PUBLIC DEBT SUSTAINABILITY IN THE CARIBBEAN

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Introduction

Borrowing policy and public debt management are tools with the potential to accelerate economic growth, alleviate poverty and improve income distribution. The Inter-American Development Bank (IDB, 2006) identifies three reasons why countries contract debt. First, to transfer income from the future to the present. It is assumed that, as countries develop over time, future generations will be richer than the current generation so that this redistribution would be socially optimal. Second, countries borrow to finance development projects. Since in developing countries savings are not enough to satisfy their financing needs, it is convenient to borrow abroad. Later on, the returns of projects financed with external resources would provide revenue to service the debt. Finally, countries borrow in the face of adverse situations such as temporary downturns in economic activity or negative shocks such as natural disasters or financial crises.

Notwithstanding, apart from these potential benefits, there are also latent risks associated with public borrowing. In particular, short-sighted vision that does not pay attention to long-term sustainability could lead to situations of excessive consumption and borrowing, at the cost of future generations' welfare. In addition, projects financed by external sources may have a return lower than expected so that their ex-post profitability would not have justified their implementation. Last, but not least, the accumulation of public debt itself makes macroeconomic management more difficult and increases vulnerability to fiscal and financial crises, as well as their intensity and duration.

The inevitable result of chronic fiscal deficits experienced by most Caribbean countries during the last decades has been a significant accumulation of public debt. Countries like St. Kitts and Nevis, Guyana and Jamaica, for instance, exhibit debt-to-GDP ratios well beyond 100%. This should be a matter of concern, inasmuch as international experience shows that when public debt surpasses a certain threshold, it becomes a serious deterrent of development.

Indeed, Patillo, Poisson and Ricci (2002) conclude that when the debt-to-GDP ratio exceeds 40%, it has a negative impact on economic growth. By the same token, Detragiache and Spilimbergo (2001) found that the probability of a debt crisis increases significantly when it surpasses 40% of GDP. Moreover, Reinhart, Rogoff and Savastano (2003) highlight that countries with low credibility and/or a background of default could show debt intolerance even at much lower levels so that they can experience debt crises at debt-to-GDP ratios that could be manageable for other countries.

This paper analyses public debt in the most indebted Caribbean countries – i.e. Barbados, Belize, Guyana, Jamaica, Antigua and Barbuda, Dominica, Grenada, and St. Kitts and Nevis – from the standpoint of its sustainability. A level of debt is deemed to be sustainable when the

debt-to-GDP ratio remains constant or declines. The concept of sustainability is closely linked to that of solvency. A government is solvent if the net present value of its future primary balances (i.e. that excludes interest payments) is equal to or greater than the present value of public debt stock. It can be demonstrated that if the debt-to-GDP ratio is not on an explosive path, that it either stable or decreasing, the solvency condition holds.

It is worth noting that the concept of fiscal sustainability addressed in this paper differs from that of optimality of public debt. The analysis that follows is intended to determine whether the service of the current debt levels is consistent with the fiscal stance. Therefore, it does not set out to identify the target debt level based on any optimality criteria.

The next section presents the main features of different theoretical approaches to analyse public debt sustainability.[1] Section II discusses the situation of public debt in the Caribbean countries showing different indicators; Section III analyses debt sustainability in countries with access to market financing; Section IV does the same in Guyana – a country dependent on concessional financing and, as such, included in the Highly Indebted Poor Countries (HIPC) Initiative – and the countries of the Eastern Caribbean Currency Union (ECCU). Sections V and VI go beyond debt levels as determinants of fiscal sustainability, highlighting the importance of the currency composition of debt and the variability of fiscal revenue. The last section concludes.

I. Approaches to analyse public debt sustainability

This section briefly presents the main elements of different approaches to analyse fiscal sustainability. First, two operative approximations are showed, one applicable to countries with access to market finance, and the other specifically designed for countries dependent on concessional loans. These two approaches have in common the emphasis on the level of public debt as the key factor for debt sustainability. Then two additional approximations are presented that focus on aspects beyond the magnitude of debt. The first emphasises the importance of the currency composition of public debt in the determination of fiscal vulnerability; the second highlights the role of variability and uncertainty in revenue. In general, these different approaches are complementary to one another; each stresses a particular aspect. A formal synthesis of each approach is presented below.

The IMF approach for countries with access to market finance

The International Monetary Fund (IMF, 2005) developed an approach that leads to the calculation of the primary balance that stabilises the debt-to-GDP ratio. With all variables expressed in domestic currency, the dynamics of public debt is given by:

$$(1)\ D_{t+1} = \left[(1+\varepsilon)(1+r^{*})\right]ED_{t} + (1+r)DD_{t} - S_{t+1}$$

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[1] For a similar analysis applied to Central American countries and the Dominican Republic see Machado (2008), chapter 4.

where *D* is total debt, *ED* is external debt, *DD* is domestic debt, r^* is the nominal interest rate on external debt, *r* is the nominal interest rate on domestic debt, ε is the nominal depreciation rate, and *S* is the primary balance. Subscripts indicate the period.

Expressing (1) as a share of GDP:

$$(2)\ d_{t+1} = \left[\frac{(1+\varepsilon)(1+r^*)}{(1+g)(1+\pi)}\right]ed_t + \left[\frac{(1+r)}{(1+g)(1+\pi)}\right]dd_t - s_{t+1}$$

where the variables in lower cases correspond to the respective variables in capital letters in (1) expressed as a share of GDP, π is the inflation rate and *g* is the real GDP growth rate.

After some algebraic manipulation of (2), the equation of motion for the debt-to-GDP ratio is obtained:

$$(3)\ d_{t+1} - d_t = \frac{1}{1+g+\pi+g\pi}\left\{\left[r^* - \pi(1+g) - g\right]ed_t + \left[r - \pi(1+g) - g\right]dd_t + \left[\varepsilon(1+r^*)\right]ed_t\right\}$$

$$- s_{t+1}$$

Equation (3) identifies the different variables that affect the dynamics of debt as a share of GDP, i.e. the primary deficit, real interest rate on both external and domestic debt, real GDP growth and the nominal depreciation rate.

