Impact of Domestic Public Debt on Private Investment in Burundi

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Abstract

In order to meet different financing needs, many developing countries rely on local resources through domestic public debt. The endless search of internal financing by States weighs too much on private investment through its impact on the banking system. The aim of this study is to determine the effect of domestic public debt on private investment in Burundi between 1980 and 2020. By so doing, we estimate a 41 observations’ series based linear model.

The main result obtained from our sample analysis, shows that in Burundi, domestic public debt has negatively influenced the private investments. Nevertheless, this relationship is not significant because in Burundi the State relies on domestic financing to cope with cyclical cash deficits. This situation also finds its justification in the fact that some private investments are made without looking for bank loans due to the fact that a large part of the Burundi economy is informal.

Keywords: Domestic public debt, Investment, private sector, banking system, informal economy, cash deficits

Introduction

In 17 countries of the Organization for Economic Co-operation and Development (OECD), using data collected over one year, domestic public debt has a positive effect on private investment (Afonso and St Aubyn, 2009) [1]. Using quarterly data,


For developing countries, Emran and Farazi (2009) [7] estimated the magnitude of the effect of domestic government borrowing on private sector credit using data from 60 countries. In this regard, they found that there is a negative and significant effect of government borrowing on private sector credit. In other words, in these countries, when government borrowing increases by $1, credit to the private sector falls by $1.4.

Using time series for different developing countries, Atukeren (2005) [2] showed that for the economies of countries such as Pakistan, Morocco and South Africa, the two types of investment are rather complementary. In the same vein, Erden and Holcombe (2005, 2006) [9] concluded that public and private investment are complementary in developing countries.

In Burundi, as in other developing countries, public debt can be considered as one of the main sources of financing for the State in the framework of the implementation of its budgetary policy. However, there is a great deal of debate about government borrowing because it can lead to over-indebtedness and thus hinder the country's development if it is not used efficiently and productively.

The annual report of the Bank of the Republic of Burundi (BRB, 2019) shows that Burundi is getting more indebted internally. The outstanding public debt increased by 18.5% to BIF 3,263.4 billion from BIF 2,753.5 billion in 2018. This increase concerned both the domestic debt (+35.3%) and the external debt (+16.3%). In relation to the Gross Domestic Product (GDP), the total public debt represented 52.2% in 2019 against 47.3% in 2018.

Since 2014, there has been a trend for Burundi to resort much more to domestic debt than to external debt. Domestic public debt accounts for 70% of total debt and increased sharply in 2015. External debt was 18.4% of GDP in 2020 compared to 36% of GDP in 2012. In such a situation, the debt can create a snowball effect in the sense that the more the outstanding debt increases, the more the interests increase as well, which leads to the slowing down of the investment flows.

In principle, local financial resources are distributed among the various economic agents in the public and private sectors. This leads everyone to wonder about the weight that domestic public debt can exert on private investments in Burundi.

In general, debt operations can affect the money market through three channels: a change in government securities held by banks which would indeed lead to a change
in the volume of bank deposits; a change in the volume of bonds held by non-bank investors which somehow changes the investment and transaction money and a change in funds between banks and the central bank (Wissem, 2007) [17].

Domestic public debt can have positive effects (leverage effect) or negative effects (crowding out effect) on private investment. Based on this negative or positive impact that domestic public debt can have on private investment, we were interested in this theory to make an in-depth analysis of domestic public debt on private investment in Burundi.

The overall objective of this study is to analyze the effects of domestic public debt on private investment in Burundi.

More specifically, it aims to: (i) assess the effects of domestic public debt on credit to the private sector through the factors that determine credit to the private sector in Burundi; (ii) analyze whether there is a long and short term relationship between domestic public debt and credit to the private sector.

Based on the results of the empirical literature, domestic public debt would have a negative effect on private investment in Burundi.

1. Materials and Methods

Our study covers the period from 1980 to 2020 because the debt crises began in the 1980s. The scope of analysis is Burundi, a country that has already benefited from debt relief under the Heavily Indebted Poor Countries Initiative (HIPC).

