukola & Eniola, 2013; Ejuvbekpokpo, Sallahuddin & Clark, 2015). Whereas, this present study uses three types of investment (private investment, public investment and foreign direct investment) seperately to ascertain the effect of fiscal deficits on each component of the investment. Furthermore, the methodologies used in previous studies are not robust enough to interrogate research data. This neccesitates the need for the study.

This study is organised into five sections. The next section discusses the literature review. Section 3 analyses the methodology of the study. Section 4 reports the findings of the paper while section 5 concludes the paper.

Review of Relevant Literature

Fiscal Deficit – Private Investment

Oluwabukola and Eniola (2013) investigated the impact fiscal deficit on the Nigeria economy, using time series data spanning from 1981-2010. The Ordinary Least Square method result showed that fiscal deficit has made a significant contribution to economic growth of the country and concluded that higher government spending does not hurt consumption but instead raises private investment. Ejuvbekpokpo, Sallahuddin and Clark (2015) examined the impact of fiscal policy on investment expenditure in Nigeria for the period of 1970-2010. The study revealed that

an increase in government spending or the implementation of a deficit budget will lead to an increase in investment expenditure.

Ezeabasili and Nwakoby (2013) studied the controversy about the possible crowding effect of government expenditure in general and particularly deficit on private sector investment in Nigeria using multiple linear regression analysis with time series data from 1970-2006. The results indicated that fiscal deficit had a depressive effect on private investment in the country. Asogwa and Okeke (2013) critically investigated the crowding out effect of budget deficits on private investments in Nigeria's economy. The authors adopted an analytical framework that employs the Ordinary Least Square and Granger Causality test. The analysis showed that the budget deficits crowd out private investments in Nigeria. Following the findings, the authors recommended that financing budget deficits should be done through money creation because is it better than through borrowing. Huntley (2014) examined the long-run effects of federal budget deficit on private domestic investment using comparative analysis with time series data. It was found that for each dollar's increase in the Federal budget deficit, the effect on investment ranges from a decrease of 15 cents to a decrease of 50 cents, with a central estimate of a decrease of 33 cent.

Fiscal Deficit – Foreign Direct Investment (FDI)

Gondor and Nistor (2012) examined conditions under which Romania will win in the competition for FDI with other (asymmetric) country between 2007 and 2011. The study found out that a high corporate tax will stimulate the FDI flows if the revenue is used to provide public goods that improve the environment in which the investors operate. Schoeman, Robinson and de WET (2000) investigted the impact of fiscal policy on FDI in South Africa. Using multiple linear regression analysis with time series data from 1970 - 1998. Engel and Yoo three step approach revealed a definite linkage between FDI flows and variables such as the deficit/GDP ratios and the tax burden on foreign investors. Hence, increase in both the tax burden and the deficit/GDP ratios have negative impact on FDI.

Suchismita and Sudipta (2011) examined the effect of government balances relative to other determinants on FDI. Using a step wise panel regression analysis with data from 15 European countries and Indian from 1996 to 2008, fiscal health by itself is found to be a very significant determinant of FDI inflows vis-à-vis certain other growth and developmental policy indicators, thus underlining the significance of pruning government deficits for sustainable FDI. Magdalena and Elena (2014) used linear regression to examine the impact of the fiscal and monetrary policies on FDIs in Romania, using monthly data series between 2000 and 2010. The empirical results showed that monetary factors such as higher interest rates and higher inflation attract FDIs while fiscal factors such as government expenditure played a less important role in the short run, but were relevant in the long-term.

Public Investment – Private Domestic Investment

Brian, Oscar, Enowbi and Ngonidzashe (2010) focused on the relationship between private and public investment in Zimbabwe utilising yearly time series data for the period 1970 to 2007. Adopting Vector Error Correlation, the results found the relationship between private and public investment to be insignificant and the direction of causality undirectional. The results support the notion that private investment precedes public investment.Magableh and Ajlouni (2016) studied the determinants of private investment in Jordan for the period 1976 - 2012. The Autoregressive Distributed Lag approach to cointegration indicates that private investment is negatively related to real public investment. Hence government capital expenditures have insignificant role in boosting private sector investment initiatives.

Giri and Mohapatra (2016) examined the role of various components of public expenditure on economic growth in India for the period 1980 to 2013. The Autoregressive Distributed Lag approach to cointegration showed that productive public investment increases productivity of private investment. The result supported the public capital hypothesis which states that public and private investments complement each other in the Indian economy. Coutinho and Gallo (1996) assessed whether public investment acted as a catalyst or competed for scarce resources. The estimation of the private investment equation on a panel of 33 countries between the period of 1970-1988 showed evidence of a crowding out of private investment from public investment. Countries with larger real flows of credit, low real interest rates and small fiscal deficits have higher levels of private investment.