Keeping total debt as a share of GDP constant and solving (3) for *s* the primary balance that stabilises the debt-to-GDP ratio is obtained:

$$(4)\ s_{t+1} = \frac{1}{1+g+\pi+g\pi}\left\{\left[r^* - \pi(1+g)\right]de_t + \left[r - \pi(1+g)\right]di_t - g(de_t + di_t) + \varepsilon(1+r^*)de_t\right\}$$

This primary balance is increasing in real interest rate on both types of debt and in the depreciation rate, and it is decreasing in the GDP growth rate. Notwithstanding, this result could be misleading if the country in question is already excessively indebted. Indeed, to set a primary balance target that maintains a debt-to-GDP ratio above a certain limit is erroneous. Thus, the annual amount of public debt as a share of GDP that needs to be reduced in order to achieve a certain level deemed to be sustainable in some period of time should be included in the right-hand side of equation (4).

Debt sustainability analysis in HIPC countries

Edwards and Vergara (2002) elaborate a model to analyse fiscal sustainability in countries included in the HIPC Initiative of external debt forgiveness so as to incorporate important elements that are generally not explicitly considered in sustainability analyses for these

countries.[2] In particular, these authors assume that HIPC countries will gradually lose access to concessional financing and that, even after debt alleviation, they will have excessive debt burden for fiscal sustainability.

In addition, this approach explicitly considers revenue derived from seignorage. That is to say, countries can finance a limited level of fiscal deficit through monetary emission. As the demand for money grows with income, supply can grow at the same rate without generating inflationary pressures.

The equation of motion of public debt is:

$$(5) \quad D_{t+1} - D_t = (r^* ED_t + rDD_t) + PFD_{t+1} - (\frac{B_{t+1}}{E_{t+1}} - \frac{B_t}{E_t})$$

where *D*, *ED*, *DD*, *r** and *r* are the same as in (1). *PFD* is the primary fiscal deficit, *B* is the monetary base and *E* is the nominal exchange rate. Subscripts indicate the period. In this case all variables are expressed in U.S. dollars at current prices except for the monetary base that is expressed in local currency at current prices.

Equation (5) indicates that public debt accumulation in *t+1* equals interest payments on external and domestic debt inherited from the previous period plus the primary deficit and minus the change in monetary base. This latter term corresponds to government revenue stemming from seignorage.

Fiscal sustainability demands that the debt-to-GDP ratio stabilises and that the issuance of new debt is consistent with demand both for external and domestic liabilities:

$$(6) \quad \theta \leq (g + \pi^*); \beta \leq (g + \pi^*)$$

where θ is the accumulation rate of debt, β is the accumulation rate of domestic debt, *g* is real GDP growth rate, and π^* is the external inflation rate.

Equation (6) imposes that external and domestic debt as a percentage of GDP does not grow, but at most remain constant when these relationships hold in equality.

Combining (5) and (6) and dividing by GDP in U.S. dollars at current prices (*Y**):

$$(7) \quad \frac{DFP_t}{Y_t^*} = \left\{ (\theta - r^*)(\frac{DE_0}{Y_0^*})e^{(\theta - g - \pi^*)(t-1)} + (\beta - r)(\frac{DI_0}{Y_0^*})e^{(\beta - g - \pi^*)(t-1)} \right\} \left\{ \frac{1}{1 + g + \pi^*} \right\}$$

$$+ (g + \pi)\left(\frac{B_0}{Y_0} \right) \left\{ \frac{1}{1 + g + \pi} \right\}$$

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where π is domestic inflation rate, Y is GDP in domestic currency and subscript 0 represents the initial period of analysis.

In equation (7) it is assumed that the nominal exchange rate is given and that each period the monetary base grows at the same rate than nominal GDP in domestic currency $(g + \pi)$. This expression gives the primary fiscal deficit as a share of GDP consistent with public debt sustainability given the values of the parameters of the model.

As regards the evolution of domestic debt, Edwards and Vergara (2002) assume that $\beta = g + \pi^*$, so that the domestic debt-to-GDP ratio remains constant. On the other hand, the authors assume four cases for the external debt dynamics:

(a)   Case A: There is complete roll-over of external debt so that its nominal value remains constant (i.e. $\theta = 0$). This implies that each year the external debt-to-GDP ratio declines approximately at the rate $g + \pi^*$, the growth rate of GDP in U.S. dollars at current prices.

(b)   Case B: There is complete roll-over of external debt plus issuance of new debt so that its real value remains constant (i.e. $\theta = \pi^*$). This implies that each year the external debt-to-GDP ratio drops approximately at the rate g, the real GDP growth rate.

(c)   Case C: External debt increases in real terms at half the rate of real GDP growth (i.e. $\theta = 0.5g + \pi^*$). This implies that each year the external debt-to-GDP ratio reduces at an approximate rate of $0.5g$.

(d)   Case D: External debt grows at the same rate than GDP in United States dollars at current prices (i.e. $\theta = g + \pi^*$). This implies that the external debt-to-GDP growth remains constant.

The analyses of the IMF and World Bank (2000a, 2000b and 2001) always consider case D. Cases A to C are less optimistic scenarios where the country starts losing access to concessional lending after debt forgiveness. In these three cases, the external debt-to-GDP ratio converges to zero in the steady state.

Although originally developed for HIPC countries, this approach is suitable to analyse countries that need to reduce their current debt-to-GDP ratios. The possibility of calculating the required primary balances to reduce debt levels at different paces and at different GDP growth rates is very appealing. However, the assumption that the domestic debt as a share of GDP remains constant seems misleading in countries with high levels of domestic debt.[3] Therefore, in these cases fiscal sustainability will imply not only the gradual reduction of external debt but also of domestic debt. In terms of the parameters of the model: $\beta < g + \pi^*$. As in the case of external debt, the speed at which the domestic debt-to-GDP ratio declines may vary according to the four cases outlined above.

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[3] This assumption, of course, is because Edwards and Vergara (2002) focus on the dynamics of external debt after debt forgiveness within the HIPC Initiative.

Currency mismatches between public debt and GDP

The incapacity of developing countries to borrow abroad in their own currencies has been called "original sin" (Eichengreen and Hausmann, 2005). The dollarisation of liabilities of these countries has put them in a position of extreme vulnerability in the presence of marked fluctuations of the real exchange rate (RER).