In the realization of our study, we used the data which come from the reports of the BRB and the statistical yearbooks at the Institute of Statistics and Economic Studies of Burundi (ISTEEBU). After the collection of the various necessary data, we proceeded to the treatment of these data with the software of application in Econometrics.

Using Excel and Eviews software, we proceeded to: (i) the univariate analysis which allows us to describe the quantitative data available for the analysis of our study (for this purpose, we used Excel and Eviews software), (ii) bivariate analysis to test the association between the dependent variable of our study and the independent variables (this analysis was useful to find the correlation coefficients between the variables of our model), (iii) multivariate analysis to carry out the regression of the variables of our econometric model with fixed effect and random effect by the method of Least Ordinary Square (MCO).

This allowed us in this work to estimate the relationship between domestic public debt and credit granted to the private sector.

To choose our model, we referred to the model specified by Mouhamadou (2013) [12]. It interested us because it is applied on an African country. For him, the model used is the following:
GFCF=f (GNP, DEx, RCh, CIE, TIR, TCR, M2), where:

- GFCF: Gross Fixed Capital Formation;
- GNP: Gross National Product;
- DEx: External debt;
- RCh: Foreign Exchange Reserve;
- CIEt: Internal credit granted to the State;
- RIRt: Real Interest Rate;
- TCRt: Real Exchange Rate.

Knowing the number and type of variables involved in the construction of our equation, we used the following log-linear model:

\[ LCSP_t = a_0 + a_1 \log(CIE_t) + a_2 \log(PIB_t) + a_3 \log(M2_t) + a_4 \log(TIR_t) + a_5 \log(TCR_t) + \epsilon_t; \]

where:
- \( a_n \) expresses the coefficient associated with each variable;
- "LCSPt" expresses the Logarithm of Credits to the Private Sector;
- "LCIEt" expresses the Logarithm of Internal State Credits;
- "LPIBt" means the Logarithm of Gross Domestic Product;
- "LM2t" refers to the Logarithm of the Money Supply level;
- "RIRt" means the Real Interest Rate;
- "LTCRt" means the Logarithm of the Real Exchange Rate;
- \( \epsilon_t \) translates the error term.

We used log data in our model because they have advantages in that they allow us to identify the elasticities of the explained variable with respect to the explanatory variables. The use of log data also ensures the linearity of the model to be estimated.

To estimate these coefficients, we used the error correction model, which allows us to obtain the short-run and long-run elasticities of the main explanatory variables for private sector credit in Burundi.

To judge the significance of our model, some tests have been borrowed. The significance of the variables individually was analyzed on the basis of Student's \( t \)-statistic while the significance of the coefficients taken as a whole was illustrated by the value of Fisher's \( F \)-statistic.

Furthermore, the value of the coefficient of determination \( R^2 \) and especially \( R^2 \)-adjusted can be used to judge whether a model is valid or not. The coefficient of determination indicates the percentage of the total variation of the dependent variable due to the presence of the explanatory variables.

The value of \( R^2 \) varies between 0 and 1. We conclude that the independent variables do not explain the variation of the dependent variable if the coefficient of determination
tends towards 0. On the other hand, if $R^2$ tends towards 1, this indicates that the explained variable varies according to the explanatory variables.

The adjusted $R^2$ coefficient is adjusted for degrees of freedom and increases with the explanatory power of the model. It decreases with the losses in degrees of freedom. Generally, if the equation is well specified, the values of the two statistics $R^2$ and $R^2$ adjusted are close.

2. Presentation and discussion of results

For our work, these previously presented tests were performed and the results are presented in the following tables.

2.1. Results of the unit root tests

The verification of the stationarity of the time series is a necessary condition to go to the next steps in the analysis of the results.

