Macroeconomic Determinants of Private Investment in Sub-Saharan Africa

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Abstract: Using panel data covering the period 2000 – 2017 for 35 Sub Saharan African (SSA) countries, this study applied the pooled regression, fixed effects and random effects models as well as the Panel Corrected Standard Error (PCSE) technique in an attempt to analyze the macroeconomic determinants of private investment. Critical diagnostic tests were carried out: unit root tests indicated that the employed data was stationary. Further diagnostic tests also indicated that the fixed effects model is suffering from heteroskedasticity, autocorrelation and cross-sectional dependence. The PCSE technique was applied to counter the detected statistical problems. Main study findings indicated that, in the SSA region, private investment was determined by GDP, real interest rates, public investment and inflation. The research then proposed four policy recommendations for consideration by the SSA countries in order to materialize the much awaited private sector growth.

Key Words: Sub-Saharan Africa (SSA), Private Investment, PCSE, Panel Data

JEL Codes: D92, E22, R42

I. INTRODUCTION

The determinants of investment (either private or public) have always stimulated intense debate by both economists and policy makers in the world over ( Nyoni & Bonga, 2017). Private investment is a crucial pre-requisite for economic growth (Frimpong & Marbuah, 2010). To move an economy on a sustainable growth path, a significant share of additional savings and investment should emanate from private sources (Nyoni & Bonga, 2017). Private sector contributes more meaningfully to economic growth than the public sector (Ayeni, 2014). This is attributed to less corruption in the private sector investment compared to the public sector investment (Seruvatu & Jayaraman, 2001). Some components of public investment maybe complementary to private investment and so would be beneficial for growth, while others maybe substitutes and have a less positive, or even negative, effect on growth (Majeed & Khan, 2008). There is no universally accepted definition of private investment, Nyoni & Bonga (2017) define private investment as the privately owned part of the economy, that part of the free market economy which is made up of firms that are neither owned nor managed by the government.

There is consensus among economists and policy makers that investment (either private or public) plays a pivotal role in economic growth of any nation. In fact, there is an undeniably strong relationship between investment and the rate of economic growth (Nyoni & Bonga, 2017). Private sector led growth has a stronger positive impact on economic growth than public investment (Khan & Reinhart, 1990). This is because private investment is relatively more efficient than public sector investment (Serven & Solimano 1990; Countinho & Gallo, 1991). In any country, one of the major drivers of sustainable growth and development is the efficient and effective utilisation of private resources (private investment) in the economy (Nyoni & Bonga, 2017). More importantly, in developing countries, private investment plays a greater role than public investment in determining economic growth (Oshikoya, 1994; Naqvi, 2002). As a result, a number of studies have investigated the determinants of private investment in developing countries (Atukeren, 2005). The expansion of private sector investment in the Sub-Saharan Africa (SSA) should be the main impetus for economic growth and development.

Statement of the problem

It is widely recognized that public investments are not enough to address sustainable economic growth challenges in developing countries. Thus, private investments are required (United Nations, 2002). Private investment is one of the key ingredients in economic growth of any nation (Nyoni & Bonga, 2017) and the SSA region cannot be an exception. African countries must raise their domestic investment to at least 35% of Gross Domestic Product (GDP) by 2025.
Domestic Product (GDP), of which 23% must be private investment (AfDB, 2013). Private investment in SSA continues to be constrained by both economic and non-economic factors despite governments’ efforts to encourage and support private sector investment. Mlambo & Oshikoya (2001) highlighted that declining investment ratios and levels are a problem, firstly because investment matters for growth, and secondly because low investment increase vulnerability in the economy. Thus, the major challenge facing the Sub-Saharan Africa region is to come up with policies that would help revive and promote the private sector in order to raise private investment, stimulate and sustain economic growth. With a view to drawing feasible policy prescriptions from the findings, it is therefore imperative to analyze the determinants of private investment in Sub-Saharan Africa.