It can be concluded from the empirical studies reviewed that the overall results with respect to the effect of fiscal deficit on investment are ambiguous. Another important argument emerging from the review is that the exact impact of deficit on investment is difficult to measure and that for any meaningful inference of policy relevance must be essentially a country specific study.

Research Method

Theoretical Framework

Neoclassical theory of investment is employed as a framework for this study. The modern approach to investment is based on Dale Jorgenson's preporsition. Eklund (2013) states that the starting point for Jorgenson's neoclassical investment theory is the optimization problem of a firm which is based on the argument that profit is maximised in each period leading to an optimal capital stock. Assuming that the production can be written as a conventional Cobb-Douglas function:

$Y(t) = f[K(t),L(t)] = AK^{\alpha} L^{1-\alpha}$ (1)

Where Y(t) is firm output, K is capital and L denotes labour, all in period t. The profit function of a representative firm can then be expressed as follows:

$\Pi(t) = p(t)Y(t) - s(t)I(t) - w(t)L(t)$ (2)

Π(t) denotes profit, p(t) is the price of output, s(t) is the price of capital, and w(t) is the wage. Assuming profit maximization, the current value of a firm, V(0), can be written as:

$V(0) = \max E\varphi_o \int_o^{\infty} \pi(t)e^{-rt}dt = E\varphi_o \int_o^{\infty} [p(t)Y(t) - s(t)I(t) - w(t)L(t)]e^{-rt}dt$ (3)

$subject\ to\ \frac{dK}{dt} = I(t) - \delta K(t) = \acute{K}(t)$ and K(0) is given

The term E is an expectations operator conditional on the information set, φ, available for the firm in each period. The maximization process yields the following equation for optimal capital stock:

$K^* = \frac{p\alpha Y}{c}$ 、 (4)

Where it is now easy to see that K^* depends on output, price of output and the user cost of capital, c. Thus, investment becomes the change in capital between two periods:

$I = \frac{p\alpha Y}{c} - K^*(t - \tau)$ (5)

Model Specification

Transforming equation (5) to account for time series data characteristics, it gives a relation between desired optimal capital stock (K^*), price of output (P), output (Y) and user cost of capital (C).

$K^*_t = \Phi P_t Y_t C_t^{-\sigma}$ (6)

Where φ and σ represent the distribution parameter and the constant elasticity of substitution between capital stock and labour respectively. An investment function generally entails gross investment being split into net investment and the replacement components of worn out capital.

This study is concerned with the net investment component and as thus, the replacement component is ignored. The net investment component (I_t^n) is equal to change in desired capital stock:

$$I_t = \Delta K_t^* \quad (7)$$

Substituting (6) into (7), the investment model for this study is derived as follows:

$$I_t = \Delta(\Phi P_t Y_t C_t^{-\sigma}) \quad (8)$$

Assuming a unitary elesticity of substitution between capital and labour, and adding the error term, it gives the basic model of investment for this study

$$I_t = \varphi_1 \Delta Y_t + \varphi_2 \Delta P_t - \varphi_3 \Delta C_t \quad (9)$$

Equation (9) is augmented with fiscal policy and financial variables to evaluate their effects on investment and determine whether there is crowding-in or crowding-out. The model to be estimated is:

$$I_t = \varphi_1 \Delta Y_t + \varphi_2 \Delta P_t + \varphi_3 \Delta C_t + \sum_k \partial_k FP_{tk} + \sum_v \Omega_v FIN_{tv} + \mu_t \quad (10)$$

The econometric model used for estimation and for achieving objectives one and three of this study is specified thus:

$$PDI_t = \alpha + \sum_j \beta_j X_{tj} + \sum_k \partial_k FP_{tk} + \sum_v \Omega_v FIN_{tv} + \mu_t \quad (11)$$

PDI_t is private domestic investment (proxied with gross fixed capital formation) scaled by GDP, X_{tj} is a set of J conditioning variables which are gross domestic product per capita growth rates(GDPPC) and foreign direct investment (FDI), FP_{tk} is a set of K fiscal and monetary policy variables which are domestic credit to private sector (DCP), fiscal deficit (FD) and public investment (PUI), FIN_{tv} is a set of financial variables which are inflation rate (INF), interest rate (INT) and log of exchange rate (LEXR), and μ_t is the error term. Thus equation (11) is further stated as:

$$PDI_t = \alpha + \beta_1 GDPPC_t + \beta_2 FDI_t + \partial_1 DCP_t + \partial_2 FD_t + \partial_3 PUI_t + \Omega_1 INF_t + \Omega_2 INT_t + \Omega_3 LEXR_t + \mu_t \quad (12)$$

