



CBB Working Paper No. WP/21/2

How Do Fiscal Rules Impact Investments for Small Open Economies?

Keisha N. Blades and Ankie Scott-Joseph

November 29, 2021

The authors would welcome any comments on this paper. Citations should refer to a Central Bank of Barbados Working Paper. The views expressed are those of the author(s) and do not necessarily represent those of the Central Bank of Barbados, its Board of Directors, or Central Bank of Barbados management.



How Do Fiscal Rules Impact Investments for Small Open Economies?

Keisha N. Blades¹ and Ankie Scott-Joseph²

Abstract

This research study investigates the impact of fiscal rules on investments for small open economies (SOEs). A comparative analysis has been conducted on five countries from various regions including the Caribbean, Europe and Latin America. These SOEs are similar to the extent that their policies implemented cannot influence the prices of the goods and services traded on the international market. The period of analysis covered the past two decades, ranging from 2000 up to 2020 and by means of a multimodal approach centred on panel data modelling, we showed that fiscal discipline associated with the presence of fiscal rules could result in stagnated levels of investment. Most of the countries in our study overperformed in meeting their fiscal targets owing to higher-than-expected revenues. Public debt was low and sustainable owing to favourable debt dynamics. However, these SOEs had low execution of public investment despite holding ample fiscal buffers. It appears therefore that the level of stringency associated with fiscal targets and rules could negatively impact investments. Our empirical results offer insights on strategies that could be considered when designing fiscal rules to strengthen the fiscal framework to ensure macroeconomic debt sustainability without compromising overall investment.

JEL Classifications: C01, C23, E22, E62, F43, H30, H50

Keywords: Fiscal Rules, Debt Sustainability, Public Investment, Small Open Economy

¹ Corresponding Author, Keisha Blades, Research Intern, Research and Economic Analysis Department, Central Bank of Barbados, Email: keisha.blades@centralbank.org.bb.

² Dr. Ankie Scott-Joseph, Lecturer of Economics, University of the West Indies, Cave Hill Campus, Barbados, Email: ankie.scott-joseph@mycavehill.uwi.edu.

1. Introduction

Fiscal rules can be defined as fiscal policy constraints implemented with the objective of not only improving debt sustainability but also to strengthen the fiscal framework. This is accomplished by placing numerical targets or limits on economic variables. Such measures have been encouraged by the International Monetary Fund (IMF) in order to facilitate domestic fiscal policy discipline or surveillance by the IMF (IMF, 2009). Along with ensuring fiscal discipline, fiscal rules are also used to stabilise economies by reducing the frequency of fluctuations in output. These measures cannot be changed frequently and act as limits that help to establish sustainable levels of debt and fiscal responsibility such as restricting government spending in “good times”. From a theoretical standpoint, there are four (4) categories of fiscal rules. Budget Balance Rules (BBR) apply a ceiling which constrains the actual deficit. This prevents the debt ratio from increasing. Debt Rules (DR) apply a ceiling or explicit limit to the stock of public debt. Expenditure Rules (ER) apply limits to total, primary and current spending. This is done by applying a ceiling to expenditure or to the ratio of expenditure to gross domestic product (GDP). In this study the expenditure rule is estimated by considering total expenditure given that disaggregated expenditure data was unavailable for each country. Lastly, Revenue Rules (RR) set ceilings or floors on revenues. The most commonly used rules are the Budget Balance Rules and Debt Rules and they are often used in combination.

This paper seeks to explore if the use of fiscal rules has been effective in small open economies (SOEs) by analysing their impact on overall investment. Countries with higher rates of savings have been found to have higher levels of economic growth, compared to those with lower savings rates. This positive relationship was explained by (Misztal, 2010). His hypothesis assumed that economic growth could potentially be stimulated by increases in savings and investments. His research found that economic growth increased in countries where higher levels of investments were made in human capital, physical capital and research and development. However, in countries with lower rates of domestic savings, this economic growth could be dependent on access to international financial markets for financing investments. Conducting an analysis of the impact of fiscal rules on investments in small open economies is critical in order to determine which rules are most effective at supporting investments and economic growth in these types of economies.

Countries have been able to increase productivity through the accumulation of capital (Ribaj & Mexhuani, 2021). Strong fiscal rules can help governments to achieve this outcome from savings and investments. The savings and investment relationship is critical to both long run development and the avoidance of short run economic fallout. The savings rate of many Caribbean territories however, has fallen well below the world average. In 2016, the average Caribbean countries’ savings or investments average was just over 13% (Ram, et al. 2018). This, along with the varied quality of infrastructure across countries of the Eastern Caribbean (due to low rates of investment) and the increased volatility in exchange rates, price variables and flows of capital, has made it particularly difficult to achieve economic growth and development (IMF 2020). A notable contributor to changes in public investment in the Caribbean region, is natural disaster recovery and resilience building. In many cases, capital expenditure has to be channelled towards infrastructural investment. Case in point, Grenada incurred financial cost at an estimated US\$900 million as a consequence of the 2004 Hurricane Ivan. The hurricane damaged more than 80 percent of the country's building structures (Relief Web, 2009).

Fiscal rules could enhance the credibility of fiscal policy and lower the debt levels in SOEs (IMF, 2021). Many SOEs have racked up unsustainable levels of debt, in part due to low economic growth and

vulnerability to economic shocks. Over the last two and a half decades, average Debt-to-GDP levels of the selected SOEs in this analysis exceeded the debt rule of 60% (60% of GDP Maastricht threshold³). In 2020, Barbados (149%), Grenada (71%), Greece (213%), witnessed increases in the ratio, while Ireland (60%) was at the threshold and Peru (35%) below. Currently there are no revenue rules in the small open economies studied in this research and only two (2) countries; Grenada and Peru, have expenditure rules. The budget balance rule - primary surplus to GDP- is adopted in each of the selected small open economies; Barbados (6%), Grenada (3.5%), Greece (3.5%), Ireland (0.5%) and Peru (1%).