Statement of objectives

i. To determine whether GDP growth affect private investment in the SSA region.

ii. To find out whether public investment affect private investment in the SSA region.

iii. To investigate whether interest rates affect private investment in the SSA region.

iv. To analyse whether inflation rate affect private investment in the SSA region.

v. To check whether private sector credit affect private investment in the SSA region.

vi. To determine whether domestic debt affect private investment in the SSA region

Organisation of the study

To attain the study objectives, the study is organised into major five headings; introduction, literature review, methodology, findings of the study and conclusion.

II. LITERATURE REVIEW

2.1 Theoretical Literature Review

Various economic theories related to private investment are discussed in this section. The theories include the accelerator theory, the neo-classical theory, Tobin Q theory, and the neo-liberal theory.

The Accelerator Theory

The Keynesian accelerator model was postulated by Keynes (1936). In its simplest version propounded by Clark (1917), the model avers that there exists an optimum quantity of real capital for a given level of output. Thus, larger stocks of capital held by firms are necessitated by high demand. In this theory, net investment expenditures equal the change in the level of real capital and thus net investment is proportional to the expected change in output. Gross investment, according this theory, requires the incorporation of replacement capital or depreciation. The basic argument of the flexible-accelerator principle is that when the gap between the existing capital stock and the desired capital stock is substantial, the firms’ rate of investment will be high. The hypothesis, as highlighted by Chirinko (1993); is that firms plan to close a fraction of the gap between the desired capital stock and actual capital stock in each period. Investment is determined from the difference between the desired level of capital and the capital that survives from the past. The capital that survives from the past is constant proportion of past capital. The accelerator theory is based on an assumption of a stable (or fixed) capital to output ratio. It further stresses that planned investment is demand induced; which implies that the demand for new plant and machinery comes from the demand for final goods and services. If expected demand (output) is higher than the present capacity of the firm then additional plant and equipment may be required. Thus investment is a function of the rate of change in national income. The underlying assumption is that there is a close association between output changes and investment spending. The accelerator theory of investment identifies output (GDP) as the major variable determining investment. It also considers other factors that affect investment such as internal funds and external cost of financing. In the Sub-Saharan Africa, private investment is also affected by these factors.

The Neoclassical Theory

The neoclassical theory which is a version of the accelerator theory was postulated by Jorgenson (1971) and it avers that the desired or optimal capital stock is proportional to output and the user cost of capital which in turn depends on the price of capital goods, the real interest rate, the rate of depreciation and the tax structure (Chirinko, 1993; Asante, 2000). The neoclassical theory provides yet another rationale for the output as a positive factor in the investment function. Under this, every firm tends to maximise its production, subject to the budget (cost) constraint (or minimise the production cost subject to a given output constraint) (Gupta, 2004). This theory invokes the microeconomic model of a firm’s production function and profit-maximising behaviour to relate the desired capital and investment to product prices (demand) and interest rates. The investment equation results from the gap between desired capital and the actual capital stock. However, a particular drawback of the neo-classical model is that it does not rationalize the rate of investment towards the capital stock (Ajide & Lawanson, 2012). Thus, the neoclassical theory of investment identifies output,
depreciation, interest rates and tax structure as the main factors affecting investment. These factors also have some effects on private investment in Sub-Saharan Africa.

**The Tobin q Theory**

The q theory was postulated by Tobin & Brainard (1968) but however the use of the letter “q” did not materialize until Tobin’s 1969 article “A general equilibrium approach to monetary theory”. Tobin hypothesized that the combined market value of all the companies on the stock market should be equal to their replacement costs. In the Tobin q theory of investment, the ratio of the market value of the existing capital stock to its replacement cost (the q ratio) is the main force driving investment (Chirinko, 1993; Ghura & Goodwin, 2000). That is to say, enterprises will want to invest if the increase in the market value of an additional unit exceeds the replacement cost (Ájide & Lawanson, 2012).