To achieve the research objective two, the following empirical model for FDI is specified.

$$FDI_t = \alpha + \sum_j \beta_j X_{tj} + \sum_k \partial_k FP_{tk} + \sum_v \Omega_v FIN_{tv} + \mu_t \quad (13)$$

FDI_t is foreign direct investment scaled by GDP, X_{tj} is a set of J conditioning variables which are GDP per capita growth rates(GDPPC), private domestic investmnet (PDI) and natural resources (TNR), FP_{tk} is a set of K fiscal and monetary policy variables which are domestic credit to private sector (DCP), fiscal deficit (FD), public investment (PUI) and external reserve (TRV), FIN_{tv} is a set of financial variables which are inflation rate (INF) and interest rate (INT), and μ_t is the error term. Thus equation (13) is further stated as:

$$FDI_t = \alpha + \beta_1 GDPPC_t + \beta_2 PDI_t + \beta_3 TNR_t + \partial_1 DCP_t + \partial_2 FD_t + \partial_3 PUI_t + \partial_4 TRV_t + \Omega_1 INF_t + \Omega_2 INT_t + \mu_t \quad (14)$$

Based on Dale Jorgenson's theory of investment, the a-priori expectations of the model are given as follows: $\beta_1>0$, $\partial_1>0$, $\partial_4>0$, $\Omega_1>0$, $\Omega_2<0$, $\Omega_3<0$. β_2 is indeterminate depending on whether FDI crowds out private domestic investment. If FDI crowds out private domestic investment, β_2 will be negative, or otherwise. ∂_2 is also indeterminate, if fiscal deficit crowds in private domestic investment, it will have positive, or otherwise negative. Into the bargain, ∂_3 is also indeterminate,

if accretions of public investment complement private domestic investment, it will be positive, or otherwise.

The Data Sources

Data required for this study are private domestic investment, GDP per capita growth rate, domestic credit to private sector, fiscal deficit, public investment, foreign direct investment, external reserve, inflation rate, interest rate, exchange rate and total natural resources. Data on these variables are annual time series data from 1980 to 2015.

Table 1:Data Souces and Measurment of Vaiables Used

Variable	Description	Measurement	Unit of Measurement	Source
PDI	Private domestic investment	Gross fixed capital formation scaled by GDP	Percentage of GDP	World Development, 2017 Edition
GDPPC	Gross Domestic Product Per Capita	GDP divided by mid year population.GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the values of the products	Annual growth rate	World Development, 2017 Edition
FDI	Foreign direct investment	Ratio of the sum of equity capital, reinvestment of earnings, other long- and short-term capital to the GDP	Percentage of GDP	World Development, 2017 Edition
TNR	Total natural resources	Ratio of the sum of oil rents, natural gas rents, coal rents, mineral rents and forest rents to GDP	Percentage of GDP	World Development, 2017 Edition
DCP	Domestic credit to private sector	Ratio of credit by financial institutions to the private sector and public enterprises to the GDP	Pecentage of GDP	World Development, 2017 Edition
FD	Fiscal deficit	Ratio of total government revenue minus total government expenditure to GDP	Percentage of GDP	Budget office of the federation, 2017 Edition
PUI	Public investment	Ratio of federal government capital expenditure to the GDP	Percentage of GDP	Federal Ministry of Finance, office of the Accountant General of the Federation
INF	Inflation rate	Annual percentage change in the cost to the average consumer of acquiring a basket of goods and services	Logarithm of consumer price index	World Development, 2017 Edition
INT	Money market interest rate	Monetary policy rate	Percentage	CBN Statistical Bullentin, 2015 Edition
LEXR	Log of Exchange rate	The price at which naira is exchanged to a dollar	LUC per US$ (logarithm form)	CBN Statistical Bullentin, 2015 Edition
TRV	Total reserve	Ratio of monetary gold, special drawing rights, reserves of IMF, and holdings of foreign exchange to the GDP	Percentage of GDP	World Development, 2017 Edition

Source: Computed by the Researcher

Estimation Techniques

In estimating the model, stationarity of the data was examined by using the Dickey Fuller Generalized Least Square (DFGLS) test and Ng-Perron test. These standard tests solve the problems of poor size and power properties of Augmented Dickey-Fuller (ADF) and Phillip Perron (PP) tests (which make them unreliable for small sample data set). These tests (ADF and PP) seem to over reject the null hypothesis when it is true and accept it when it is false (Awan, Munir, Hussain, & Shek, 2010).