In examining the sources of accumulation of public debt in Latin America, the IDB (2006) finds that the bulk of debt volatility and, especially, the sudden explosions of debt levels, are the result of the effects of exchange rate depreciations on the balance sheets of governments, or to the materialisation of contingent liabilities. Therefore, as important as the debt level is its currency composition.

Calvo, Izquierdo and Talvi (2003) introduce an indicator to measure fiscal vulnerability to RER fluctuations. Fiscal balance required to guarantee fiscal sustainability depends on the debt-to-GDP ratio. This relationship, in turn, in the presence of significant RER shocks is conditioned by the currency denomination of debt and by the composition of GDP in terms of tradables and non tradable goods. This relationship is:

$$(8) \quad d = \frac{D + eD^*}{Y + eY^*}$$

where D is public debt to be paid in non tradable goods (i.e. debt payable in domestic currency), D^* is debt to be paid in tradable goods (i.e. debt payable in foreign currency), Y is GDP of non tradable goods, Y^* is GDP of tradable goods and e is the RER defined as the price of tradables in terms of non tradable goods.

Indicator d in equation (8) allows comparing the impact of a change in the RER on debt value vis-à-vis GDP value. Mismatches between debt and GDP composition may lead to important changes in the debt-to-GDP ratio after a real depreciation.

On one extreme, when d = eD*/Y, all depreciation is absorbed by the debt value so that an increase in the RER will increase the debt-to-GDP ratio in a very significant magnitude. On the other extreme, when debt and GDP are perfectly matched – i.e. *(D/eD*)/(Y/eY*) = 1* – a real depreciation will not alter the debt-to-GDP ratio. When this relationship is lower than 1, an increase in the RER will increase public debt as a percentage to GDP. When it is greater than 1, a real depreciation will reduce the debt-to-GDP ratio. In general, when the amount of debt denominated in domestic currency relative to that denominated in foreign currency is lower (higher) than non tradable GDP in terms of tradable GDP, an increase of RER will augment (reduce) public debt as a percentage of GDP.

Uncertainty and variability of fiscal revenue

Mendoza and Oviedo (2004, 2006) introduce uncertainty in the analysis of fiscal sustainability trough revenue and determine debt-to-GDP ratios consistent with the commitment

of governments to meet their obligations. This approach analyses the capacity of the government to commit itself in a credible manner to service its debt, even in the presence of revenue levels substantially lower than expected.

In this context, the government will determine the maximum level of debt that it can sustain and will set a contingency plan to adjust expenditure as smoothly as possible so as not to exceed it. This debt limit will allow government to offer creditors a credible commitment that it will be able to service its debt even in the presence of a fiscal crisis. Such an event occurs when, as a result of successive revenue which is lower than expected, public debt reaches that level. Therefore, this debt limit is the primary balance – adequately discounted – that results from low revenue and a certain minimum level of primary expenditure.

In general, such debt limit will be lower than the sustainable debt level derived from other operative approaches. In the case of fiscal crises, they will be equal. This approach highlights the importance of volatility in fiscal revenue: the lower it is, the higher the debt limit. Mendoza and Oviedo (2004, 2006) estimate the higher level of primary expenditure that is possible to be financed in the case of a fiscal crisis replacing the debt limit by its actual value and revenue by two standard deviations below its average value.

The starting point is the equation of motion of public debt:

$$(9) \quad D_t = (1 + r - \pi^e)D_{t-1} - S_t$$

where D is public debt stock, r is the nominal interest rate on debt, π^e is the expected inflation rate, and S is the primary balance. As above, subscripts indicate the period.

Expressing all variables in (9) as a percentage of GDP, in the steady state:

$$(10) \quad \tilde{d} = \frac{\tilde{s}(1 + g)}{(r - \pi^e - g)}$$

where $\tilde{d}$ is public debt as a percentage of GDP, $\tilde{s}$ is the primary balance as a percentage of GDP, and g is long term growth rate. It is assumed that $(r - \pi^e - g) > 0$.

Taking into account that primary surplus (s) equals the difference between fiscal revenue (t) and primary expenditure (exp), the maximum level of sustainable debt in the presence of a fiscal crisis is given by:

$$(11) \quad d^{MAX} \equiv (t^{MIN} - \exp^{MIN}) * \frac{(1 + g)}{(r - \pi^e - g)}$$

where d^{MAX} is the debt limit, t^{MIN} is the minimum possible fiscal revenue, and $\exp^{MIN}$ is the level of primary expenditure in times of fiscal crisis. All variables are expressed as a share of GDP.

Revenue in the presence of a fiscal crisis (t^{MIN}) is defined as two standard deviations below its average value. This allows calculating the cost – in terms of reduction of primary expenditure – of a fiscal crisis. The expression for the maximum level of primary expenditure possible to finance in this situation ($\exp^{MAX}$) is:

$$(12) \quad \exp^{MAX} = t^{MIN} - \frac{(r - \pi^e - g)}{(1 + g)} d_t$$

Izquierdo and Zucardi (2006) state that as this approach establishes the debt limit for the worse possible revenue scenario, one could ask why governments would like to tie themselves to this level of debt. For instance, they could set a debt level consistent with fiscal revenue just one standard deviation below the average as opposed to two. However, in such a case the interest rate would be higher so as to compensate for the higher risk of no capacity of repayment in case of a fiscal crisis. In this context, these authors highlight the possibility of a trade-off between debt limit and interest rate, which gives rise to the possibility of an optimum value for this maximum level of debt.

II. Situation of public debt in the region

It has already been mentioned that a number of studies set 40% of GDP as the maximum level of sustainable debt. In addition, the HIPC Initiative, of which Guyana is part, states that public debt should not exceed 250% of fiscal revenue or 150% of exports. Although they may be arbitrary, these limits can be taken as indicators to evaluate whether public debt in Caribbean countries are actually at sustainable levels.