Tobin’s famous q theory of investment starts from the idea that the stock market value of a firm helps to measure the gap between K (actual capital stock) and K−1 (desired capital in the next period). The variable q is defined as the stock market value of the firm divided by the replacement cost of the capital of the firm. The “replacement cost of capital” refers to the cost that one would have to pay to purchase the plant and equipment of the firm in the output market. If the firm sells for $USD150 million on the stock market, and the replacement cost of capital of the firm is equal to $USD100, then q would be equal to 1.5. Thus, q is the ratio of the cost of acquiring the firm through the financial market versus the cost of purchasing the firm’s capital in the output market. Tobin and his followers have shown conditions under which q is good indicator of the profitability of new investment spending. Specifically, when q is greater than 1, it tends to mean that K−1 (previous capital stock) is greater than K, so that investment should be high. Similarly, when q is less than 1, the market is indicating that K−1 is less than K, so that investment should be low (Sachs and Larraine, 1993). In short, the q theory of investment identifies interest rates as the major determinant of investment. Interest rates affect investment in a negative manner according to Tobin’s q theory in the sense that a rise in interest rates results in the increased user cost of capital, hence reduced investment. In the Sub-Saharan Africa region, interest rates have a strong bearing on private investment.

**The Neoliberal Approach**

The neoliberal approach, popularized by McKinnon (1973) and Shaw (1973) is another theory that attempts to explain investment behaviour. The theory posits that developing countries suffer from financial repression and if they were liberated from this problem, saving would be induced, and eventually, growth. Liberalisation is crucial in this theory. With liberalisation, both savings and loanable funds will increase, resulting in more efficient allocation of funds with potential contribution to higher economic growth. Unlike the neoclassical theory, in this theory investment is positively related to the real rate of interest. The reason for this is that a rise in interest rates increases the volume of financial savings through financial intermediaries and thereby raises investible funds, a phenomenon that McKinnon (1973) and Shaw (1973) referred to as the “conduit effect”. Thus, while it may be true that demand for investment declines with the rise in the real rate of interest, realized investment actually increases because of the greater availability of funds. This conclusion applies only when the capital market is in disequilibrium with the demand for funds exceeding supply (Asante, 2000). Neoliberalists identify interest rates as the main determinant of investment. According to this theory interest rates have a positive effect on investment, however this is in contrast with both the q theory and the neoclassical theory of investment that suggest a negative effect of interest rates on investment.

**2.2 Empirical Literature Review**

Akpalu (2002) modelled the determinants of private investment in Ghana using time series data from 1970-1994 and employed the Engle-Granger two step approaches and the Johansen multivariate approach. The study revealed that in relative terms, private investment in the short run responds more to real per capita income growth, credit availability and public investment. There was a significant positive relationship between real GDP and private investment both in the short run and long run models; this is in line with the accelerator theory of investment.

Maganga & Edriss (2012) carried out an empirical test of the macroeconomic variables that can potentially affect private investment decisions in Malawi in a short and long run perspective using time series data for the period 1979-2009 and employing the co-integration and error correction models. Their main result was that public investment exerts a short-term crowding-out effect on private investment. Maganga & Edriss (2012) also found that investment decisions seem to be determined by bank credit to the private sector and the real interest rate in the short run and in the long run, the capital accumulation path seems to be closely dependent on both GDP growth and real exchange rates.

Jecheche (2011) looked at the determinants of private investment in Zimbabwe from 1990-2008 using an unrestricted Error Correction Model (ECM). The results indicated that public investment crowds-in private investment. Jenkins (1998) studied the determinants of private investment in Zimbabwe from the period (1970-
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1990) using the Engle-Granger two step approach and found that the uncertainty about political developments also discouraged investment. Jenkins (1998) also identified retained profits as the long run determinant of investment and that foreign exchange shortages and external debt to GDP ratio also discourage private capital formation in Zimbabwe.

Mbanga (2002) analyzed the impact of external debt on private investment in Cameroon from 1970-1999 using time series data. The study found out the investment accelerator in existence (since a significant positive real GDP-private investment relationship was found), a crowding-in effect of public investment on private investment and the detrimental effect of overvalued exchange rate, thus confirming the results of Asante (2000) who used the Ordinary Least Square (OLS) approach to model private investment using time series data over the period 1970-1992 in Ghana. Mbanga (2002) also discovered that there was a crowding-out effect of debt service ratio, a positive and significant relationship between credit expansion and private investment and that deteriorating terms of trade had negative effects on private investment. Asante (2000) also found out that lack of foreign exchange, corruption and erratic import licensing and rent seeking activities on private investment were also key factors over the study period and that the political dummy representing political stability was highly significant and negative in all trials.