To examine the long-run as well as the short-run relationship between fiscal deficit, private domestic and public investments and foreign direct investment, bounds testing approach to Co-integration were employed within the framework of Autoregressive Distributed Lag model, which can be applied when there is mixed order of integration of not more than I(1). After the establishment of long run relationship among the variables, Error Correction Mechanism was used to analyse the short-run dynamics of the model. Pairwise Granger Causality Test was carried out to determine the relationship between private domestic investment and public investment. The evaluation methods adopted in this study are Akaike Information Criteria (AIC) and Schwartz Information Criteria (SIC). The AIC and SIC take into account how well the model fit the observed series and the number of parameters to be used. The minimum AIC and SIC criterion are hopefully closer to the best possible choice, by assuming to describe the adequacy of the model (See appendix). Also, the diagnostic tests which include normality test, Breusch-Dodfrey LM test, heteroskedasticity test and stability test (Ramsey RESET test) by assuming to describe the adequacy of the model. For the level of significance, 5 percent was adopted for all estimations with probability values. The test is significant if p-value is less than 5 percent, and insignificance if otherwise.

Results and Discussion of Results

Results of Unit Root Test of Fiscal Deficit and Investment in Nigeria

The results of Dickey Fuller Generalized Least Square and Ng-Perron Unit root tests presented in Table 2a and 2b respectively. The results revealed that domestic credit private sector, fiscal deficit, foreign direct investment, and gross domestic product per capita, interest rate, public investment and total natural resources are stationary at levels while private domestic investment, inflation, exchange rate and total reserve are stationary at first difference. Hence, the variables are integrated of order 0 and 1. The implication of this is that the variables are independent of time that is they are not varied with time.

Table 2a: Results of Unit Root Test of Fiscal Deficit and Investment in Nigeria

Dickey Fuller Generalized Least Square (DFGLS)									
variables	Levels				First Difference				
	DFGLS	MacKinnon critical values			DFGLS	MacKinnon critical values			Order
		1%	5%	10%		1%	5%	10%	of Int.
PDI	-1.397	-2.635	-1.951	-1.611	-2.897*	-2.642	-1.952	-1.610	I(1)
DCP	-2.733*	-2.633	-1.951	-1.611					I(0)
FD	-3.046*	-2.633	-1.951	-1.611					I(0)
FDI	-2.744*	-2.633	-1.951	-1.611					I(0)
GDPPC	-4.577*	-2.633	-1.951	-1.611					I(0)
INF	-0.260	-2.639	-1.951	-1.611	-2.805*	-2.635	-1.951	-1.611	I(1)
INT	-2.37**	-2.635	-1.951	-1.611					I(0)
LEXR	0.012	-2.633	-1.951	-1.611	-5.095*	-2.635	-1.951	-1.611	I(1)
PUI	-2.883*	-2.637	-1.951	-1.611					I(0)
TNR	-1.9***	-2.635	-1.951	-1.611					I(0)
TRV	-1.468	-2.633	-1.951	-1.611	-4.583*	-2.635	-1.951	-1.611	I(1)

Source: Computed by the Researcher

Table 2b: Results of Unit Root Test of Fiscal Deficit and Investment in Nigeria

Ng-Perron:					
Asymptotic Critical Values:					
MZ_a: 1% (-13.8), 5% (-8.1), 10% (-5.7)					
MZ_t: 1% (-2.58), 5% (1.98), 10% (-1.62)					
Variables	Levels		First Difference		Order of integration
	MZ_a	MZ_t	MZ_a	MZ_t	
PDI	-1.18	-0.72	-12.68**[1]	-2.51**[1]	I(1)
DCP	-10.27**	-2.27**			I(0)
FD	-11.90**	-2.42**			I(0)
FDI	-9.75**	-2.21**			I(0)
GDPPC	-16.52*	-2.87*			I(0)
INF	-2.08	-0.79	-10.68**	-2.29**	I(1)
INT	-7.57***	-1.95***			I(0)
LEXR	0.66	0.74	-16.76*	-2.89*	I(1)
PUI	-11.8**	-2.22**			I(0)
TNR	-7.49***	-1.69***			I(0)
TRV	-3.79	-1.37	-16.17*	-2.82*	I(1)

, **, *, implies rejection of the null hypothesis of unit root at 1%, 5% and 10% respectively based on the MacKinnon critical values.* [1] *at maximum lag zero*

Source: Computed by the Researcher

Private Domestic Investment Model

Table 3 presents the results of co-integration between fiscal deficit and private domestic investment in Nigeria. The value of the F-statistics is greater than the upper boundary at all significant levels. This shows that there is co-integration, that is, there is the presence of long run relationship among the variables. This implies that all the variables used in this model are converged in the long run.