In 2018, Barbados implemented the Barbados Economic Recovery and Transformation (BERT) plan. The objective of this plan was to improve Barbados' fiscal position, achieve a sustainable level of debt, restore foreign reserves, and increase economic growth (IDB 2019). Prior to the Corona Virus pandemic, Barbados had been making good progress at achieving this. However, a sharp decline in tourist arrivals and stalled economic activity due to movement restrictions and lockdowns, led to a fall in revenue for 2020. As a result, the target for primary surplus initially set at 6 percent, had to be reduced to 1 percent of GDP surplus and then to 1 percent of GDP deficit (IMF 2021). Further support over the medium and long term has been given by introducing a fiscal rule by the middle of 2021. The design of the fiscal rule will increase coverage and the fiscal responsibility legislation will include an escape clause to accommodate the impact of natural disasters and other potential shocks (IMF, 2021).

According to the 2019 IMF Staff Country report, Greece (IMF, 2019) has and continues to meet its fiscal targets. The country overperformed against these fiscal target commitments in 2018, where the primary balance of 4.2 percent of GDP, surpassed the target of 3.5 percent and the 2019 primary surplus was projected to exceed Greece's 3.5 percent of GDP commitment. This was as a result of increased tax revenue collection and low public investments. At the beginning of the pandemic, Greece was still in its recovery process and despite its high tourism dependency and pre-existing vulnerabilities, the economy only contracted by 8.2 percent in 2020. Its public debt spiked in 2020 and 2021 but is expected to decline gradually and remain stable over the medium term. The pandemic has since highlighted the country's large public investments and social spending gap. Recommendations have been made to increase spending on health, education, housing, childcare and unemployment benefits, infrastructure, digitalisation, "green" mobility, and human capital (re-skilling/training) (IMF, 2021).

Grenada has advanced with respect to the comprehensiveness of its Fiscal Rules (FROC, 2016). The Fiscal Responsibility Act outlines the objectives of the fiscal rules and it is commonly used in the Caribbean. Accordingly, the Government of Grenada introduced the Fiscal Responsibility Act No. 29 of 2015. The objectives of this Act are "to establish a transparent and accountable rule-based fiscal responsibility framework in Grenada, to guide and anchor fiscal policy during the budget process, to ensure that government finances are sustainable over the short, medium, and long term, consistent with a sustainable level of debt, and for related matters." Grenada has the most comprehensive set of rules; there are six (6) rules and one (1) target. There was compliance with three (3) of the rules, compliance with one (1) with reservation and non-compliance with two (2) (FROC, 2016). The fiscal responsibility law (FRL) has been successful in guiding fiscal policy, but its next phase of implementation aims to strike a proper balance between fiscal prudence and much-needed increases in productive spending, as public capital spending has been particularly low in recent years (IMF, 2020). Pre-pandemic growth had

³ European Fiscal Board 2019.

been rigorous; however, this has been severely impacted by the halt in tourism arrivals. As a result, government announced fiscal support to the economy by deploying its fiscal buffers for an effective response to the crisis.

The outlook for the Irish economy prior to the 2020 global pandemic appeared to be positive with strong growth, unemployment nearing historical lows, improved public finances and the economy was operating at near full capacity. Despite the favorable outlook of the economy, the country was uniquely vulnerable to Brexit (IMF, 2019). That said, policymakers were focused on accelerating fiscal consolidation to build buffers and strengthen resilience of the economy in preparation for a possible major external shock. The policy space built before the pandemic, resulted in a limited fiscal deficit of around 5 percent of GDP in 2020 and the policy stance continues to be supportive considering the vulnerabilities of the pandemic and Brexit (IMF, 2021). The current fiscal space and the Next Generation EU recovery funds are being used to scale up public investment in the near term and public debt-to-GDP ratio is projected to increase to 63 percent this year before declining over the medium-term to 53 percent. Low interest rates, growth as well as the projected return to primary surpluses makes the long-term target of reducing the debt- to-GDP ratio below 50 percent possible (IMF, 2021).

During 2019, Peru outperformed its fiscal target commitments due to increased revenues and under-execution of public investment. This resulted in a procyclical fiscal stance which reflected in the limited capacity of investment execution (IMF, 2020). Public debt was low and sustainable owing to favourable debt dynamics and the country held ample fiscal buffers in the form of bank deposits. The pandemic presented an unprecedented challenge and required a broad-based fiscal response to contain its impact. Though this response was initially poorly implemented, Peru's fiscal space held under the current fiscal rules, made policy buffers adequate to withstand the impact of the COVID-19 pandemic (IMF, 2021). Even though public debt remained low, increased spending and looming uncertainty surrounding the pandemic led to the temporary suspension of fiscal rules in 2020-2021 (IMF, 2021).

Fiscal rules can be applied to government expenditure, government borrowing, taxes or the fiscal balance. The debt criterion is difficult to fulfil as, in the short run, a restrictive policy can increase the debt-ratio (Mathieu & Sterdyniak, 2012). A rigid rule has the potential to constrain government expenditure and consumption and it is against this background that there are two critical questions of interest in this study; (1) What are the impacts of fiscal rules on investments in small open economies? (2) How can fiscal rules currently used by these small open economies be improved? The conclusions of such an analysis are both important and timely because we found that countries with small open economies suffer from structural economic imbalances along with large infrastructure and service gaps, particularly following debt restructuring programs. It appears that most of the countries in our study overperformed in meeting their fiscal targets but at the expense of low execution of public investments, resulting in infrastructural gaps. Deficiencies in infrastructure can have significant impacts on output and economic growth. For many of these economies already constrained by rising debt levels and stagnated growth, this is a major concern. This has motivated the investigation of the impact that fiscal rules have on investments in these small open economies especially since there are limited studies on the effect of fiscal rules on total investment outcomes. The authors believe that designing effective fiscal rules could significantly narrow these gaps, improve expenditure efficiency, strengthen investment management systems, and boost economic growth.

The remainder of the paper is organised as follows. Section 2 reviews previous research on fiscal rules and design, debt, public investment and growth and identifies our contribution to the literature. Section 3 presents the data used and describes our empirical strategy. Sections 4 reports the main results and conclusions. Lastly, Section 5 concludes by discussing policy implications and avenues for future research.