Frimpong & Marbuah (2010) analyzed the determinants of private sector investment in Ghana and employed modern time series econometric techniques namely unit root tests, co integration and error correction techniques within an ARDL framework. The research revealed that private investment is determined in the short-run by public investment, inflation, real interest rate, openness, real exchange rate and a regime of constitutional rule, while real output, inflation, external debt, real interest rate, openness and real exchange rate significantly influenced private investment response in the long-run, confirming the results by Leooltho (2006) who investigated the determinants of private investment in Botswana for the period 1976-2003 and employed the regression analysis based on the co-integration and Error Correction Model (ECM).

The literature review (both theoretical and empirical) identified a number of factors as the determinants of private investment and these are output or GDP, inflation, interest rates, public investment, private sector credit, political instability, exchange rates, terms of trade, savings and external debt and so on. In this study we are going to analyze whether the following variables affect private investment in the SSA region: GDP, interest rate, inflation, credit to the private sector, domestic debt, and public investment. These variables have been selected on the basis of availability of data—it is almost unnecessary to reiterate the fact that data availability in developing countries is still a big problem. It can be noted that no study has been done so far specifically on the Sub-Saharan Africa. Most of the studies have been done for individual countries and this creates a gap on the need to analyze the Sub-Saharan African region as a whole, especially given the existence of similar economic problems and stagnant private investment through out the SSA region.

III. METHODOLOGY

Model Specification and Estimation Issues
With the guidance of the literature review, both empirical and theoretical, the model to be estimated in this study is specified in deterministic form as:

\[ PVTINV = f (GDPP, R, INFL, CRDT, DEBT, PLCINV) \] \[ \text{[1]} \]

where \( PVTINV \) is private investment that is proxied by gross capital formation by the private sector expressed as a percentage of GDP, \( GDPP \) is GDP growth rate defined as percentage change in the total goods and services produced within the boundaries of a nation measured at constant prices, \( R \) is real interest rate defined as the rate charged by financial intermediaries on borrowed funds and is adjusted for inflation, \( INFL \) is inflation rate defined as the rate at which prices of general goods and services are rising in the economy, \( CRDT \) is credit extended to the private sector by the financial sector as a percentage of GDP, \( DEBT \) is government gross debt expressed as a percentage of GDP, and \( PLCINV \) is public investment which is proxied by the gross capital formation by the government expressed as a percentage of GDP.

From equation (1), an empirically estimable model is specified as:

\[ PVTINV_{it} = \alpha + \beta_1 GDPP_{it} + \beta_2 R_{it} + \beta_3 INFL_{it} + \beta_4 CRDT_{it} + \beta_5 DEBT_{it} + \beta_6 PLCINV_{it} + u_{it} \] \[ \text{[2]} \]

where \( i \) is a cross sectional unit identifier, \( t \) is a time identifier operator, \( \alpha \) is an intercept, \( \beta \)'s are slope coefficients and \( u_{it} \) is a composite error term defined as \( u_{it} = \mu_i + \epsilon_{it} \).

Model (2) can be termed as a fixed effects model or a random effects model depending on the assumption being made. In the fixed effects model, the individual specific effects, \( \mu_i \), are assumed to be fixed parameters to be estimated and correlated with the regressors (Cameron & Trivedi, 2009 and Baltagi, 2013). In the random effects model, the individual specific effects, \( \mu_i \), are assumed to be random variables not correlated with the regressors (Baltagi, 2013). In case the specific/random effects are ignored, the model is said to be a pooled model that can be estimated with Ordinary Least Squares (OLS) method. In view of this discussion,
model (2) was estimated using OLS, fixed effects or within estimator and random effects estimator. An F-test\(^1\) was used to compare the fixed effects model and the pooled regression model, and Breusch-Pagan LM test\(^2\) was used to test if a random effects model is better than the pooled effects model. The study also employed the Hausman test to help choose an appropriate method, fixed effects or random effects, for the data used. In the Hausman test, the fixed effects estimator is consistent under both the null and alternative hypothesis whereas the random effects estimator is inconsistent under the alternative hypothesis but efficient under the null hypothesis. Thus, a random effects model is a better technique if the null hypothesis is not rejected otherwise the fixed effects model is. However, for the fixed effects model, it is important to check if it is free from heteroscedasticity, autocorrelation with panels and cross-sectional dependence. In this regard, the study tested for heteroscedasticity, autocorrelation within panels and cross-sectional dependence using Modified Wald test, Wooldridge test and Pesaran test, respectively. In case these problems exist, the study had an option of using Panel Corrected Standard Errors (PCSE) method that can provide consistent, efficient and unbiased estimates.