Table 1 presents total public debt and its disclosure between external and domestic as a percentage of GDP at the end of 2006. All countries show public debt-to-GDP ratios above 70%, and six above 100%. Three countries stand out by this indicator: Guyana (157.7%), Jamaica (135.6%) and St. Kitts and Nevis (182.9%). Unlike during the 1970s and 1980s, when external financing was prominent, lately this situation has changed and four of the 10 countries considered record higher domestic than external debt. Indeed, except for Belize, all of them show domestic debt in excess of 25% of GDP.

Table 1
Public debt, 2006[a]
(Percentage of GDP)

	External debt	Domestic debt	Total debt
Barbados	29.9	58.9	**88.8**
Belize	81.2	12.4	**93.6**
Guyana	116.4	41.3	**157.7**
Jamaica	56.9	78.7	**135.6**
ECCU			
Antigua and Barbuda	47.6	61.4	**109.0**
Dominica	78.5	32.6	**111.2**
Grenada	84.3	27.0	**111.3**
St. Kitts and Nevis	66.7	116.2	**182.9**
St. Lucia	44.2	27.1	**71.3**
St. Vincent and the Grenadines	**51.9**	**26.0**	**77.9**

Source: Author's calculations on the basis of official data.
[a] End of period (December 31).

Figure 1 depicts total debt as a percentage of total revenue and external debt as a percentage of exports of goods and services in 2006.[4] The former ratio is particularly high in St. Kitts and Nevis (466.5%), followed by Antigua and Barbuda (444.4%) and Jamaica (433.1%). Overall, the 10 countries exhibit public debt as a percentage of total revenue above the threshold of 250%. The Caribbean countries fare better in terms of external debt as a percentage of exports. Actually, in only three countries this ratio exhibits levels above the limit of 150%: Dominica (178.3%), Grenada (288.8%) and St. Kitts and Nevis (152.9%), whereas Guyana is marginally below (147.3%).

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[4] The former indicator informs about the capacity of the government to comply with its obligations, whereas the latter gives an idea of the availability of foreign exchange to repay external debt.

Figure 1
Public debt and external debt, 2006
(Percentage of public revenue and of exports of goods and services)
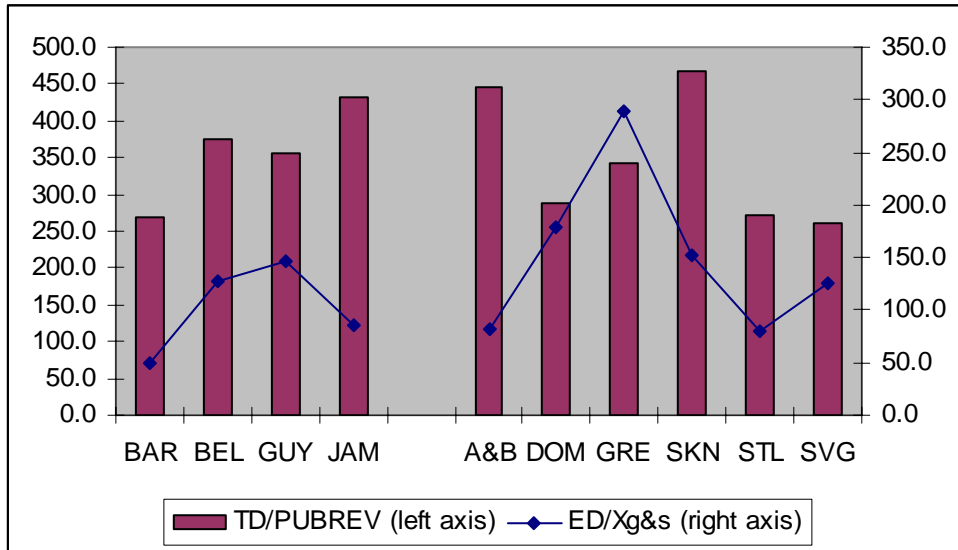
Source: Author's elaboration on the basis of official data.

Other relevant indicators to evaluate the burden that debt represents to public finance are interest payments as a share of GDP and of public revenue. Figure 2 shows these figures in 2006. Interest payments are particularly high in St. Kitts and Nevis (15.6% of GDP), St. Vincent and the Grenadines (10.2%), Antigua and Barbuda (9.2%) and Jamaica (8%). The countries where these payments are lower are Grenada (3% of GDP) and Guyana (3.9%). The other countries are in an intermediate position.

Figure 2
Interest payments on public debt, 2006
(Percentage of GDP and of fiscal revenue)
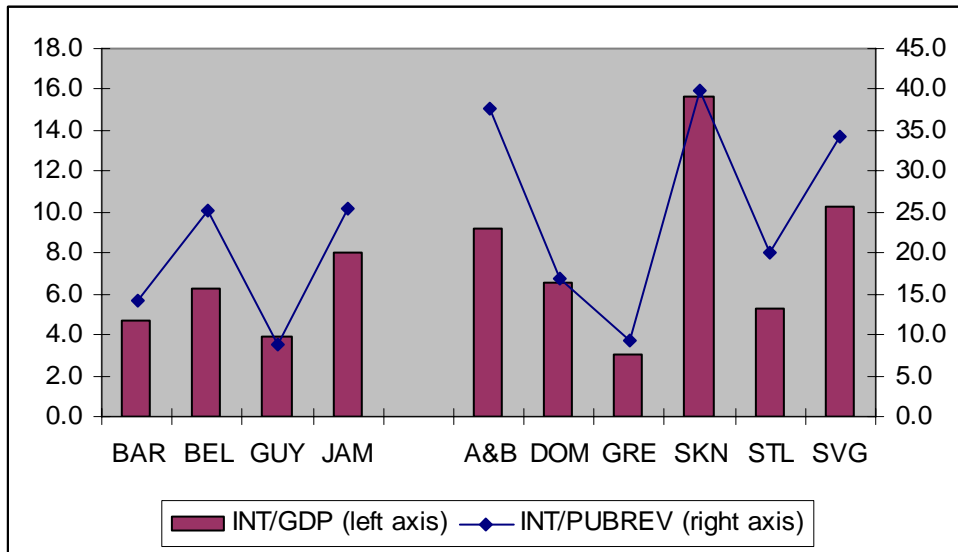
Source: Author's elaboration on the basis or official data.