2. Literature Review

The objective of fiscal policy can be relatively unclear. The question often becomes should fiscal policy target full employment or the equilibrium of public finances? What is clear however, is the general impact of fiscal policy on public investments. Some studies found that countries with low saving rates also have low investment rates (Bayoumi, 1990; Dooley, Frankel & Mathieson, 1987; Feldstein & Horioka, 1980). According to the authors, the positive relationship between domestic savings and domestic investment is often viewed as evidence of imperfect international capital flows. Clarity in the literature is also required on how fiscal rules allow countries to run optimal fiscal, savings, investments and debt policies. Many studies investigate the various linkages between fiscal balances and the economy.

2.1 Alternative Rules and Public Investment

The use and impact of alternative fiscal rules such as the Structural Fiscal Deficit Rule (SFDR) and the Golden Rule or Current Deficit Rule (CDR), have been investigated by W. Mendoza, et al. (2021). Since SFDR does not take cyclical movements into account, the authors found that SFDR was more effective at predicting public expenditure as it remains the same regardless of whether the economy is in a boom or a bust. According to them, procyclicality appeared to be lower with the golden rule as compared to the fiscal deficit rule. Also, with the golden rule, public investment is financed through borrowing while current expenditure is financed by government revenues. This promotes the protection of capital expenditure and ensures that beneficiaries pay for the projects (intergenerational equity). Mendoza et al. (2021) measured the effects of these alternative fiscal rules on public investment and macroeconomic variables, by using a Dynamic Stochastic General Equilibrium Model (DSGE) calibrated for the period 2000-2019.

The Chilean Rule, also known as a budget balance rule, had a specified target for the structural balance for 2001-2007 (surplus of 1 percent of GDP) and has become a reference rule in policy formulation (IMF, 2017). In 2008, a new specified target was defined (surplus of 0.5 percent of GDP) while in 2009 the target of a zero structural surplus was defined with a specified target for the structural balance. Though Chile is not included in our analysis, the Chilean Rule has been successful modernising public finance management and by extension, achieving its goals (IDB, 2013). This rule has also been successful at accumulating significant savings under normal or favourable macroeconomic conditions, i.e. without a recession (Fuentes, et al. (2021)). It is for this reason that the authors reviewed the design and operation of the Chilean fiscal rule in the past 30 years. They used a dynamic stochastic general equilibrium model to simulate the response of the Chilean economy to a set of exogenous shocks (productivity, world interest rates, and the terms of trade), with and without the fiscal rule in operation. The model's aim was to highlight such shocks and their likely effect on public investment and public debt. Lastly, a comparison of pre- and post-fiscal rule periods was carried out to identify whether the rule has had short or long-term impacts on the level of public investment and/or its trajectory. The authors found

that while public investment fell in the short run, during recessionary periods, recovery was faster under the fiscal rule.

Likewise, Sebastien, et al. (2013) investigated the impact of fiscal rules on public expenditure and public investment. They found these rules to have a procyclical effects which was exacerbated by the stringency of fiscal rules that targeted the overall fiscal balance on an annual basis. They also concluded that procyclicality occurred whenever there was a positive relationship between an economic variable and the overall state of the economy. In this paper, Sebastien, et al. (2013) added to previous research by comparing the West African Economic and Monetary Union (WAEMU) to a large sample of other low-income (LIC) and lower middle-income countries (LMIC) for the period 1995-2012. They analysed the pro-cyclicality of public investment and current expenditure, along with the pro-cyclicality of the fiscal balance. This was done by performing a regression analysis for the period 1981 to 1994. This analysis was used to provide evidence of the impact of the fiscal framework on the cyclical patterns of public investment and current expenditures Sebastien, et al. (2013).

2.2 Public Debt, Public Investment and Economic Growth

In discussing the relationship between public debt, public investment and economic growth, Isaac Sánchez-Juárez and García-Almada (2016) stated that there is a positive correlation, which is in line with the findings of other researchers. Moreover, they show that public investment is a positive determinant of economic growth. Sánchez-Juárez and García-Almada (2016) also found that where public debt may be used as an option to finance public investment, it must be fully utilised for this area and not diverted for other purposes, which is always likely due to the configuration of the incentives of the political class in power. The authors used dynamic models with panel data and generalised method of moments (GMM) to produce econometric results confirming that public debt is positively correlated with public investment and that this in turn generates economic growth.

2.3 Fiscal Design and Impact on Debt

Research done by Mathieu and Sterdyniak, 2012 found that it was difficult to design fiscal rules that are able to achieve several objectives simultaneously. Furthermore, Sutherland, et al. (2005) found it difficult to identify the “ideal” rule or set of rules. They discovered that sub-central governments often have to implement more than one fiscal rule and rather than applying them directly to government spending, they apply limits to the sub-central budget balance or borrowing and to tax autonomy, all at once. It is challenging to constrain expenditure by using rules-based controls, and as a result, sub-central governments are often faced with the difficulty of controlling spending despite the increasing demand for services provided to the public. Detailed information about the fiscal rules implemented by the sub-central governments of a number of Organisation for Economic Co-operation and Development (OECD) countries was provided by using responses from questionnaires and other sources.

2.4 The Relationship Between Fiscal Targets, Public Investment and Growth

The paper entitled “Fiscal Rules, Public Investment, and Growth” written by Servén (2007), found that the standard practice among policy makers was to determine the strength of the fiscal accounts solely on the basis of the cash deficit. Servén (2007) acknowledged the importance of short-term cash flows but noted that focusing on them could result in a practice which has encouraged governments to contract investment spending particularly during periods of fiscal tightening, which could negatively impact growth. Since investments in public infrastructure makes up a small portion of GDP and overall public spending, this was of interest to the author. He examined the arithmetic of solvency and its

practical application to offer an analytical review of the links between fiscal targets, public investment and the adverse effects on growth and fiscal solvency. What he found was that using short-term cash flows to determine the strength of public finances could potentially have a negative impact on future growth. Servén suggested that this could be avoided with the use of alternative fiscal rules which used accounting and economic measures of net worth (less focus on liquidity and debt). He however, made it clear that this does not imply that governments should ignore short-term measures of fiscal performance, but rather they should also consider the assets and future revenues to be gained through acquiring debt.