Prior to estimation, unit root test was carried out for all variables using Fisher type unit root test technique, Augmented Dickey-Fuller (ADF) test, that can test for unit root in the case of weakly balanced or unbalanced panel data as this was the case for this study. Pairwise correlation between the regressors was also conducted to check if multicollinearity is a serious problem for the data used.

### Data Issues

The study used panel data covering the period 2000 to 2017 for 35 countries in SSA\(^3\) region. These countries were selected on the basis of the availability of data for both the regressors and the regressand. The data for the variables used in this study were obtained from the World Bank and International Monetary Fund.

### IV. FINDINGS OF THE STUDY

#### Descriptive Statistics

Descriptive statistics for all variables included in the study are shown in table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs.</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVTINV</td>
<td>620</td>
<td>15.21</td>
<td>9.05</td>
<td>-3.87</td>
<td>117.39</td>
</tr>
<tr>
<td>GDPG</td>
<td>619</td>
<td>4.54</td>
<td>4.51</td>
<td>-30.15</td>
<td>33.63</td>
</tr>
<tr>
<td>CRDT</td>
<td>611</td>
<td>20.85</td>
<td>25.97</td>
<td>.01</td>
<td>160.12</td>
</tr>
<tr>
<td>R</td>
<td>558</td>
<td>13.39</td>
<td>60.62</td>
<td>-60.78</td>
<td>1158.03</td>
</tr>
<tr>
<td>INFL</td>
<td>620</td>
<td>9.7</td>
<td>32.17</td>
<td>-65.93</td>
<td>550</td>
</tr>
<tr>
<td>PLCINV</td>
<td>620</td>
<td>6.96</td>
<td>4.85</td>
<td>-42.67</td>
<td>34.86</td>
</tr>
<tr>
<td>DEBT</td>
<td>604</td>
<td>59.05</td>
<td>58.31</td>
<td>5.5</td>
<td>514.9</td>
</tr>
</tbody>
</table>

Source: Authors’ Own Computation

Table 1 shows that the variables have different number of observations signifying that the panel is unbalanced as some of the observations are missing.

#### Unit Root Test Results

The results for the unit root test presented in the Appendix section suggest that all the variables are stationary. This is because the p-values for the various statistics provided by the ADF method are low enough (p-value<0.01) such that the null hypothesis, which state that unit root is present is rejected. Therefore, all the variables are stationary and integrated of order zero.

#### Multicollinearity test

As shown in table 2, the correlation between variables is very low, below 0.2, for all variables. This suggests that multicollinearity is not a serious problem in this study.

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\(^1\) The null hypothesis is that there are individual effects are jointly equal to zero.

\(^2\) The null hypothesis state that there are no random effects in the model.

\(^3\) These countries are Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Comoros, Congo Democratic Republic, Cote d’Ivoire, Gambia, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe.
### Table 2: Pairwise Correlation Test

<table>
<thead>
<tr>
<th>Variables</th>
<th>GDPG</th>
<th>CRDT</th>
<th>R</th>
<th>INFL</th>
<th>PLCINV</th>
<th>DEBT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDPG</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRDT</td>
<td>-0.07</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>-0.26</td>
<td>-0.08</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFL</td>
<td>-0.13</td>
<td>-0.08</td>
<td>0.17</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLCINV</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.12</td>
<td>-0.07</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>DEBT</td>
<td>-0.19</td>
<td>-0.14</td>
<td>-0.01</td>
<td>0.12</td>
<td>-0.03</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Source: Authors’ Own Computation

### Presentation of the Estimated Findings

The results obtained using the methodology presented in the previous section are presented in table 3.