<table>
<thead>
<tr>
<th>Test</th>
<th>Stationarity of the variables in level at the 5% threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADF at 5%</td>
</tr>
<tr>
<td>LCIE</td>
<td>-0.5170</td>
</tr>
<tr>
<td>LCSP</td>
<td>1.2759</td>
</tr>
<tr>
<td>LPIB</td>
<td>-0.5237</td>
</tr>
<tr>
<td>LM2</td>
<td>0.8855</td>
</tr>
<tr>
<td>LTCR</td>
<td>-1.1111</td>
</tr>
<tr>
<td>SHOOT</td>
<td>-1.5806</td>
</tr>
</tbody>
</table>

Source: Our surveys.

By analyzing the above table, we note that all the variables are non-stationary in level because the calculated values are higher than the critical values at the 5% threshold. This statement is corroborated by Bourbonnais (2003) and Doucoure, B.F (2003, p.81) [4].

As the series are not stationary in level, we applied the same tests in first difference and the results are presented in the following table.
Table 2: Results of the first difference stationarity test.

<table>
<thead>
<tr>
<th>Test</th>
<th>Variable</th>
<th>Stationarity of the variables in first difference at the 5% threshold</th>
<th>ADF at 5%</th>
<th>PP at 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Calculated value</td>
<td>Critical value</td>
<td>Stationary &quot;yes or no&quot;</td>
</tr>
<tr>
<td>LCIE</td>
<td>-6.9647</td>
<td>-2.938</td>
<td>YES</td>
<td>-10.7075</td>
</tr>
<tr>
<td>LCSP</td>
<td>-5.6416</td>
<td>-2.938</td>
<td>YES</td>
<td>-5.6481</td>
</tr>
<tr>
<td>LPIB</td>
<td>-4.0245</td>
<td>-2.938</td>
<td>YES</td>
<td>-3.6104</td>
</tr>
<tr>
<td>LM2</td>
<td>-5.9158</td>
<td>-2.938</td>
<td>YES</td>
<td>-5.9184</td>
</tr>
<tr>
<td>LTCR</td>
<td>-3.9162</td>
<td>-2.938</td>
<td>YES</td>
<td>-3.9290</td>
</tr>
<tr>
<td>SHOOT</td>
<td>-5.6684</td>
<td>-2.938</td>
<td>YES</td>
<td>-5.6962</td>
</tr>
</tbody>
</table>

Source: Our surveys.

All variables are stationary in first difference with Augmented Dickey Fuller (ADF) and Philips-Perron (PP).
Thus, as proven by Engle and Granger (1987) [8], the logarithms of most macroeconomic variables are integrated of order 1, we find that our series are all integrated of order 1. This is the most frequent case and also the most interesting from the point of view of economic content as already pointed out.

2.2. Estimation results for the static relationship between the variables
The estimation is based on the following long-term relationship model:
\[
\text{LCSP}_t = C + a_1\text{LCIE}_t + a_2\text{LPIB}_t + a_3\text{LM2}_t + a_4\text{LTIR}_t + a_5\text{LTCR}_t + \epsilon_t.
\]

The regression of this equation gives us the coefficients from a1 to a5 which are elasticities. The table below presents the results of the estimation of the static relationship.

Table 3: Our results from the estimation of the static relationship

<table>
<thead>
<tr>
<th>Explained variable</th>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>t-statistics</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCSP</td>
<td>Constant</td>
<td>2.335435</td>
<td>5.099950</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>LCIE</td>
<td>-0.041731</td>
<td>-0.675172</td>
<td>0.5040</td>
</tr>
<tr>
<td></td>
<td>LPIB</td>
<td>0.180180</td>
<td>2.915086</td>
<td>0.0062</td>
</tr>
<tr>
<td></td>
<td>LM2</td>
<td>1.67E-07</td>
<td>6.829993</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>LTCR</td>
<td>1.392876</td>
<td>8.528631</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>LTIR</td>
<td>-0.092540</td>
<td>-3.685685</td>
<td>0.0008</td>
</tr>
</tbody>
</table>

R²: 0.989259 F-statistic: 644.6864
R²-adjusted: 0.987724 Prob (F-statistic): 0.000000

Source: Our surveys
From this table, we have coefficients that are interpreted as elasticities of the dependent variable Credit to the Private Sector (CSP) with respect to each independent variable.