The paper written by (Gupta, et al. (2011), examines the impact of increased public investments on output. It suggested that there was a positive relationship between public investments and demand, which could lead to higher output and economic growth, through increases in the stock of public capital. Gupta, et al. (2011) found that the types of projects selected and their implementation, determined their level of contribution to public capital and economic growth and could potentially dictate the economy's capacity to effectively repay its debts. Throughout the study the authors sought to establish a link between economic activity and the execution of public investment. Estimating the public capital stock was achieved by using the perpetual inventory method and the results confirmed that the type of projects selected and their implementation were critical to the overall investment process. Improvements in project selection and implementation could be made by utilising competitive bidding and internal audits. This could have significant benefits for public investment and growth in low-income countries.

2.5 Fiscal Rules in Alignment with Economic Growth

If public investment turns out to be productive, the design of fiscal rules could potentially impact the growth-friendliness of fiscal adjustment strategies. Authors Ardanaz , et al. (2020) found that the execution of public investment during periods of fiscal consolidations, was heavily dependent on the design of fiscal rules. Flexible fiscal rules were more effective at protecting public investment from budgetary cuts. Included in these flexibility features were well-defined escape clauses and differential treatment of investment expenditures. The study used a sample of 75 advanced and developing countries and analysed the impact of changes in fiscal rule design during 1990-2018. The authors made the distinction between flexible and rigid fiscal rules in their panel regression analysis and results showed that in countries with either no fiscal rule or with a rigid fiscal rule, a fiscal consolidation of at least 2 percent of GDP is associated with an average 10 percent reduction in public investment. They also found that under flexible fiscal rules, the negative effect of fiscal adjustments on public investment vanishes. Ardanaz , et al. conducted a series of sensitivity analyses which included the use of alternative definitions and measures of fiscal consolidations, the introduction of additional variables and verification of whether the results were being influenced by other flexibility features. This revealed how certain flexibility features such as escape clauses can help protect public investment during periods of fiscal tightening.

2.6 Fiscal Sustainability in SOEs

The paper written by Wright, Grenade and Scott-Joseph (2017) discussed the key technical, operational, and institutional issues surrounding fiscal rules. The paper focused on the design, implementation and monitoring of fiscal rules that were relevant to Caribbean countries without any current legislated rules. The authors found that meeting critical economic targets was highly dependent on governments' ability to design and manage binding rules to guide an effective fiscal framework. They examined the

impact of fiscal rules on consumer welfare and macroeconomic variables by undertaking a simulation exercise, with the use of a small open economy real business cycle model. The results of this simulation exercise suggested that fiscal rule design should consider the business cycle of small open economies and seek to enhance consumer welfare while reducing the volatility of macroeconomic variables.

The current contribution to the existing body of literature is to help the reader gain an understanding of the various aspects posed by research on fiscal rules, fiscal design, public investment, debt, and growth. This is significant to gain a clear view of the links between each of the variables and their correlations. Recall the IS-LM model, which stands for "investment-savings" (IS) and "liquidity preference-money supply" (LM). It is a Keynesian macroeconomic model that shows how the market for economic goods (IS) interacts with the loanable funds market (LM) or money market. The Keynesian model argues that increases in government spending could lead to or encourage (crowds in) investment spending due to an accelerator effect (ECB, 2010). Further, if these investments are spent on productive projects such as infrastructure or public health care, it could potentially lead to long-term increases in output. The graph of the IS-LM model implies that during periods of fiscal consolidation government reduces its expenditure or increases taxes and output falls. The changes in these variables as a result of changes in government expenditure, underscores the importance of analysing fiscal rule design and its impact on investments in small open economies.

To the best of the authors' knowledge, there is no literature investigating the impact of fiscal rules on total investment expenditure in small open economies. Taking this into account, the aim of this study is to fill in this gap by using panel data analysis for the past two decades on five countries with small open economies. The main contribution is to analyse the impact of fiscal rules on investments in small open economies.

3. Methodology

This study used annual panel data between 2000-2020 to conduct the empirical analysis and modelled the SOEs fiscal rule by adapting an original version by Ardanaz, M. et. al (2020). The data series selected for the study included: Gross Domestic Product (GDP), Primary Balance (PM), General Government Gross Debt (GD), Total Expenditure (TE), Total Revenue (TR), Total Investment (TI), Inflation (IF) and Interest Payments (IP). The data sets were collected from the Central Bank of Barbados, the Eastern Caribbean Central Bank, World Development Indicators of the World Bank, and the European Statistical System and we analysed using the statistical software Eviews11. The sample included five countries which have undertaken debt restructuring programs within the last 20 years. The countries selected are Barbados, Greece, Grenada, Ireland, and Peru. We were unable to provide country-specific results due to insufficient data and so the paper does not address country specific impacts. Rather, it looks at how fiscal rules can be used to drive investments in small open economies. With regards to defining and measuring fiscal discipline, our discussion does not disaggregate pre and post implementation. The measurement of the impact is assumed to be the same throughout the period under investigation.

The "Golden Rule" advocates for the implementation of fiscal rules in order to restrict governments from running excessive deficits. According to the rule, governments' current expenditure must be financed by revenues from taxation and investment which will increase generational equity, by borrowing. The precise definition of this rule is as follows:

We will assume that a country may wish to maintain a sustainable level of debt by equating its public debt to its public capital stock. Public debt in real terms varies as:

Where $r - \pi$ denotes real interest rate and S_p is the primary government balance:

$$D = D_{-1}(1 + r - \pi) - S_p \quad (1)$$

The public capital stock level varies as:

$$S = S_p - RD_{-1} - (1 - \delta k_{-1} + \pi D_{-1}) \quad (2)$$

Government borrowing should equal net public investment plus debt depreciation due to inflation. From a Keynesian perspective, a certain level of public debt and deficit is necessary to ensure that demand equals potential output. Public deficits result from the macroeconomic situation and are not at the origin of this situation. The public debt rule and the budget balance rule will be investigated to analyse their impact on investments. To answer our research questions, we formulated the following hypothesis:

Hypothesis 1 (H1): there is a significant relationship between investment and the primary balance, general government gross debt, total expenditure, gross domestic product, inflation, and interest payments.