Table 3: Results of the Bound Test for Co-integration between Fiscal Deficit and Private Domestic Investment in Nigeria (Selected model: ARDL (1,0,2,0,1,2,0,1,1))

Test Statistics	Value	K
F – statistics	4.922643	8
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	1.95	3.06
5%	2.22	3.39
1%	2.79	4.1

Source: Computed by the Researcher

The results of short run parameters and the speed of adjustment in Table 4 shows that fiscal deficit, either in previous or current year has a negative and highly significant effect on private domestic investment. The Error Correction Mechanism (i.e. speed of adjustment) is negative as expected and stands at a high rate of 44 percent. The implication of this is that adjustment following a shock towards long run equilibrium takes around 14 months on average (the analysis of the speed of adjustment is $(\frac{1}{/ecm/} - 1)$. The economic implication of this is that fiscal deficit has a crowding out effect on private domestic investment.

Table 4: Results of Short- run Parameters and the Speed of Adjustment of Fiscal Deficit on Private Domestic Investment in Nigeria (Selected model: ARDL (1,0,2,0,1,2,0,1,1))

Cointegrating form				
Variable	Coefficient	Std. Error	t-statistics	Prob.
D(DCP)	0.035	0.074	0.477	0.639
D(FD)	-0.584	0.146	-4.006	0.001
D(FD(-1))	-0.517	0.170	-3.048	0.008
D(FDI)	-0.750	0.344	-2.180	0.045
D(GDPPC)	-0.076	0.055	-1.392	0.183
D(INF)	-0.253	4.705	-0.054	0.958
D(INF)	14.518	4.206	3.452	0.003
D(INT)	-0.294	0.149	-1.968	0.067
D(LEXR)	-0.860	1.639	-0.525	0.607
D(PUI)	-0.035	0.172	-0.206	0.840
CointEq(-1)	-0.436	0.102	-4.296	0.000
Cointeq=PDI - (0.0805*DCP – 0.2142*FD – 1.7207*FDI – 0.3790*GDPPC – 48470*INF – 0.6738*INT + 5.8866*LEXR – 0.7857*PUI + 15.6059)				

Source: Computed by the Researcher

On the other hand, fiscal deficit has a negative but insignificant effect on private domestic investment in the long-run as the results indicates in Table 5. The implication of this is that fiscal deficit crows out private domestic investment in the lung-run but its effect is insignificant.

Table 5: Results of Long-run Parameter Estimates of Fiscal Deficit on Private Domestic Investment in Nigeria. (Selected model: ARDL (1,0,2,0,1,2,0,1,1))

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DCP	0.080	0.166	0.485	0.634
FD	-0.214	0.644	-0.331	0.744
FDI	-1.721	0.717	-2.401	0.029
GDPPC	-0.379	0.194	-1.950	0.069
INF	-4.847	4.162	-1.165	0.261
INT	-0.674	0.377	-1.788	0.094
LEXR	5.887	4.180	1.408	0.178
PUI	-0.786	0.503	-1.561	0.138
C	15.606	5.681	2.747	0.014

Source: Computed by the Researcher

The results of the short run and long run of the ARDL on private domestic investment (PDI) model in Tables 4 and 5 revealed that fiscal deficit (FD) has a negative effect on PDI in the short and long run, but the effect seems to be insignificant in the long run. 1 percent increase in FD is expected to reduce PDI by 0.58 percent in the short run. This result is akin to the earlier studies, such as Asogwa and Okeke (2013), Ezeabasili and Nwakoby (2013), Huntley (2014), and Magableh and Ajlouni (2016). While it contradicts the ealier findings of Oluwabukola and Eniola (2013) and Ejuvbekpokpo, Sallahuddin and Clark (2015). As policy implications, this finding implies that for fiscal deficit to promote private domestic investment in Nigeria there is need among others for proper design and implementation of fiscal discipline. For instance, government should ensure that unjustifiable frivolous expenditure proposals do not find their way into the overall budget proposals of the government.

