Effects of Fiscal Components on Private Investment in Rwanda

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Abstract: *Private investment forms an integral pillar in attainment of sustainable growth in the economy. Despite the reforms that Rwanda has taken overtime aimed at attracting private investments the ratio of private investments to GDP though increasing is still as low as below 10% which does not meet the threshold of sustained rapid economic growth and that which can make the vision 2020 to be realized. The study aims to analyze the effects of fiscal components on private investment in Rwanda. Specifically; to assess the effects of government revenue on private investment in Rwanda, to determine the effects of government spending on private investment in Rwanda and lastly to investigate the effects of government borrowing on private investments in Rwanda. The study adopted quantitative descriptive study design. Time series secondary data was used in this study for a period of 18 years from 2000 to 2017.Data was sourced from BNR, NISR and MINECOFIN. The study adopted the OLS technique in its analysis. Prior to this pre-estimation statistical test were carried out on the data to ascertain the suitability of the data in the analysis. The findings indicated that government debt, government spending and tax revenue had strong positive association with private investment in Rwanda. OLS regression indicates that government spending had negative significant effect while government debt and tax revenue had positive significant effects on private investment. R Squared value was 88.7% and F Statistics of 178.457.the study recommends more tax reforms and channeling of more borrowings and government expenditure in stimulating private investments. This study will be helpful to the government, the private sector investors both domestic and foreign and donors who may be interested in the influence of fiscal policies on private investments.*

Keywords: Fiscal components, Private investment, Government expenditure, Government borrowing, Government revenue

1. Introduction

Globally, fiscal Policy is regarded as tool for stimulating economic growth through its impact on investment. Jia et al(2014) opine that tax reduction is a common strategy for attracting new firms in addition to infrastructure projects undertaken to enhance firm's location. Jia et al (2014) examined fund allocation in China over the period 1997 to 2006 and found that the government funds construction projects more than education and administration. This led to some zones having more firms than others a scenario termed as "economic development zone fever" (Chen et al, 2017). The scenario is has been replicated in other nations like Europe which is characterized by expanded business zones (Gallouge C, 2013) and Japan characterized by under-utilized industrial parks (Besho&Terai, 2011).

Rwanda has recorded a steady growth of private investment overtime. This commitment has been accelerated by the fact that private investment contributes greatly to economic growth of Rwanda (BNR, 2015). The government overtime has created investment reforms aimed at creating good investment environment for investors hence a steady rise in number of investors (RDB, 2017). These investment incentives are among others fiscal policies for example tax incentives, increased funding of security docket and improved infrastructure.

2. Statement of the Problem

Private investment has been recognized as one of the pillars for achieving sustainable economic growth. Through private investment, the untapped resources can be exploited, jobs created and businesses increase in number hence improving income of people. The national output in terms of goods and services produced ultimately increases and this improves economy of the country. Despite the importance of private investment in speeding up economic growth, there is still comparably low average private investment as a ratio of GDP (WB, 2015). The ratio of private investment to GDP in Rwanda in the period 2000 – 2014 still averaged 8.71 per cent. This figure is smaller than the one for developed nations and falls short of the figure required to propel growth through enhanced employment opportunities and reduction in poverty.(Gitari, 2012). This scenario poses a threat to Rwanda's dream of achieving Vision 2020.

For the past few years, Rwanda has undertaken several fiscal reforms with aim of encouraging private investment (Jean Bosco, 2018). In Rwanda few studies have been done on fiscal policies and the studies have focused on its effects on economic growth. For example, Christine (2017) looked at the effects of expansionary fiscal policies on economic growth in Rwanda; Jean Bosco (2018) examined the role of taxation in Rwanda's economic development Rwanda. The effects of fiscal policies on private investment have not attracted attention in Rwanda despite its importance in speeding up economic growth and realizing the vision 2020 goals. Therefore, it's not clear which fiscal components are key drivers of investment growth. This scenario necessitated this study.