Perhaps a better idea of the burden of debt on public finance is given by the interest payments-to-public revenue ratio. Among ECCU countries, the highest levels are shown by St. Kitts and Nevis (39.9%), Antigua and Barbuda (37.6%) and St. Vincent and the Grenadines (34.3%). As regards the other countries, Belize and Jamaica stand out, with values just above 25%. It is worth noting that in the case of Guyana, the highly subsidized interest rates it pays on its public debt explains why the country rates much better in the indicators shown in Figure 2, as opposed to the ones exhibited in Figure 1 and Table 1.

The above discussion indicates that all countries record levels of public debt well above the limit of 40% of GDP deemed as sustainable. In addition, in general they rate better in terms of the indicators of debt as a share of exports than as a share of public revenue. Finally, interest payments are particularly burdensome in Antigua and Barbuda, St. Kitts and Nevis, St. Vincent and the Grenadines, Belize and Jamaica.

III. Fiscal sustainability in countries with access to market financing

In this section the analysis framework developed in IMF (2005) outlined above is applied to evaluate public debt sustainability in countries with access to external market financing. Such countries are considered to be those that have been able to issue sovereign bonds in world markets during the last years, i.e. Barbados, Belize and Jamaica.

The first column in Table 2 shows primary fiscal balances needed to keep debt-to-GDP ratios constant (equation (4) above) in 2007.[5] The first issue that stands out is that despite their current high levels of public debt, Barbados and Belize could run even primary deficits of 2.2% and 2.4% of GDP, respectively, and stabilise their debts as a share of GDP. The reason for this apparently contradictory result is that to maintain the debt-to-GDP ratio constant, each year the stock of debt should grow at the same rate of nominal GDP – i.e. real GDP growth plus the inflation rate. This can be consistent with recurrent primary deficits. In the case of Jamaica, the country needs to post a primary fiscal surplus of 3.1% of GDP. Comparing these figures with the primary balances recorded in 2005-2007 (last column of Table 2), it is found that in Belize and Jamaica the recent fiscal stance is solid to maintain debt-to-GDP ratios constant. In contrast, the primary deficit of 3.1% of GDP posted by Barbados during the last three years is too high to maintain public debt as a share of GDP at its current levels, requiring a fiscal adjustment of almost 1 percentage point of GDP to achieve this goal.

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[5] The Annex presents the values and definitions of the variables used for the calculations.

Table 2
Fiscal primary balance for public debt sustainability, 2007
(Percentage of GDP)

	To maintain debt/GDP constant	To reduce debt/GDP to 40% in 10 years	To reduce debt/GDP to 40% in 20 years	Observed fiscal primary balance 2005-2007
Barbados	-2.2	2.7	0.2	-3.1
Belize	-2.4	3.0	0.3	3.2
Jamaica	3.1	12.7	7.9	9.5
Source: Author's calculations				

But as mentioned earlier, in highly indebted countries as the ones under analysis, this definition of sustainability is inadequate as public debt as a share of GDP largely exceeds the standard level of 40% deemed to be the limit for public debt sustainability. Thus, in the second column of Table 2 the primary balances needed to bring the debt-to-GDP ratio down to 40% in 10 years are shown. In this context, Barbados and Belize would need to record primary surpluses of 2.7% and 3.0% of GDP, respectively. In the former country this would mean a fiscal adjustment of 5.8% of GDP, which is significant. In Belize, the primary fiscal surplus registered in 2005-2007 (3.2% of GDP) would allow a reduction of debt to 40% of GDP in 10 years. Given its higher level of debt (135.6% of GDP in 2006), Jamaica would need to post primary surpluses of 12.7% of GDP over the next 10 years in order to achieve the target level. This would imply a fiscal adjustment of some 3.2% of GDP from the average primary surplus registered in 2005-2007. Of course, the fiscal efforts are much lower if the countries are to reduce their debt-to-GDP ratios to 40% in 20 years. In this case, Barbados and Belize need to record small primary surpluses while Jamaica needs to post one of 7.9% of GDP, as shown in the third column of Table 2.

The solid fiscal position recorded by Belize and Jamaica in 2005-2007 puts them in a favourable position to reduce their current debt levels to 40% of GDP should this be maintained for the next 20 years. However, only Belize would be able to do so in 10 years. On the contrary, Barbados would need to implement important fiscal adjustments in order to reduce its public debt as a share of GDP to 40% in 10 or 20 years. The relevant question is, of course, whether countries that have accumulated impressive amounts of public debt in the past will be able to maintain perceptible primary surpluses for a long period of time.

It is worth noting that this analysis is highly sensitive to changes in the values of the parameters. Indeed, small variations in interest rates, inflation, GDP growth and depreciation rate could lead to significant changes in the calculated fiscal surplus to stabilise the debt-to-GDP ratio. In particular, an acceleration in inflation decreases the required primary surplus (or increases the deficit) significantly as this simultaneously pushes real interest rates on both external and domestic debt downwards as well as fosters nominal GDP growth. For instance, using the inflation rate of 8% (GDP deflator inflation in 2006) instead of 5.6% (CPI inflation) in Barbados calculations, the fiscal deficit needed to maintain debt as a percentage of GDP constant increases in two full percentage points of output.

IV. Fiscal sustainability in Guyana and ECCU countries

This section evaluates fiscal sustainability in countries with difficulties in accessing external market financing, defined as those that do not issue sovereign bonds internationally. These are the cases of Guyana – which is also a HIPC country – and the six ECCU countries under scrutiny. This is done applying the approach developed by Edwards and Vergara (2002) outlined in the second section with one modification, that domestic debt as a share of GDP declines at the same pace as external debt. The rationale for this is that domestic debt in these countries is significant, particularly in Antigua and Barbuda (61.4% of GDP) and, especially, St. Kitts and Nevis (116.2%).

The basic assumption in the calculations is that the stock of both external and domestic debt remains constant in real terms, i.e. that each year it grows at the rate of external inflation (case B above). This means that external and domestic debt as a share of GDP declines annually at approximately the real GDP growth rate. Calculations are made with annual growth rates of 3%, 4% and 5%. Table 3 shows the primary balances needed to achieve this reduction in the debt-to-GDP ratio in the seven countries. As can be seen, two features stand out. First, fiscal demands are decreasing in the growth rate. This is because the higher it is, the lower the resulting debt-to-GDP for any debt stock. Second, fiscal demands are decreasing in time, as debt as a share of GDP declines alongside.