The result in Table 6 shows the presence of homoscedasticity in the model as probability Chi-Square value of 86% is greater than 5% significant level. The result of diagnostic test in Table 6 below shows that the p-value of 76% is greater than 5%, hence the error is normally distributed. On stability Test, the Table shows that the probability value of about 69% is greater than 0.5, Table 6 shows that the coefficients estimated are stable over time.

Table 6: Diagnostic Test for Fiscal Deficit on Private Domestic Investment in Nigeria.

Adjusted R-Sq	0.908
F-statistic	20.778(PV=0.0000)
Normality Test(Jarque-Bera)	0.544(PV =0.7618)
Heteroskedasticity (Breusch-Pagan-Godfrey)	10.064 (PV=0.863)
Stability Test(Ramsey RESET)	0.40(PV=0.695)

Source: Computed by the Researcher

Foreign Direct Investment Model

Table 7 present the results of co-integration between fiscal deficit and foreign direct investment in Nigeria. As presented in Table 7, the value of the F-statistics is greater than the upper boundary at all significant levels. This shows that there is co-integration, that is, there is the presence of long-run relationship between fiscal deficit and foreign direct investment. This implies that all the variables used in this study are relevant to the model.

Table 7: Results of the Bound Test for Co-integration between Fiscal Deficit and Foreign Direct Investment in Nigeria (Selected model: ARDL (3,2,2,2,2,2,1,2,2,2))

Test Statistics	Value	K
F – statistics	23.272	9
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10percent	1.88	2.99
5percent	2.14	3.3
1percent	2.65	3.97

Source: Computed by the Researcher

In the short run, previous values of foreign direct investment (FDI) have significant effect on its current value, while the value of the previous year had a negative effect. Also, the current value of fiscal deficit has no significant effect on FDI, while the value of the previous year had a negative and significant effect. The Error Correction Mechanism (i.e. speed of adjustment) is negative as expected and stands at a high rate of 73 percent (see Table 8). The implication of this is that adjustment following a shock towards long run equilibrium takes around 4 months on average (the analysis of the speed of adjustment is $(\frac{1}{/ecm/} - 1)$. The economic implication of this is that the previous value of fiscal deficit has a crowding out effect on foreign direct investment in the short-run.

Table 8: Result of Short- run Parameters and the Speed of Adjustment of Fiscal Deficit on Foreign Direct Investment in Nigeria (Selected model: ARDL (3,2,2,2,2,2,1,2,2,2))

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI(-1))	-0.214	0.065	-3.279	0.082
D(FDI(-2))	0.116	0.033	3.504	0.073
D(FD)	0.089	0.039	2.311	0.147
D(FD(-1))	-0.524	0.028	-18.677	0.003
D(DCP)	0.177	0.021	8.515	0.014
D(DCP(-1))	-0.101	0.019	-5.278	0.034
D(GDPPC)	-0.112	0.012	-8.982	0.012
D(GDPPC(-1))	0.043	0.015	2.864	0.103
D(INF)	10.577	0.799	13.246	0.006
D(INF)	3.366	1.128	2.983	0.096
D(INT)	0.195	0.046	4.208	0.052
D(INT(-1))	-0.082	0.044	-1.884	0.200
D(PDI)	0.097	0.036	2.668	0.117
D(PUI)	-0.049	0.032	-1.538	0.264
D(PUI(-1))	0.130	0.056	2.316	0.147
D(TNR)	0.120	0.011	11.127	0.008
D(TNR(-1))	0.101	0.013	8.062	0.015
D(TRV)	0.000	0.002	0.023	0.984

D(TRV(-1))	0.007	0.002	4.326	0.050
CointEq(-1)	-0.730	0.098	-7.495	0.017
Cointeq = FDI - (0.7071*FD + 0.4256*DCP - 0.2991*GDPPC + 0.4431*INF + 0.3866*INT + 0.0050*PDI - 0.6043*PUI + 0.0552*TNR - 0.0134*TRV - 7.0138)				

Source: Computed by the Researcher

Fiscal deficit has a positive effect on foreign direct investment (FDI) in the long- run at 5 per cent significant level as indicated in Table 9. The implication of this is that fiscal deficit crowds in foreign direct investment in the lung-run.