Consistent with the literature discussion the model may be specified as the following:

$$\text{Model: } I_{it} = \alpha_0 + \alpha_1 BB_{it} + \alpha_2 DR_{it} + \alpha_3 ER_{it} + \alpha_4 GDP_{it} + \alpha_5 IF_{it} + \alpha_6 IP_{it} + \varepsilon_{it} \quad (3)$$

Where:

I_{it} = Investments

BB_{it} = Budget Balance Rule

DR_{it} = Debt Rule

ER_{it} = Expenditure Rule

GDP_{it} = Gross domestic product per capita, constant prices

IF_{it} = Inflation, end of period consumer prices

IP_{it} = Interest payments (% of revenue)
 ε_{it} = Error Term
 i = the country
 t = the period analysed (i.e., 2000–2020)

The fundamental building block of fiscal analysis is the inter-temporal budget constraint. The identity can be expressed in mathematical notation as:

$$B_t - B_{t-1} = I_t - X_t - (M_t - M_{t-1}) \quad (4)$$

Hence the subscript t indexes time, which is usually measured in years; B_t is the quantity of public debt at the end of the period t , I_t is interest payments, X_t is the primary balance (revenue minus non-interest expenditure), and M_t is the monetary base at the end of period t .

The starting point is the standard debt accumulation equation:

$$d_t = \frac{1+i_t}{1+y_t} d_{t-1} - pb_t, \quad (5)$$

Where d_{t-1} , y_t and pb_t label the initial debt-to-GDP ratio, the nominal growth potential of the economy which reflects trend dynamics in growth and prices and the primary balance-to-GDP ratio, respectively.

Secondly, the primary balance ratio can be decomposed into a structural cyclical component:

$$pb_t = capb_t + \mu og_t, \quad (6)$$

Where $capb_t$ labels the cyclically-adjusted primary budget balance ratio, μ the cyclical sensitivity of the budget balance and og_t the output gap.

4. Results

This section reports the results of the investigation on the analyses conducted on the variables of interest, in order to examine the impact of fiscal rules on investments for our sample of countries with small open economies. Again, the variables of concern included the primary balance, general government gross debt, total expenditure, gross domestic product, inflation, and interest payments.

The first round of analysis conducted is presented below in the descriptive statistics (see Table 1). The variable definitions are displayed in Table A of the appendix. Based on the standard deviation values, GDP registered the highest volatility, while the budget balance rule, inflation and interest payments registered the lowest volatility. In terms of skewness, nine variables were right skewed and one variable was left skewed. The kurtosis value for three of the variables of interest were below the threshold of three and the results from the Jarque-Bera test indicated that all variables were non-normally distributed at the 1 percent significance level.

Table 1: Descriptive Statistics

	BB	DBS	DR	ER	GDP	IF	I	IP	S
Mean	-2.789	85.602	85.406	33.061	613.405	2.264	20.186	11.327	15.479
Median	-2.202	82.140	79.562	30.833	197.204	2.177	18.942	10.564	14.379
Maximum	5.879	213.101	213.101	65.032	3270.790	9.559	44.794	26.904	36.262
Minimum	-	-	-	-	-	-	-	-	-
Std. Dev.	19.260	19.963	19.963	18.593	6.109	2.535	8.502	2.917	3.882
Std. Dev.	4.651	48.008	48.221	10.911	864.240	2.407	6.606	5.715	7.100
Skewness	-0.460	0.590	0.587	0.759	1.695	0.344	1.184	0.864	0.915
Kurtosis	3.544	2.640	2.612	2.642	4.579	3.156	4.974	3.433	3.510
Jarque-Bera	5.004	6.651	6.689	10.648	61.160	2.178	41.584	13.882	15.804
Probability	0.082	0.036	0.035	0.005	0.000	0.336	0.000	0.001	0.000
Observations	105	105	105	105	105	105	105	105	105

The second round of analysis focused on testing the correlations between the predictors in order to check for multicollinearity issues. The correlation coefficients are presented in Table 2.

Table 2: Correlation Matrix

	BB	DBS	DR	ER	GDP	IF	I	IP	S	TE
BB	1									
DBS	-0.142	1								
DR	-0.135	0.999	1							
ER	-0.366	0.710	0.707	1						
GDP	0.123	-0.121	-0.121	-0.335	1					
IF	-0.107	-0.191	-0.187	-0.180	-0.151	1				
I	-0.048	-0.478	-0.469	-0.257	-0.027	0.124	1			
IP	-0.433	0.451	0.449	0.107	-0.054	0.117	-0.390	1		
S	0.289	-0.601	-0.590	-0.390	-0.117	-0.106	0.662	-0.526	1	
TE	-0.026	-0.087	-0.082	0.291	-0.359	-0.159	0.159	-0.487	0.309	1

Table 2 shows that all correlations registered low to moderate levels. Therefore, we concluded that multicollinearity would not pose any problems for the econometric estimations and conclusions derived from these estimations.

At this stage of the analysis, our focus turns to the econometric estimation.

The Econometric Model 1 (see Table 3) which investigates investments (I), shows the three predictors which proved to be significant were BB and ER and negatively related to investments while IF showed a positive effect. In this sense, when BB rises by one unit, I falls by 0.7 units. Should IF increase by one unit, I would increase by 0.2 units. Moreover, a one unit increase in ER would be followed by a decrease of 0.6 units in Investments.

Table 3: Econometric Model 1

Model 1	
	I_{it} $= \alpha_0$ $+ \alpha_1 BB_{it}$ $+ \alpha_2 DR_{it}$ $+ \alpha_3 ER_{it}$ $+ \alpha_4 GDP_{it}$ $+ \alpha_5 IF_{it}$ $+ \alpha_6 IP_{it}$ $+ \varepsilon_{it}$
C	41.5189 (9.2078)
BB	-0.6790* (-4.5283)
DR	0.0113* (0.5198)
ER	-0.6002 (-4.6307)
LOG(GDP)	0.0006 (0.3128)
IF	0.2783* (1.2455)
IP	-0.4705 (-3.2996)
R-squared	0.532156
Durbin-Watson stat	1.408741

Note: Robust t -statistics are indicated in parentheses; * denotes statistical significance at the 5% level.