### Table 3: Pooled Regression, Fixed Effects, Random Effects and PCSE Findings

<table>
<thead>
<tr>
<th></th>
<th>(1) Pooled Regression</th>
<th>(2) Fixed Effects</th>
<th>(3) Random Effects</th>
<th>(4) PCSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDPG</td>
<td>0.186***</td>
<td>0.021</td>
<td>0.030</td>
<td>0.186**</td>
</tr>
<tr>
<td></td>
<td>(0.094)</td>
<td>(0.072)</td>
<td>(0.073)</td>
<td>(0.081)</td>
</tr>
<tr>
<td>CRDT</td>
<td>0.009</td>
<td>0.214***</td>
<td>0.095***</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.048)</td>
<td>(0.033)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>R</td>
<td>-0.008</td>
<td>-0.003</td>
<td>-0.004</td>
<td>-0.008**</td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.006)</td>
<td>(0.006)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>INFL</td>
<td>-0.044***</td>
<td>-0.012</td>
<td>-0.018</td>
<td>-0.044***</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.017)</td>
<td>(0.017)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>PLCINV</td>
<td>-0.466***</td>
<td>-0.602***</td>
<td>-0.575***</td>
<td>-0.466***</td>
</tr>
<tr>
<td></td>
<td>(0.077)</td>
<td>(0.072)</td>
<td>(0.071)</td>
<td>(0.055)</td>
</tr>
<tr>
<td>DEBT</td>
<td>-0.001</td>
<td>-0.013*</td>
<td>-0.014**</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.007)</td>
<td>(0.006)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>_cons</td>
<td>18.263***</td>
<td>15.772***</td>
<td>18.520***</td>
<td>18.263***</td>
</tr>
<tr>
<td></td>
<td>(1.100)</td>
<td>(1.418)</td>
<td>(1.561)</td>
<td>(0.800)</td>
</tr>
</tbody>
</table>

| Obs.     | 543                   | 543               | 543                | 543     |
| R-squared: overall | 0.085              | 0.022             | 0.048              | 0.085   |
|          | : within              | 0.161             | 0.151              | -       |
|          | : between             | 0.002             | 0.151              | -       |
| F-statistic (p-value) | -                  | 16.330 (0.000)   | -                  | -       |
| LM test statistic (p-value) | -                | -                 | 707.950 (0.000) | -       |
| Hausman test statistic (p-value) | -                | -                 | 18.490 (0.005)   | -       |

### Diagnostic Tests

| Modified Wald test | 17584.21*** |
| Wooldridge test   | 76.99***   |
| Pesaran test      | 1.96*      |

*** p<0.01, ** p<0.05, * p<0.1. Standard errors are in parenthesis for variables only.

Source: Authors’ Own Computation

At first the study ignored the panel data properties and considered model (2) as a pooled model. This means that model (2) was estimated using OLS method. For this case, the results are presented in column indicated (1) in table 2. Variables with significant coefficients include GDP growth rate, inflation rate and public investment of which the impact of GDP growth rate on private investment is positive whereas that of inflation rate and public investment is negative. Fixed effects model was estimated and compared with the Pooled model using the F test and the results are presented in column (2) in table 3. The p-value for the F-statistic is low enough (p-value < 0.01) to reject the null hypothesis that the model has no fixed effects. In this
case, a fixed effects model is chosen against a pooled model. The study also estimated a random effects model
and tested if the model has random effects using the Breusch-Pagan LM test. The results of the LM test shows
that the model has random effects as the null hypothesis that random effects are not present is rejected at 1%
level of significance, thus, a random effects model is better than the pooled regression model. The random
effects is then compared with the fixed effects model using the Hausman test which shows that a fixed effects
model produces consistent results than random effects as the null hypothesis is rejected at 1% level of
significance. Thus, a fixed effects model is preferred to a random effects model. In this sense, a fixed effects
model is tested for heteroscedasticity, cross-sectional dependence and auto correlation. However, the fixed
effects model is found have heteroscedasticity, autocorrelation and cross-sectional dependence. To counter these
problems, the study used Panel Corrected Standard Error (PCSE) method to estimate model (2) and the results
are presented in the last column of table 2. However, the results obtained using PCSE are similar to those
obtained using OLS but different to those of the fixed effects and random effects model.