Table 9: Long-Run Parameter Estimates of Fiscal Deficit on Foreign Direct Investment in Nigeria (Selected model: ARDL (3,2,2,2,2,2,1,2,2,2))

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FD	0.707	0.119	5.958	0.027
DCP	0.426	0.098	4.335	0.049
GDPPC	-0.299	0.065	-4.575	0.045
INF	0.443	0.163	2.711	0.113
INT	0.387	0.132	2.928	0.010
PDI	0.005	0.038	0.133	0.906
PUI	-0.604	0.172	-3.512	0.072
TNR	0.056	0.019	2.964	0.098
TRV	-0.013	0.004	-3.276	0.082
C	-7.014	1.974	-3.553	0.071

Source: Computed by the Researcher

The results of short run and long run of the ARDL on foreign direct investment (FDI) model in Tables 8 and 9 indicate that fiscal deficit (FD) has positive effect on FDI both in the short run and long run but the effect is insignificant in the short run. 1 percent increase in FD increases FDI by 0.71 percent in the long run. This result is in agreement with the earlier results of Suchismita and Sudipta (2011) and Magdalena and Elena (2014), while it against the findings of Schoeman, Robinson and de WET (2000).

Diagnostic result shows that the p-value which is about 40% is greater than 5%, hence the error is normally distributed see Table 10.

Table 10: Diagnostic Test for Fiscal Deficit on Foreign Direct Investment in Nigeria

Adjusted R-Sq	0.992
F-Statistic	139.432 (PV=0.0007)
Normality Test**(**Jarque-Bera**)**	1.847(PV =0.396)
Heteroskedasticity (Breusch-Pagan-Godfrey)	29.204 (PV=0.455)
Stability Test(Ramsey RESET**)**	0.917(PV=0.528)

Source: Computed by the Researcher

Also, normality test shows the presence of homoscedasticity in the model as probability Chi-Square value of about 45% is greater than 5% significant level. On stability test,the probability value of about 53% is greater than 0.05, Table 12 shows that the coefficients estimated are stable over time.

The results of pairwise granger causality test (with their p-values of 0.25 and 0.79 which are greater than 5 per cent) shows that neither public investment granger cause private domestic investment nor private domestic investment granger cause public investment. That means they have no relationship, hence public investment and private domestic investment are autonomous in Nigeria. This result is consistent with the works of Brian, Oscar, Enowbi and Ngonidzashe (2010) but differs significantly with the conclusions of Magableh and Ajlouni (2016), Giri and Mohapatra (2016), Coutinho and Gallo (1996). As policy implications, this finding implies that

more emphasis of government expenditure should be on infrastructures that help on capital formation instead of reccurent expenditures.

Table 11: Results of Pairwise Granger Causality Test of the Relationship between private domestic investment and public investment in Nigeria

Pairwise Granger Causality Tests			
Null Hypothesis:	Obs	F-Statistic	Prob.
PUI does not Granger Cause PDI	32	1.47907	0.2457
PDI does not Granger Cause PUI		0.24756	0.7825

Source: Author's Computation

5 Conclusion

This study generally investigates the effect of fiscal deficit on investment in Nigeria, and specifically determine the effect of fiscal deficit on private domestic investment and foreign direct investment. Furthermore, it determines the relationship between private domestic investment and public investment in Nigeria between 1980 and 2015. The study adopts neoclassical theory of investment of Dale Jorgenson's approach and employs Dickey Fuller Generalized Least Square (DFGLS), Ng-Perron unit root tests, ARDL Bounds testing approach to cointegration and ECM, taking into consideration the Nigerian annual time series data from 1980 to 2015. The econometric evidence indicates that fiscal deficit has a negative effect on private domestic investment in the short-run and long-run, but the effect is insignificant in the long run. Also, fiscal deficit has positive effect on foreign direct investment both in the short-run and long-run but the effect is insignificant in the short-run.

Furthermore, neither public investment granger causes private domestic investment nor private domestic investment granger cause public investment. That means they have no relationship, hence public investment and private domestic investment are autonomous in Nigeria. Base on these findings, the study suggests the following recommendations:

- Government should adopt fiscal management actions that aim at reducing fiscal deficit that often result from extra budgetary expenses of questionable viability. For instance, government should ensure that unjustifiable frivolous expenditure proposals do not find their way into the overall budget proposals.
- Furthermore, government should ensure that available credit facilities are given to the real and genuine investors. This is believed to stimulate private investment, and in turn, spur economic growth.
- Finally, more emphasis of governments' expenditure should be on infrastructures that help on capital formation which will inturn increase private domestic investment, instead of reccurent expenditures that has no impact on private domestic investment.