5. Discussion

With regards to the cross-section effect estimations, the econometric model revealed relevant results that are consistent with the literature. In line with our expectations, the predictors Budget Balance Rules (BB) and Expenditure Rules (ER) were both negatively related to Investment (I). This relationship tells us that in the face of fiscal discipline there is a tradeoff between current expenditure and productive capital expenditure. When fiscal adjustments are made and the stringency of these fiscal rules are increased with the aim of achieving corresponding increases in the primary surplus, investments will be negatively impacted. The rationale is that during periods of consolidation there could be a crowding out effect and so rather than cutting current expenditure, capital expenditure will be reduced instead. This fiscal adjustment strategy could be ineffective, particularly in cases where investment projects not only “pay for themselves” but also have the ability to yield future income.

According to (Servén, 2007), in Latin America, the fall in public infrastructure investments occurred at the time when most infrastructure sectors were privatised. Results following this, revealed that total investments (public plus private) fell in all infrastructure sectors with the exception of telecommunications. Servén (2007) found it surprising that the countries attracting higher private investment were those that maintained higher levels of public investment. This implies that private and public investment may complement rather than substitute each other. The ideal alternative would be to impose fiscal targets and rules that do not result in the fall in total investment (reflecting the under-execution of public and private investment).

Also revealed by the econometric model is a possible explanation as to why the expenditure rule is not widely used by the countries being examined. The need to comply with targets set through stringent expenditure rules may result in easy cuts in investment spending which could potentially amplify volatility associated with pro-cyclical expenditure cuts, particularly in public and private investments. This approach deviates from the previous arguments found in the literature which suggests that public and private investment complement each other and could be due to the composition of current expenditures. Generally, a large portion of current expenditure is usually made up of wages, transfers, and debt service, therefore making short term cuts difficult. In the event of unforeseen adverse shocks, investment spending will be used to finance the unexpected changes in revenue or current expenditure, making investments a major shock absorber (Sebastien, Sanchez, Luis, & Varoudakis, 2013). This tendency to cut investment expenditure during “bad times” provides justification for underutilising the expenditure rule and underscores the importance of a rules-based framework (the previously mentioned golden rule), which prevents the government from running current account deficits by allowing borrowing to finance investments. Spreading the costs of investments over time without violating fiscal targets allows government to dedicate more resources to investing in revenue-generating projects which have positive return on assets.

Fiscal rules are the instrument of choice to correct excessive deficits (IMF, 2018). It is noteworthy that fiscal rule adoption has been linked to improvement in fiscal balances. However, is this the best way to measure or assess the quality and efficacy of fiscal rules? Well-designed fiscal rules are described as being simple, flexible (provision of escape clauses) and enforceable (incentives for compliers and penalties for non-compliers). Our approach is that rather than relying solely on these three properties as a measure of efficacy, is proposed that consideration be also given to their impact on economic variables such as investment, thereby including their effect on economic growth. Addressing this

consideration could be the key to striking a balance between constraining excessive fiscal deficits and attaining sustainable economic growth.

The preceding discussion does not imply that governments should stop using conventional fiscal rules as a means to strengthen the fiscal framework to ensure macroeconomic debt sustainability. The recommendation is that governments should reassess, redesign and improve the quality of their fiscal rules to make them more effective at ensuring fiscal discipline but doing so without crowding out investment expenditure.

6. Conclusion

Our study has shed some light on the importance of designing effective fiscal rules and how they impact investments in SOEs. Although the presence of a fiscal rule in a country is associated with achieving fiscal discipline, it is important for governments, especially those of developing countries to have well-designed fiscal frameworks that allow for sustainable debt while creating more fiscal space, thus freeing up resources for investment in human and physical capital. The literature has supported our view that investment and economic growth are positively correlated, and the results of our study implies that the type of fiscal rule(s) enacted could impact the level of investment in small open economies. This analysis revealed a negative relationship between investment and the budget balance and expenditure rules. This relationship is concerning since investment plays a key role in the promotion of the governments' objectives of achieving economic growth and improving the welfare of citizens. We acknowledge that the implementation of a fiscal rule framework is necessary in the absence of fiscal discipline, transparency and sustainable levels of debt. However, the absence of economic growth at the expense of fiscal discipline and management seems ineffective and counterproductive. This study therefore recommends that fiscal rules not only give priority to debt sustainability but also to investment, thereby attaining and enhancing sustainable economic growth.

The findings of this study, which included an analysis of five countries from the Caribbean, Europe and Latin America has key policy implications for governments as they try to find the most effective fiscal response to counter economic shocks. Recovery plans for economic shocks such as the recent COVID-19 pandemic will require that investment (both public and private) be scaled up. Quality investment will need to be prioritised in areas such as health care systems, infrastructure, education and green technologies such as wind and solar energy. The current pandemic has highlighted the importance of having a fiscal framework that not only encourages fiscal discipline but also supports investment and economic growth. Most of these SOEs were already faced with constraints imposed by fiscal rules enacted in the past to ensure fiscal discipline prior to the COVID-19 pandemic, with most of them achieving and in some cases overachieving their fiscal targets which resulted in large investment spending gaps.

Fiscal rules such as the expenditure rule, can induce lower levels of public investment. Since expenditure rules do not specify the kinds of spending that needs to be contained to ensure compliance they often lead to excessive cuts in capital spending as noted by the IMF (March 15, 2018). This effect is most striking in developing economies as they often have large growth and development needs. That said, SOE governments from various countries globally should strive to strengthen their fiscal

framework by designing and enacting rules that not only aim to establish a link between numerical limits and fiscal objectives, but also seeks to increase quality investment spending.