From an econometric point of view, we note that the values of the coefficients of determination $R^2$ and $R^2$-adjusted obtained are all significant. Thus, more than 98% of the variability of the CSP is explained by the related exogenous variables. In other words, the variation of CSP is explained by the joint variation of these exogenous variables.

From an economic perspective, the results of this table tell us that in the long run:

The Internal State Credit (ISC) has no significant influence on the evolution of the PSC;
The evolution of GDP, the M2 money supply, the RCR and the IRR have a significant influence on the evolution of the PSC;
Thus, in the long term, the EIF has a negative but not significant influence on Private Sector Credit.

We then performed the co-integration test to test for the existence of a stable long-run relationship between the variables in our model.

2.3 Results of stationarity tests on the residual series

For the cointegration relationship to be validated, the residual from the static regression must be stationary as noted above. We then proceeded to the cointegration test by applying the test to the residual. The stationarity of the residual is tested using the Dickey-Fuller (DF) or Augmented Dickey-Fuller (DFA) tests.

The following table presents the results of the stationarity test on the residual series.

<table>
<thead>
<tr>
<th>Test Variable</th>
<th>ADF</th>
<th>VC at 5%</th>
<th>Stationary (YES or NO)</th>
<th>pp</th>
<th>VC at 5%</th>
<th>Stationary (YES or NO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>-2.8227</td>
<td>-1.949</td>
<td>YES</td>
<td>-2.8277</td>
<td>-1.949</td>
<td>YES</td>
</tr>
</tbody>
</table>

Source: Our surveys.

From the results of this table, we see that the series of residuals from our model is stationary in level, thus integrated of order zero, since the values calculated with the ADF and PP tests are far below the critical values at the 5% threshold.

Therefore, we claim that the series in our model are co-integrated and that there was a long-run relationship between the variables under the period of our study from 1980 to 2020. In other words, each of the different variables considered by our
analysis is co-integrated with the CSP as claimed by Brooks (2014) [6] and Niyimbanira (2015) [13].

2.4. Results of the Error Correction Model (ECM) test

Since the series are co-integrated, the analysis is deepened by estimating the short-term dynamics with the Error Correction Model (ECM), which makes it possible to calculate the adjustment coefficients (velocities) and to check the adequacy of the co-integration relationship.

Table 5: Our results from the MCE test

<table>
<thead>
<tr>
<th>Explained variable</th>
<th>Controllers</th>
<th>Coefficient</th>
<th>t-statistics</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δ LCSP</td>
<td>C</td>
<td>0.084150</td>
<td>2.209827</td>
<td>0.0358</td>
</tr>
<tr>
<td></td>
<td>Δ (LCIE)</td>
<td>-0.032723</td>
<td>-0.960119</td>
<td>0.3455</td>
</tr>
<tr>
<td></td>
<td>Δ (LCIE(-1))</td>
<td>-0.005004</td>
<td>-0.146026</td>
<td>0.8850</td>
</tr>
<tr>
<td></td>
<td>Δ (LM2)</td>
<td>1.18E-07</td>
<td>4.320086</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td>Δ (LM2(-1))</td>
<td>1.63E-08</td>
<td>0.418566</td>
<td>0.6788</td>
</tr>
<tr>
<td></td>
<td>Δ (LP1B)</td>
<td>0.023239</td>
<td>0.610600</td>
<td>0.5466</td>
</tr>
<tr>
<td></td>
<td>Δ (LP1B(-1))</td>
<td>-0.007431</td>
<td>-0.084031</td>
<td>0.9337</td>
</tr>
<tr>
<td></td>
<td>Δ (LT2C)</td>
<td>0.428945</td>
<td>1.655638</td>
<td>0.1094</td>
</tr>
<tr>
<td></td>
<td>Δ (LT2C(-1))</td>
<td>0.050059</td>
<td>0.174517</td>
<td>0.8628</td>
</tr>
<tr>
<td></td>
<td>Δ (TIR)</td>
<td>0.000156</td>
<td>0.007133</td>
<td>0.9944</td>
</tr>
<tr>
<td></td>
<td>Δ (TIR(-1))</td>
<td>0.006311</td>
<td>0.269922</td>
<td>0.7893</td>
</tr>
<tr>
<td></td>
<td>R (-1)</td>
<td>-0.351843</td>
<td>-2.970125</td>
<td>0.0062</td>
</tr>
<tr>
<td></td>
<td>R (-1)</td>
<td>-0.351843</td>
<td>-2.970125</td>
<td>0.0062</td>
</tr>
</tbody>
</table>

Source: Our surveys.