Clearly, the seven countries can be divided in two groups according to the fiscal demands they face to meet the target reduction in domestic and external debt as a share of GDP. The first group comprises the countries that need to achieve primary surpluses, i.e. Antigua and Barbuda, Dominica, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines. The second group comprises Guyana and Grenada, the countries where primary deficits are consistent with the achievement of target debt reduction.

Table 3
Primary fiscal balance required to achieve fiscal sustainability, 2008-2020
(Percentage of GDP)

	g = 3%	g = 4%	g = 5%
Guyana			
2008	-0.93	-1.19	-1.44
2010	-1.04	-1.30	-1.56
2015	-1.24	-1.52	-1.78
2020	-1.39	-1.66	-1.92
Antigua and Barbuda			
2008	6.58	6.21	5.85
2010	5.92	5.42	4.94
2015	4.51	3.80	3.13
2020	3.40	2.57	1.83
Dominica			
2008	2.88	2.49	2.10
2010	2.54	2.09	1.64
2015	1.84	1.26	0.72
2020	1.27	0.64	0.06
Grenada			
2008	-1.21	-1.57	-1.91
2010	-1.30	-1.67	-2.03
2015	-1.47	-1.87	-2.25
2020	-1.61	-2.02	-2.42
St. Kitts and Nevis			
2008	10.10	9.51	8.93
2010	8.93	8.12	7.34
2015	6.47	5.29	4.19
2020	4.53	3.16	1.94
St. Lucia			
2008	3.18	2.87	2.56
2010	2.85	2.47	2.09
2015	2.15	1.64	1.17
2020	1.58	1.01	0.49
St. Vincent and the Grenadines			
2008	6.81	6.38	5.96
2010	6.23	5.65	5.09
2015	4.94	4.09	3.29
2020	3.86	2.85	1.94

Source: Author's calculations.

Within the first group, the demands are higher in St. Kitts and Nevis, followed by St. Vincent and the Grenadines and Antigua and Barbuda. In St. Kitts and Nevis, the main explanatory factor is the current debt levels that amount to 182.9% of GDP (see Table 1). In the case of St. Vincent and the Grenadines the situation is different inasmuch as this country exhibits low levels of public debt as compared to the other countries (77.9% of GDP). However, in this country the driving forces for fiscal demands are interest rates particularly those on external debt that recorded an annual level of 17% in 2006, by far the highest recorded among Caribbean countries.[6] Finally, in the case of Antigua and Barbuda, the factor that explains the high primary surpluses demanded seems to be a combination of high domestic debt (61.4% of GDP) and high interest rates on this type of debt, which is the highest – although only 0.3 percentage points above that of St. Kitts and Nevis and Saint Lucia – among the countries under scrutiny.

On the other hand, although both Dominica and Saint Lucia need to record primary surpluses to meet the target of public debt reduction, these are certainly lower than those required by the three countries discussed above. In the former, fiscal demands seem to be a combination of high debt (111.2% of GDP) and low inflation (0.6% in 2006)[7] coupled with slow growth (0.9% per annum in 1997-2006). In the latter, the need for primary surpluses seems to be explained by relatively high interest rates on both types of debt and, especially, low inflation (0.9% in 2006).

As regards the countries that can meet the target debt reduction running primary deficits, the main driving force for this apparent contradictory conclusion is that both Guyana and Grenada pay very low interest rates on their debts. The implicit interest rate on external debt in 2006 was 1.8% in the former country, and 3.1% in the latter.[8] In contrast, in the other countries this interest rate ranged from 5.2% in Dominica to 17% in St. Vincent and the Grenadines. The case is similar as regards the implicit interest rate on domestic debt: while Guyana and Grenada faced rates of 3.8% and 2.2%, respectively, the other countries confronted much higher rates between 7.2% in Dominica and 8.2% in Antigua and Barbuda.

Figure 3 shows the evolution of the debt-to-GDP ratios should the countries manage to achieve the primary balances presented in Table 3 and a GDP growth rate of 4% per year. Of course, the countries that will reach the debt-to-GDP ratio level of 40% will be the ones with the lowest current levels of debt, i.e. Saint Lucia and St. Vincent and the Grenadines. As shown, these two countries achieve that level of debt between 2020 and 2025. On the contrary, the most indebted countries – i.e. Guyana and St. Kitts and Nevis – will reach that level 20 years later. Finally, Antigua and Barbuda, Dominica and Grenada are in an intermediate position, achieving debt-to-GDP ratios of 40% around 2030.

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[6] This is the implicit interest rate posted in 2006. See the Annex for details.

[7] As measured by the GDP deflator. See the Annex.

[8] This means that these two countries had access to external concessional financing. Indeed, as mentioned above, Guyana is part of the HIPC Initiative.

Figure 3
Public debt evolution, 2006-2045
(Percentage of GDP)
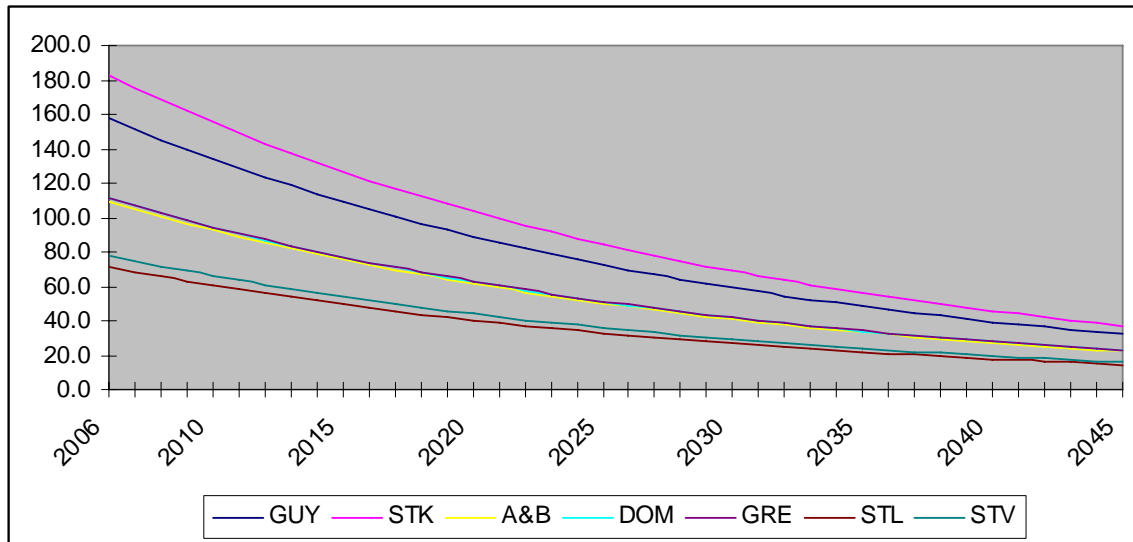
Source: Author's elaboration.