3. Objectives of the Study

The general objective of this study was to analyze empirically the effects of fiscal components on private investment in Rwanda. One of its specific objective was to assess the effects of tax revenue on private investment in Rwanda

4. Conceptual Framework
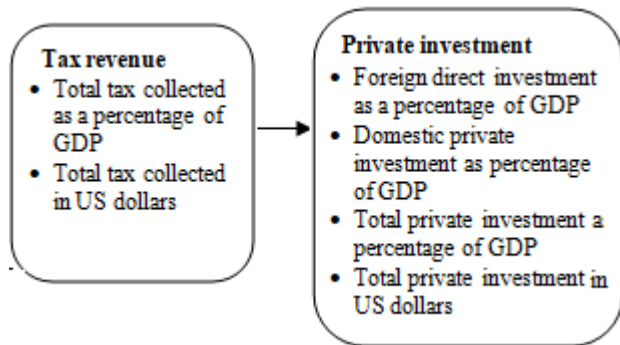
5. Research Methodology

- **Research Design**: This study adopted descriptive quantitative research design
- **Data collection and procedure**: The study used quarterly time series secondary data for a period of 17 years from 2000 to 2017. Data for fiscal components that is government spending and government debt was obtained from MINECOFIN database while data on government revenue which comprised majorly of tax revenue was obtained from RRA database. Data on private investments was sourced from National Bank of Rwanda (BNR).
- **Data Analysis and presentation**
  This study addresses three specific objectives i.e. the effects of government revenue, government expenditure and government borrowing on private investment. The quantitative data collected were analyzed using E-views software and the output was presented in form of tables and graphs. The effects of these fiscal components on private investment was clearly shown using a linear regression model that the study adopted.
- **Stationarity Tests**: The non-random behaviour of the time series data can interfere with the usefulness of the standard econometrics methods if applied without taking time series properties of the data into account (Gujarati, 2009). To test for stationarity in the variables used in the study, the unit root test was carried out. The two known techniques for unit root testing are Augmented Dickey- Fuller (ADF) and Philips Perron (PP) tests. The fact that data generating process isnot an AR (1) process, ADF is often specified in the higher-order case (Granger, 2009). The ADF method retains the validity of the tests based on white – noise errors by making sure that they are indeed white noise. PP procedures correct for serial correlation through a parametric correction to the standard statistic (Stock, 2009).

The ADF tests the null hypothesis that $/\rho/ = 0$ against an alternative that $/\rho/< 0$ in the autoregressive equations:

i. ADF without intercept and trend

$$\Delta y_t = \rho y_{t-1} + \sum_{i=1}^{k} \delta_i \, \Delta y_{t-1} + u_t \quad\ldots\ldots\ldots\ldots 3.11$$

ii. ADF with an intercept but no trend

$$\Delta y_t = \alpha + \rho y_{t-1} + \sum_{i=1}^{k} \delta_i \, \Delta y_{t-1} + u_t \quad\ldots\ldots\ldots 3.12$$

iii. ADF with both intercept and trend

$$\Delta y_t = \alpha + \beta_t + \rho y_{t-1} + \sum_{i=1}^{k} \delta_i \, \Delta y_{t-1} + u_t \quad\ldots\ldots 3.13$$

- **Cointegration:** Cointegration refers to the existence of a long-run equilibrium relationship between variables. The idea of long-run equilibrium implies that two or more variables may wander away from each other in the short-run but move together in the long-run (Enders, 2010). The use of cointegration technique allows the study to capture the equilibrium relationship between non–stationary series within a stationary model following Adams (2010).

There are two main tests for cointegration, namely Johansen cointegration test and the Granger two-step methods. Johansen's methodology is adopted in this research, which is expressed as a vector auto-regression (VAR) of order p is given by:

$$y_t = u + A_1 y_{t-1} + \ldots\ldots\ldots\ldots + A_p y_{t-p} + \varepsilon_t$$

Where y_t is a $n \times 1$ vector of innovations. This VAR can be re-written as

$$\Delta y_t = u + \prod y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-1} + \varepsilon_t$$

Where

$\prod = \sum A_i - I$ and

$\Gamma_i = \sum_{j=i+1}^{p} A_j$

If the coefficient matrix $\prod$ reduced rank r < n, then there exist n x r matrices α and β each with rank r such that $\prod = \alpha\beta'$ and $\beta' y_t$ is stationary, r is the number of cointegrating relationships. The elements of α are known as the adjustment parameters in the vector correction model, and each column of β is a cointegrating vector. It has been shown that for a given r, the maximum likelihood estimator of β defined the combination of y_{t-1} that yielded the r largest canonical correlations of Δy_t with Δy_{t-1} after correcting for lagged differences and deterministic variables (Johansen, 1995, Fu R. & M. Pangani, 2010). Johansen proposed two different likelihood ratio tests of the significance of these canonical correlations and thereby the reduced rank of the $\prod$ matrix. The trace test and maximum Eigen value test are shown in equation (3.19) and (3.20), respectively.