7. Appendix

Table A: Variable Descriptions

<i>Abbreviation</i>	<i>Description</i>	<i>Indicator</i>
<i>BB</i>	Balance Budget Rule	Primary Balance
<i>DR</i>	Debt Rule	General Government Gross Debt
<i>ER</i>	Expenditure Rule	Total Expenditure
<i>GDP</i>	Gross Domestic Product	Gross Domestic Product at Current Price
<i>IF</i>	Inflation	Inflation, end of period consumer price
<i>IP</i>	Interest Payments	Interest Payments (% of revenue)
<i>S</i>	Savings	Gross national savings (% of GDP)
<i>I</i>	Investments	Total Investments
<i>DBS</i>	Debt Sustainability	Debt-to-GDP Ratio

Table B: Fiscal Rules for Each Country

FISCAL RULES FOR EACH COUNTRY				
Country	Budget Balance Rules (BB)	Debt Rules (DR)	Expenditure Rules (ER)	Revenue Rules (RR)
Barbados	6%Primary Surplus/GDP	60% of GDP	n/a	n/a
Grenada	3.5%Primary Surplus/GDP	60% of GDP	2% Expenditure Ceiling	n/a
Greece	3.5%Primary Surplus/GDP	60% of GDP	n/a	n/a
Ireland	0.5% Primary Balance/GDP Ceiling	60% of GDP	n/a	n/a
Peru	1% Primary Balance/GDP Ceiling	60% of GDP	4% Expenditure Ceiling	n/a

Source: Fiscal Rules at a Glance (IMF, 2017)

References

- Ardanaz, M., Cavallo, E., Izquierdo, A., & Puig, J. (2020, February). *Growth-Friendly Fiscal Rules? Safeguarding Public Investment from Budget Cuts through Fiscal Rule Design*. Retrieved from Inter-American Development Bank: https://publications.iadb.org/publications/english/document/Growth-friendly_Fiscal_Rules_Safeguarding_Public_Investment_from_Budget_Cuts_through_Fiscal_Rule_Design.pdf.
- Bayoumi, T. (1990). Saving-Investment Correlations: Immobile Capital, Government Policy, or Endogenous Behavior? *JSTOR*. Retrieved from <https://www.jstor.org/stable/3867294>.
- Central Bank of Barbados. (n.d.). *Research and Publications: Annual Reports*. Retrieved from The Central Bank of Barbados: <http://www.centralbank.org.bb/research-publications/publications/annual-reports..>
- Dooley, M., Frankel, J., & Mathieson, D. J. (1987). *International Capital Mobility: What Do Saving-Investment Correlations Tell Us? IMF Staff Papers*.
- Eastern Caribbean Central Bank. (n.d.). *Eastern Caribbean Central Bank Statistics Dashboard*. Retrieved from <https://www.eccb-centralbank.org/statistics/dashboard-datas/>.
- ECB. (2010, November). *European Central Bank*. Retrieved from Keynesian Government Spending Multipliers and Spillovers in the Euro Area: <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1267.pdf>.
- European Fiscal Board. (2019, August). *Assessment of EU Fiscal Rules with a Focus on the Six and Two-Pack Legislation*. Retrieved from https://ec.europa.eu/info/sites/default/files/2019-09-10-assessment-of-eu-fiscal-rules_en.pdf.
- EUROSTAT. (n.d.). *European Statistical System*. Retrieved from <https://ec.europa.eu/eurostat/web/european-statistical-system>.
- Feldstein, M., & Horioka, C. (1980). *Domestic Savings and International Capital Flows*. *The Economic Journal* 90, no. 358 (1980): 314–29. <https://doi.org/10.2307/2231790>.
- FROC. (2016). *Fiscal Responsibility Oversight Committee*. Retrieved from Fiscal Responsibility Oversight Committee 2016 Annual Report: <https://gov.gd/sites/default/files/docs/Documents/reports/froc-report.pdf>.
- Fuentes, J., Schmidt-Hebbel, K., & Soto, R. (2021, March). *Fiscal Rule and Public Investment in Chile*. Retrieved from Inter-American Development Bank: <https://publications.iadb.org/publications/english/document/Fiscal-Rule-and-Public-Investment-in-Chile.pdf>.
- Gupta, S., Kangur, A., Papageorgiou, C., & Wane, A. (2011, September). *Efficiency-Adjusted Public Capital and Growth*. Retrieved from International Monetary Fund: <https://www.imf.org/external/pubs/ft/wp/2011/wp11217.pdf>.

IDB. (2013, June). *The Structural Balance Rule in Chile: Ten Years, Ten Lessons* . Retrieved from <https://publications.iadb.org/publications/english/document/The-Structural-Balance-Rule-in-Chile-Ten-Years-Ten-Lessons.pdf>.

IDB. (2019, December). *Caribbean Region: A look at 2019 and Beyond*. Retrieved from https://publications.iadb.org/publications/english/document/Caribbean_Region_Quarterly_Bulletin_Volume_8_Issue_4_December_2019_en.pdf.

IMF. (2009, December 16). *Fiscal Rules—Anchoring Expectations for Sustainable Public Finances*. Retrieved from International Monetary Fund: <https://www.imf.org/external/np/pp/eng/2009/121609.pdf>.

IMF. (2017, March). *Fiscal Rules at a Glance*. Retrieved from International Monetary Fund: <https://www.imf.org/external/datamapper/fiscalrules/Fiscal%20Rules%20at%20a%20Glance%20-%20Background%20Paper.pdf>.

IMF. (2018, March). *How to Notes: Fiscal Policy - How to Select Fiscal Rules*. International Monetary Fund. March. <https://www.imf.org/en/Publications/Fiscal-Affairs-Department-How-To-Notes/Issues/2018/03/15/How-to-Select-Fiscal-Rules-A-Primer-45552>.

IMF. (2018). *Second-Generation Fiscal Rules: Balancing Simplicity, Flexibility and Enforceability* . International Monetary Fund . April. <https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2018/04/12/Second-Generation-Fiscal-Rules-Balancing-Simplicity-Flexibility-and-Enforceability-45131>.

IMF. (2019, November 15). *Greece : 2019 Article IV Consultation-Press Release; Staff Report; and Statement by the Executive Director for Greece*. Retrieved from International Monetary Fund : <https://www.imf.org/en/Publications/CR/Issues/2019/11/14/Greece-2019-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-48806>.

IMF. (2019, June). *IMF Country Report No. 19/164: 2019 Article Iv Consultation—Press Release; Staff Report; And Statement By The Executive Director For Ireland* . Retrieved from International Monetary Fund.

IMF. (2020, May). *IMF Country Report No. 20/161*. International Monetary Fund. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwi_79OQlb70AhWISjABHa4zBwgQFnoECAoQAQ&url=https%3A%2F%2Fwww.imf.org%2F~%2Fmedia%2FFiles%2Fpublications%2FCR%2F2020%2FEnglish%2F1BRBEA2020001.ashx&usg=AOvVaw0wM5aRmWRe1_ozpskxtcNU.