From an econometric point of view, the coefficient associated with the recall force R=-0.351843 is negative and significant at the significance level below 5%. This allows us to conclude that our model is valid in the short run.

From an economic perspective, the coefficients from the ERM estimation are interpreted as short-run elasticities. Regression with the logarithms of the dummy variables gives us the overall short-run elasticities.

The following table shows the short-run and long-run elasticities for the variables in our analysis model.
Table 6: Elasticities of Private Sector Credit with respect to explanatory variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>TC elasticities</th>
<th>LT elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCIE</td>
<td>-0.032723</td>
<td>-0.041731</td>
</tr>
<tr>
<td>LPIB</td>
<td>0.023239</td>
<td>0.180180</td>
</tr>
<tr>
<td>LM2</td>
<td>1.18E-07</td>
<td>1.67E-07</td>
</tr>
<tr>
<td>LTIR</td>
<td>0.000156</td>
<td>-0.092540</td>
</tr>
<tr>
<td>LTCR</td>
<td>0.428945</td>
<td>1.392876</td>
</tr>
</tbody>
</table>

Source: Our surveys

In the short term, the 1% increase in domestic credits granted to the State has a negative effect on the evolution of credits to the private sector (0.032%) while in the long term, the same variation causes a reduction of 0.041% of credits to the private sector but, statistically and economically, these effects are not significant.

The negative relationship between internal government credit and credit to the private sector means that the more the ICE increases, the more the PSC decreases, and this is verified theoretically because according to (Raffinot and Idlemouden, 2005) [10], domestic public borrowing can have a crowding-out effect on the private sector. Indeed, if public borrowing exceeds the level of available savings, it causes a decrease in the funds available to private agents.

This relationship is not significant (probability=0.5040, see table 3) because in Burundi the government often resorts to short-term credit to deal with cyclical cash flow deficits without significantly affecting private sector investment. This situation is also explained by the fact that in Burundi some investments are made without recourse to banks due to a large part of its economy being informal. According to the report by Bigirimana Blaise Pascal (2014) [3], the informal sector in Burundi occupies 78.8%.

The M2 variable is significant for both the short and the long run and in both cases it positively influences the explained variable which is credit to the private sector, meaning that the increase in M2 facilitates access to credit for the private sector.

In the long run, the IRR negatively and significantly influences the CSP, and this is consistent with the theory that defends the negative relationship between the interest rate and the credit granted.

The other variables such as GDP and RCR are significant only in the long run and they positively influence the explained variable (CSP); the increase in GDP leads to an increase in credit granted to the private sector due to the availability of financial means.
3. Conclusion and recommendations

The aim of our work was to analyze the effects of domestic public debt on private investment in Burundi in order to highlight the room for manoeuvre available to decision makers to increase, manipulate economic policy instruments concerning domestic public debt and private investment in Burundi.

The econometric analysis led us to conclude that in the long run, the increase in domestic public borrowing did not lead to a reduction in private sector investment, i.e. there is no crowding out effect.

Thus, our hypothesis that domestic public debt has a negative effect on private investment in Burundi is invalidated.

The government should place particular emphasis on implementing legislative measures to increase and mobilize economic actors in the informal sector to migrate to the formal sector.

The results obtained in our study show that domestic public borrowing has not led to a reduction in private sector investment, which suggests that very few investors are using bank credit. Burundian investors should get used to grouping together to ensure credibility with banks and thus invest in larger, more productive projects.

References


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