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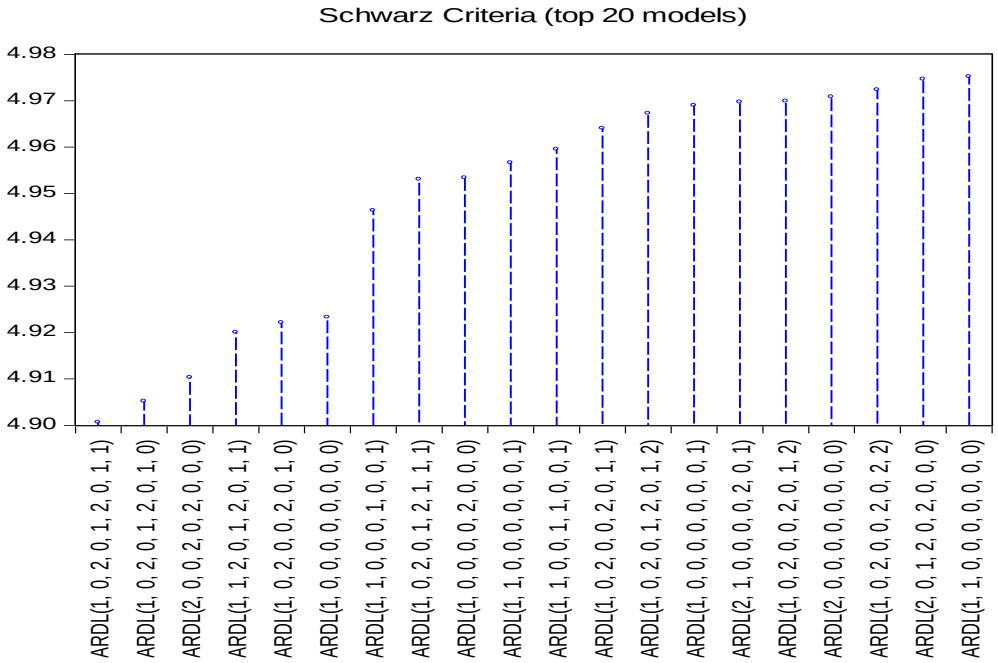
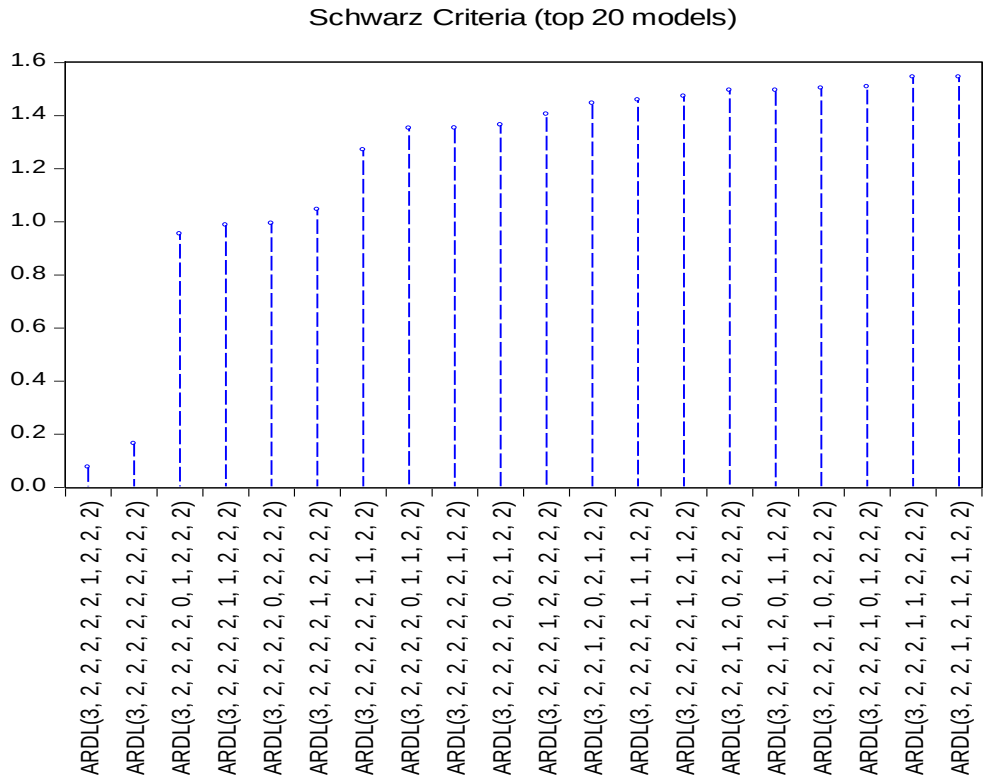
Appendix

(Lag length criteria for Private Domestic Investment Model)



Schwarz criterion (Top 20 models)

(Lag length criteria for Foreign Direct Investment Model)



Schwarz criterion (Top 20 models)