Discussion of the Findings
The findings obtained using the PCSE are interpreted and discussed in this study. The findings
presented for the sample of SSA countries and period considered in this study are that GDP growth rate, interest
rate, inflation rate and public investment were the determinants of private investment as they have statistically
significant coefficients. GDP growth rate has a positive coefficient meaning that an increase in GDP growth rate
positively affected private investment during the study period. In this sense, an increase in GDP growth rate by a
unit was associated with an increase in private investment by 0.186 units. This positive relationship can be
explained by the flexible-accelerator model that assumes a fixed relationship between the desired capital stock
and the level of real output (Oshikoya, 1994). More so, an increase in the GDP growth rate means that more
income could be devoted to savings which could be used to finance investment projects. This finding is similar
to that obtained by Akpalu (2002 and Frimpong & Marbuah (2010). Concerning real interest rate, the coefficient
is negative meaning that an increase in interest rate was associated with a decline in private investment, and in
this case, private investment declined by 0.008 units if interest rate increased by a unit. According to the debt
intermediation hypothesis proposed by Shaw (1973), people in developing countries have low income that is
insufficient for investment purposes, hence, they have to borrow from financial intermediaries in order to invest.
In line with this view, the amount borrowed is negatively associated with the interest rate, which is the cost of
borrowing. Therefore, as interest rate rises, borrowing declines and investment also declines. These arguments
are line with the Tobin’s q theory of investment and the neoclassical theory of investment which argue that
interest rates negatively affect private investment. Maganga & Edriss (2012) also found out that real interest
rates have a negative impact on private investment. In addition, inflation rate had a negative impact on private
investment and its coefficient means that an increase in inflation rate by a unit leads to a decline in private
investment by 0.044 units. High inflation rate indicates economic instability that negatively affects private
investment through creating an unconducive business and economic environment characterised by high level of
uncertainty and risk of investing, thus, adversely affect private investment. The table also shows that public
investment negatively affected private investment in SSA countries. A unit increase in public investment is
associated with a decline in private investment by 0.466 units. Public investment negatively affects private
investment in SSA countries because, in most cases, it comes with budget deficits that crowd out private
investment though high interest rates, credit rationing and high current or future tax burden (Oshikoya, 1994).
Maganga & Edriss (2012) also found out that public investment has a negative impact on private investment.

Policy Recommendations
i. Policy makers in the SSA region ought to target boosting production (output) in order to enhance private
sector growth.
ii. In the SSA region, public investment has been shown to compete for resources against the private sector,
therefore, SSA countries should focus more on infrastructure investment which is generally complementary
to private investment. In this regard, SSA countries are also encouraged to desist from their tendencies of
“squandering” national resources through their so-called “national projects”.
iii. Governments in the SSA region should, from time to time, control “spiralling” interest rates in order to
facilitate private sector growth.
iv. SSA countries should always make sure inflation is under control. In this regard, single digit figures of
inflation (i.e. from 0% to below 10%) should be targeted.

V. CONCLUSION
Private investment can be regarded as the backbone for SSA countries and without it, sustainable
economic growth will remain a pipeline dream. It is encouraging and interesting to highlight the fact that
governments in the SSA region continue to prioritize private sector – led growth in their national economic
policies, something which is commendable. This study sought to determine the main factors that affect private
investment in the SSA region and our panel regressions have shown that GDP, real interest rate, public investment and inflation are the major determinants of private investment in the SSA region. The study is envisioned to go a long way in improving the design of private-sector-led growth policies in the SSA region for the enhancement of the much awaited sustainable growth and development.

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