$$J_{trace} = -T\sum_{i=r+1}^{n} \ln(1 - \lambda')$$

$$J_{max} = -T ln(1 - \lambda')$$

where T is the sample size and λ' is the ith largest canonical correlation. The trace test tests the null hypothesis of r cointegrating vectors against the alternative hypothesis of n cointegrating vectors. The maximum Eigen value test, on the other hand, tests the null hypothesis of r contegrating vectors against the alternative hypothesis of $r+1$ cointegrating vectors

Model specification: This study adopted the flexible accelerator theory of investment in coming up with a linear regression model. This theory asserts that investment is a function of output and economic conditions (Arestis, P et al. 2012) Fiscal policies are potential economic conditions that may affect investment. Therefore, the study will adopt the modified flexible accelerator model by Blejer and Khan. Therefore, private investment can be expressed as a linear function of fiscal components i.e. private investment is a function of government expenditure, government revenue mainly tax revenue and government borrowing. Private investment is the dependent variable while fiscal components are independent variables.

The linear model can therefore be expressed as,

$$I_P = \beta_0 + \beta_1 GE + \beta_2 GR + \beta_3 GB + \varepsilon_t$$

Where

$I_P \rightarrow$ private investment

$\beta_0 \rightarrow$ Constant of regression

$\beta_1, \beta_2, \beta_3 \rightarrow$ beta coefficients of independent variables

$GE \rightarrow$ Government expenditure

$GR \rightarrow$ Government revenue

$GB \rightarrow$ Government borrowing

6. Summary of Research Findings

6.1 Descriptive Statistics

Form the results, the mean value as a percentage of GDP of government debt, government spending, private investment and tax revenue are 45.52, 15.96, 22.30 and 13.5 respectively. The maximum values for government debt, government spending, private investment and tax revenue as a percentage of GDP are 90%, 19.57, 26.52 and 16.8 respectively whereas the minimum values are 19.5%, 12.94%, 16.69% and 10.2%.the probability values for Government debt, government spending, private investment and tax revenue are 0.004, 0.02,0.035and 0.087.this implies that the descriptive statistics values for government expenditure, government debt and private investment were significant during the study period whereas the descriptive statistics values for tax revenue were insignificant. The researcher observed that the government debt as a percentage of GDP was highest during the early years within the study period a scenario explained by the fact that Rwanda had just experienced the Genocide attack which brought the economy to its grassroots therefore there was need for more funds to revive the economy. The tax revenue has also experienced tremendous growth overtime due to the improved tax collection methods and adoption of various tax reforms which the Rwandan government has come up with overtime leading to reduced tax default among the economic players. Government expenditure on the other hand has improved overtime due to expansion of the economy attracting more government responsibilities in terms of provision of essential services which ultimately leads to increased government budget every year to various public sectors. Lastly private investment has also recorded significant increase overtime due to the conducive business environment which the Rwandan government has overtime made efforts to provide. The descriptive statistics findings based on the four variables discussed are summarized as follows:

	Government Debt	Government spending	Private investment	Tax revenue
Mean	45.52222	15.96389	22.29511	13.50000
median	31.25000	15.15000	23.36750	12.95000
maximum	90.00000	19.57000	26.52100	16.80000
minimum	19.50000	12.94000	16.68800	10.20000
StdDev	28.24382	2.233916	3.241996	1.948636
Skewness	0.712431	0.314747	-0.226689	0.406309
Kurtosis	1.741019	1.524167	1.573494	2.015547
Jarque-Bera	10.84579	7.723038	6.721414	4.888490
Probability	0.004414	0.021036	0.034711	0.086792
Sum	3277.600	1149.400	1605.248	972.0000
Sum Sq. Dev	56637.64	354.3169	746.2481	269.6000
Observations	72	72	72	72

Source: Author, 2019

Table 1: ADF Stationarity test findings

	Augmented Dickey Fuller Test	
	Probability at level	probability at 1st difference
Government debt	0.9677	0.0000
Government spending	0.9445	0.0000
Tax revenue	0.5671	0.0000
Private investment	0.2457	0.0000

Source: Author 2019

Table 2: PP Stationarity test findings

	Phillips Perron Test	
	Probability at level	probability at 1st difference
Government debt	0.9741	0.0000
Government spending	0.9445	0.0000
Tax revenue	0.5790	0.0000
Private investment	0.1892	0.0000

Source: Author 2019

Table 3: Johansen Cointegration results

Hypothesized No of CEs	Trace statistics	Critical value 0.05	p-value	Maximum Eigen statistics	Critical value 0.05	p-value
None*	53.75636	47.85613	0.0152	29.68700	27.58434	0.0069
At most 1	17.06936	29.79707	0.6350	9.418038	21.13162	0.7974
At most 2	7.651318	15.49471	0.5034	7.602639	14.26460	0.4205
At most 3	0.048679	3.841466	0.8254	0.048679	3.841466	0.8254