This analysis reveals that the challenges in terms of fiscal adjustment are not easy to meet in most countries. Even assuming a sustained GDP growth rate of 4% per year for the next decades – dynamism more rapid than the one posted by all countries in 1997-2006 except for the 4.9% recorded by Antigua and Barbuda – the achievement of sustained primary surpluses in these countries seem to be rather optimistic, given their past fiscal performances, growth rates and manifest vulnerabilities to external shocks, including natural disasters.

The cases of Guyana and Grenada are certainly special, given the below-market interest rates they pay on their public debt. Should these conditions change, both countries would need to achieve substantial primary surpluses. Indeed, if Guyana faces interest rates on external debt of 5.2% – the lowest among the other countries – it should post a primary surplus of 2.4% of GDP in 2008. This means an additional 3.6% of GDP of fiscal demand under current conditions. Meanwhile, Grenada should post a surplus of 1.2% of GDP in 2008 when facing the same external and domestic interest rates as Dominica, implying 2.8% of GDP more fiscal effort than the figures shown in Table 3.

V. Fiscal vulnerability to changes in exchange rates

The six countries of the ECCU considered in this study along with Barbados and Belize have fixed exchange rate regimes, whereas Guyana and Jamaica have managed floating frameworks. Notwithstanding, it is useful to analyse what would happen with the sustainability of public debt in the presence of a real exchange rate depreciation. As the main indicator is the debt-to-GDP ratio, the impact would depend on the differential effect this would have on the debt stock (the numerator) and on GDP (the denominator). The former effect would depend on debt currency composition – i.e. domestic or foreign exchange – whereas the latter on output of tradable and non tradable sectors. This analysis is relevant because a real depreciation can turn unsustainable a debt level that was deemed to be sustainable before the exchange rate variation. For instance, during the financial crisis suffered by the Dominican Republic at the beginning of this decade, public debt climbed from 25% of GDP in 2002 to 46% in 2003. Around half of this increase was due to the bailout of the banking sector implemented by the Central Bank whose debt escalated from 5.5% to 16.3% of GDP. The other half was explained by the effect of the real exchange rate depreciation of 26.3% on the balance sheet of the public sector. Following the approach developed by Calvo, Izquierdo and Talvi (2006) outlined in the second section, Table 4 details the ratio of domestic to external public debt, of non tradable to tradable GDP, as well as the indicator of sensitivity of public debt as a share of GDP in the presence of a real exchange rate depreciation.

Table 4
Currency mismatches between public debt and GDP, 2006
(Percentage)

	Domestic debt/External debt (1)	Non tradable GDP/Tradable GDP[a] (2)	Ratio (1)/(2)
Barbados	197.0	136.0	1.45
Belize	15.2	183.7	0.08
Guyana	35.4	132.6	0.27
Jamaica	138.1	85.2	1.62
ECCU			
Antigua and Barbuda	129.0	246.5	0.52
Dominica	41.6	142.2	0.29
Grenada	32.0	237.5	0.13
St. Kitts and Nevis	174.2	163.1	1.07
St. Lucia	61.4	179.6	0.34
St. Vincent and the Grenadines	50.1	270.9	0.18

Source: Author's calculations on the basis of official data.
[a] In local currency at constant prices.

The first column of Table 4 shows domestic debt as a percentage of external debt. In four countries the former is higher than the latter, particularly in Barbados where domestic debt almost doubles external debt. In St. Kitts and Nevis this relationship is also high, with domestic debt surpassing external debt by nearly 75%, whereas in Jamaica and Antigua and Barbuda this difference is lower (38% and 29%, respectively). This indicates that these countries have relied more on domestic financing to the public sector than on foreign markets. This seems surprising in the cases of Barbados and Jamaica, countries with access to international capital markets, which has allowed them to raise private external funding by issuing sovereign bonds during the last years.

Despite the fact that contracting of domestic debt does not imply currency risk inasmuch as it is denominated in local currency, there are some negative effects generated by this type of operation. Perhaps the main one is the absorption of domestic credit by the public sector which leaves fewer resources available to the private sector for the financing of productive activities. By the same token, the higher public sector demand for domestic credit pushes interest rates up thus making more expensive the contracting of debt by the private sector and slowing down economic activity. These effects may be particularly damaging for small and medium enterprises that usually do not have access to external capital markets.

In the other six countries, domestic debt is lower than external debt with ratios ranging from 15.2% in Belize to 61.4% in Saint Lucia. As noted above, the fact that these countries have been more dependent on foreign than on domestic financing implies that they are more vulnerable to exchange rate depreciations due to the higher currency risk attached to external – i.e. foreign currency denominated – debt.

The second column in Table 4 presents the non tradable to tradable GDP ratio in local currency at constant prices. Tradable sectors are considered to be agriculture, mining and quarrying, manufacturing, hotels and restaurants, and banks and insurance. Surprisingly, except for Jamaica, in all countries the non tradable sector output is higher than that of the tradable sector. Moreover, in countries such as Antigua and Barbuda, Grenada, and St. Vincent and the Grenadines the non-tradable sector more than doubles tradable sector GDP. The main explanation for this apparently surprising result is the importance of the construction and government sectors.