IMF. (2020, January 13). *Peru : 2019 Article IV Consultation-Press Release; Staff Report; Staff Statement and Statement by the Executive Director for Peru*. Retrieved from International Monetary Fund: <https://www.imf.org/en/Publications/CR/Issues/2020/01/13/Peru-2019-Article-IV-Consultation-Press-Release-Staff-Report-Staff-Statement-and-Statement-48942>.

IMF. (2020, August). *Strengthening Public Investment Management in the Eastern Caribbean Currency Union: Getting more bang for the dollar!* Retrieved from International Monetary Fund: <https://www.imf.org/en/Publications/WP/Issues/2020/08/28/Strengthening-Public-Investment-Management-in-the-Eastern-Caribbean-Currency-Union-Getting-49698>.

IMF. (2021, June 18). *Barbados: Fifth Review Under the Extended Arrangement, Request for Waiver of Nonobservance of Performance Criterion, and Modification of Performance Criteria-Press Release; Staff Report; and Statement by the Executive Director for Barbados*. Retrieved from International Monetary Fund: <https://www.imf.org/en/Publications/CR/Issues/2021/06/18/Barbados-Fifth-Review-Under-the-Extended-Arrangement-Request-for-Waiver-of-Nonobservance-of-460880>.

IMF. (2021, July 16). *Greece: 2021 Article IV Consultation-Press Release; and Staff Report*. Retrieved from International Monetary Fund: <https://www.imf.org/en/Publications/CR/Issues/2021/07/15/Greece-2021-Article-IV-Consultation-Press-Release-and-Staff-Report-462201>.

IMF. (2021, June). *Ireland IMF Country Report No. 21/123 2021 Article Iv Consultation—Press Release; And Staff Report*. Retrieved from International Monetary Fund.

IMF. (2021, March 24). *Peru : 2021 Article IV Consultation-Press Release; Staff Report; and Statement by the Executive Director for Peru*. Retrieved from International Monetary Fund: <https://www.imf.org/en/Publications/CR/Issues/2021/03/24/Peru-2021-Article-IV-Consultation-Press-Release-Staff-Report-and-Statement-by-the-Executive-50305>.

IMF. (2021). *Strengthening the Credibility of Public Finances*. Retrieved from <https://www.elibrary.imf.org/view/books/089/460454-9781513584140-en/460454-9781513584140-en-book.xml>.

International Monetary Fund . (n.d.). *World Economic Outlook Database*. Retrieved from <https://www.imf.org/en/Publications/WEO/weo-database/2021/October>.

Mathieu, C., & Sterdyniak, H. (2012). *Do We Need Fiscal Rules?* Carin. Info. <https://www.cairn.info/revue-de-l-ofce-2013-1-page-189.htm>.

Mendoza, W., Vega, M., Rojas, C., & Anastacio, Y. (2021, Januaryl). *Fiscal Rules and Public Investment*. Retrieved from Inter-American Development Bank: https://publications-iadb-org.translate.goog/publications/english/document/Fiscal-Rules-and-Public-Investment-The-Case-of-Peru-2000-2019.pdf?_x_tr_sl=es&_x_tr_tl=en&_x_tr_hl=en-GB&_x_tr_pto=ajax,elem,sc

Misztal, P. (2010). *Financial Internet Quarterly*. Retrieved from Ministry of Finance and Higher Education: <https://www.econstor.eu/obitstream/10419/66731/1/670173894.pdf>.

Ram, J., Cotton, J., Frederick, R., & Elliot, W. (2018). *A Multidimensional Vulnerability Index for the Caribbean Measuring Vulnerability*. Caribbean Development Bank. <https://www.caribank.org/sites/default/files/publication-resources/Measuring%20Vulnerability-A%20Multidimensional%20Vulnerability%20Index%20for%20the%20Caribbean.pdf>.

Relief Web. (2009). *Grenada: Dealing with the aftermath of Hurricane Ivan*. Retrieved from Relief Web: <https://reliefweb.int/report/grenada/grenada-dealing-aftermath-hurricane-ivan>.

Ribaj, A. A., & Mexhuani, F. (2021, January 08). *The Impact of Savings on Economic Growth in a Developing Country (The Case of Kosovo)*. Journal of Innovation and Entrepreneurship. 08 January. <https://doi.org/10.1186/s13731-020-00140-6>.

Sánchez-Juárez, I., & García-Almada, R. (2016). *Public Debt, Public Investment and Economic Growth in Mexico*. International Journal of Financial Studies 4, no. 2: 6. <https://doi.org/10.3390/ijfs4020006>.

Sebastien, D., Sanchez, D., Luis, J., & Varoudakis, A. (2013, August). *Fiscal Rules and the Pro-Cyclicity of Public Investment in the West African Economic and Monetary Union*. Retrieved from World Bank Group: <https://openknowledge.worldbank.org/handle/10986/15996>.

Servén, L. (2007). *Fiscal Rules, Public Investment, and Growth*. Policy Research Working Paper; No. 4382. Retrieved from World Bank: World Bank. <https://openknowledge.worldbank.org/handle/10986/7543>.

Sutherland, D., Price, R., & Joumard, I. (2005, December). *Fiscal Rules for Sub-Central Governments: Design and Impact*. Retrieved from Organisation for Economic Co-Operation and Development (OECD) - Economics Department (ECO): https://papers.ssrn.com/sol3/papers.cfm?abstract_id=870443.

The World Bank. (n.d.). *Data Bank: World Development Indicators*. Retrieved from <https://databank.worldbank.org/source/world-development-indicators>.

Wright, A., Grenade, K., & Scott-Joseph, A. (2017, February). *Fiscal Rules: Towards a New Paradigm for Fiscal Sustainability in Small States*. IDB Working Paper Series WP-780 Country Department Caribbean Group Inter-American Development Bank. Retrieved from Inter-American Development Bank: <https://publications.iadb.org/publications/english/document/Fiscal-Rules-Towards-a-New-Paradigm-for-Fiscal-Sustainability-in-Small-States.pdf>.