Source: researcher, 2019

Table 4: Correlation findings

	Private investment	Government spending	Government debt	Tax revenue
Private investment	1	-0.784	-0.602	0.855
Government spending	-0.784	1	0.906	-0.611
Government debt	-0.602	0.906	1	-0.524
Tax revenue	0.855	-0.611	-0.524	1

Source: researcher, 2019

Table 5: Multiple regression findings

| Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dependent Variable: PRIVATE_INVESTMENT				
Method: Least Squares				
Date: 04/21/19 Time: 21:43				
Sample: 1 72				
Included observations: 72				
C	27.47811	2.703747	10.16297	0.0000
Government_DebT	0.058859	0.011088	5.308394	0.0000
Government_Spending	-1.302209	0.150828	-8.633765	0.0000
Tax_Revenue	0.957475	0.085915	11.14439	0.0000
R-squared	0.887300	Mean dependent var		22.29511
Adjusted R-squared	0.882328	S.D. dependent var		3.241996
S.E. of regression	1.112114	Akaike info criterion		3.104356
Sum squared resid	84.10228	Schwarz criterion		3.230837
Log likelihood	-107.7568	Hannan-Quinn criter.		3.154708
F-statistic	178.4570	Durbin-Watson stat		0.622998
Prob(F-statistic)	0.000000			
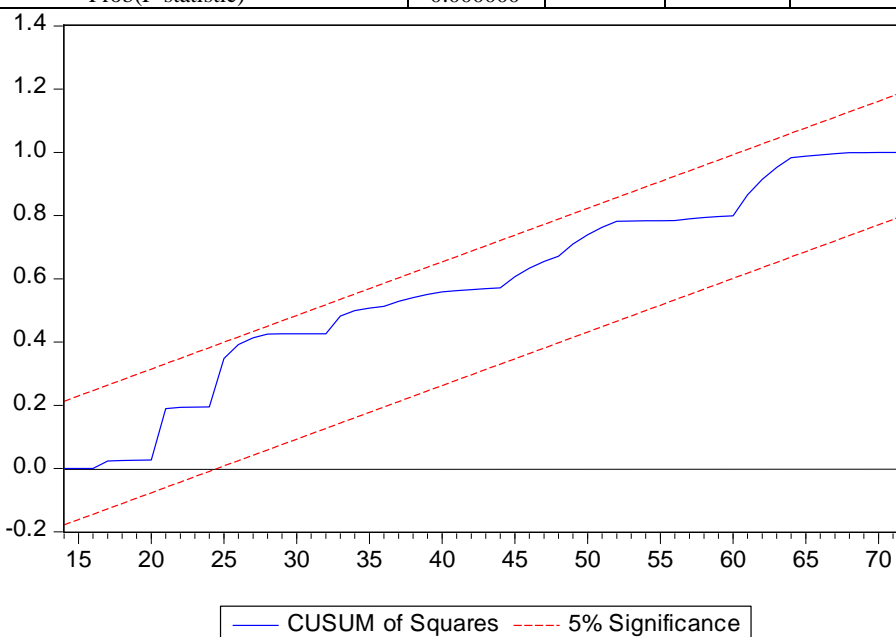
Figure 1: CUSUM Stability test
Source: Researcher, 2019

Figure 2: CUSUMSQ Stability test
Source: researcher, 2019

Series: Residuals
Sample 1 72
Observations 72

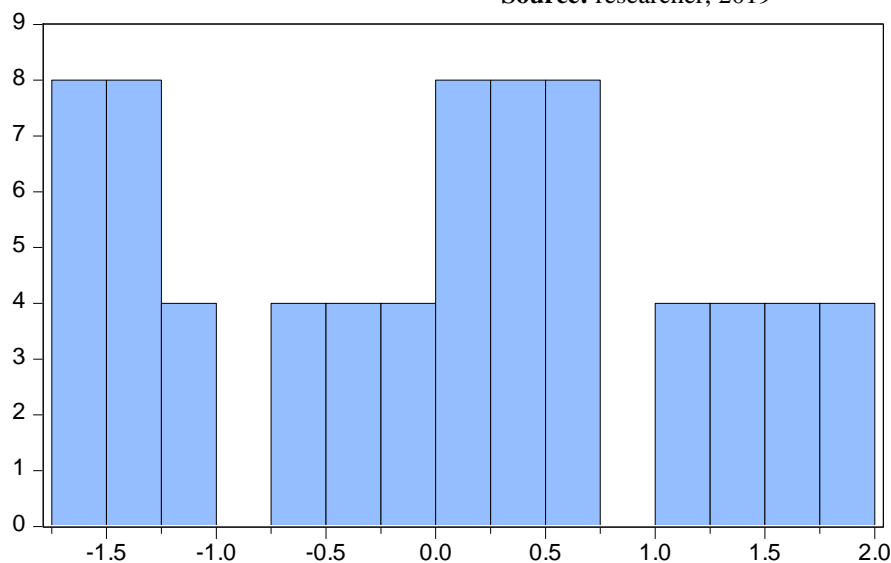|	
Mean	-1.51e-14
Median	0.085670
Maximum	1.969899
Minimum	-1.597920
Std. Dev.	1.088365
Skewness	0.067822
Kurtosis	1.938323
Jarque-Bera	3.436671
Probability	0.179364

Figure 3: Normality test

Source: researcher, 2019

Table 4.7: heteroscedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	5.083512	Prob. F(3,68)	0.0672
Obs*R-squared	13.18957	Prob. Chi-Square(3)	0.0042
Scaled explained SS	5.519577	Prob. Chi-Square(3)	0.1375

Source: researcher, 2019

Table 6: Serial correlation findings

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	31.94220	Prob. F(2,66)	0.2560
Obs*R-squared	35.41362	Prob. Chi-Square(2)	0.1870

Source: researcher, 2019

6.2 Effect of Tax revenue on private investment in Rwanda

Tax revenue had a significant positive effect on private investment in Rwanda. There is a strong positive association between tax revenue and private investment from the correlation findings. From the multiple regression findings, the coefficient of regression for tax revenue was found to be significant and stable. A one percent change in tax revenue brings a 95.74% change in private investment in the same direction, ceteris paribus. These findings are against the theory which argues that taxes discourage investment through increased cost of production and indirect effect on prices of goods which lowers demand. However, through favorable taxation policies and reforms like tax incentives for investors and reduced tax on essential commodities, taxation can stimulate private investment by raising consumption levels hence need for more output hence increased investment. The revenue from tax can also be channeled to loanable funds hence increasing investment. These findings of this study are similar to those of Ubesie (2016) who also found a positive significant effect of government revenue mainly contributed by taxes on private investment in Nigeria. However, the findings do not fully agree with the findings of Gitahi (2012) who argued that taxes could either promote or deter private investment in the short run or long run.

7. Conclusions and Recommendations

The researcher made the following conclusions based on the findings of the study.

First, data set was made stationary before modelling the relationship between fiscal components and private investment. This was confirmed in the first difference results when the null hypothesis of presence of unit root was reject meaning the data is stationary. The rejection of null hypothesis of none cointegrating equations in the cointegration analysis confirms that there is cointegration between the study variables. Therefore, the study concludes that there is a long run relationship between the study variables.

There is a strong positive association between private investment and tax revenue indicated with high correlation coefficient of 0.855 in the correlation analysis findings. There is a high negative correlation between private investment and both government spending and government debt. This is indicated by a high negative coefficient

between these variables in the correlation table. An increase in tax revenue leads to an increase in private investment whereas an increase in government spending or government debt leads to a fall in private investment according to the correlation findings.

Lastly fiscal components captured in this study have significant effects on private investment. Keeping other factors constant 1% change in tax revenue, government spending and government revenue leads to a change in private investment by 95.75%, 130.22% and 5.9% respectively. With no effects of fiscal components, private investments stand at 27.478% of GDP. Lastly fiscal components captured in this study account for 88.7% of changes in private investments.

7.2 Recommendations

Based on the results and conclusions regarding the effects of fiscal components on private investment in Rwanda, the study makes some recommendations.

First the study recommends that the government's efforts in implementing the tax reforms bears fruit in terms of encouraging private investments and therefore there is need for more reforms to be put in place to ensure more revenue is generated in form of tax as tax is the main source of government revenue. This will go a long way in supporting private investors more so domestic investors hence increasing private investment.

Secondly the study found a positive effect of government debt on private investment. This implies that debt increases private investment. Therefore, this study encourages debt taking by the government and recommends proper utilization of such debts to stimulate economic growth by advancing investment loans through financial institutions using such borrowings. Lastly government spending is found to have a negative significant effect on private investment. The study recommends that most of government expenditure be focused on stimulating private investment in order to avoid crowding out of such private investments in the economy. This will ultimately lead to a positive impact of government spending on private investment.

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