Finally, the last column in Table 4 indicates whether a real depreciation expands or contracts the debt-to-GDP ratio. Whenever this indicator is below 1, any depreciation increases debt as a share of GDP. When it is above 1, an increase in the real exchange rate reduces the debt-to-GDP ratio. As shown, except for Antigua and Barbuda, in countries that exhibit higher domestic than external debt such as Barbados, Jamaica and St. Kitts and Nevis, a real depreciation will improve fiscal sustainability. In the former two countries the reduction of the debt-to-GDP ratio would be perceptible, whereas in St. Kitts and Nevis the decline would be marginal.

On the contrary, in the other countries the effect of an increase in the real exchange rate will be an augmentation of public debt as a share of GDP. This highlights the vulnerability of these countries. The high vulnerability shown by Grenada and, especially, Belize, is mainly

explained by the fact that their domestic debt is small relative to their external – i.e. denominated in foreign currency – debt. It is worth noting that while most countries have fixed exchange rate regimes, what is relevant for this analysis is not the evolution of the nominal but of the real exchange rate. In addition and perhaps more importantly, as all Caribbean countries that have fixed exchange rate regimes have pegged their local currencies to the United States dollar, the significant depreciation of the greenback against the Euro, the Sterling Pound and the Yen means pressures towards a real depreciation of these Caribbean currencies which, in turn, will increase the debt-to-GDP ratio in most countries, as discussed above.

VI. Variability in revenue and fiscal vulnerability

This section examines the maximum level of primary expenditure that the public sector can afford in the context of a fiscal crisis given the current levels of public debt (equation (12) above). Such a crisis is defined as a situation when fiscal revenue is more that two standard deviations below its average level. Thus, the more unstable the fiscal revenue, the lower it will be and, therefore, the lower affordable primary spending.

Figure 4 shows the coefficients of variation of fiscal revenue as a share of GDP in 1997-2006. Dominica and St. Kitts and Nevis exhibit the highest variability in fiscal revenue that was above 10% in the 10-year period. On the contrary, the countries with a more stable performance are Barbados and St. Vincent and the Grenadines, with coefficients of variation of fiscal revenue around 3%. The other countries are in an intermediate position.

Figure 4
Coefficient of variation of fiscal revenue as a share of GDP, 1997-2006
(Percentage)
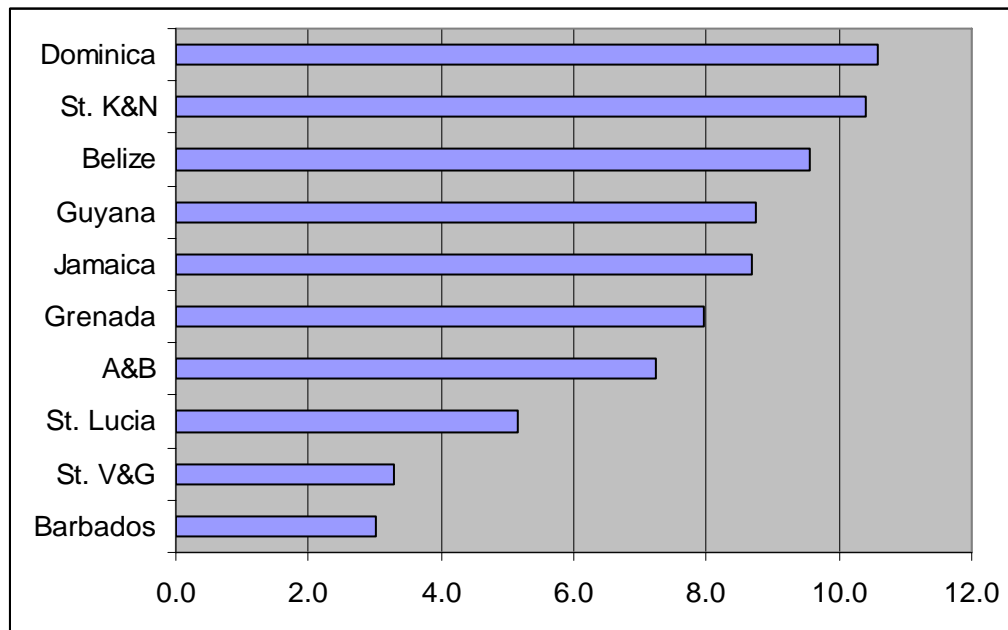
Source: Author's elaboration on the basis of official data.

Table 5 presents the maximum primary expenditure that can be financed in the presence of a fiscal crisis, the primary expenditure observed in 2004-2006 and the percentage of the latter that can be financed in case of fiscal distress. Maximum primary spending is particularly high in Barbados and Guyana, where it reaches 30.8% and 34.1% of GDP, respectively. In the ECCU countries, the (simple) average of this variable is 22.6% of GDP with extreme values of 17.5% of GDP in Antigua and Barbuda and 28.4% in Grenada.

Table 5
Primary expenditure affordable in a fiscal crisis, 2007
(Percentage of GDP)

	Maximum primary expenditure (1)	Primary expenditure 2004-2006 (2)	(1)/(2) (%)
Barbados	30.8	31.1	98.6
Belize	22.5	23.4	96.1
Guyana	34.1	48.8	70.0
Jamaica	20.6	20.8	99.2
ECCU			
Antigua and Barbuda	17.5	24.7	70.8
Dominica	24.1	34.3	70.2
Grenada	28.4	30.7	92.6
St. Kitts and Nevis	21.2	34.2	62.0
St. Lucia	21.5	28.5	75.3
St. Vincent & the Grenadines	23.1	30.7	75.4
Source: Author's calculations.			

When comparing these figures with the actual primary expenditure recorded in 2004-2006 as shown in the second column of Table 4, it is found that no country will be able to finance this level of spending. The countries that are best positioned in this aspect are Barbados, Belize and Jamaica, that could afford more than 95% of primary spending even in the presence of fiscal turmoil. Within the ECCU countries, Grenada would be the one that would have to curtail primary spending less in this situation, some 7.4% of the level recorded in 2004-2006. In the other countries the reduction in primary spending should be much higher, particularly in St. Kitts and Nevis that would need to implement a contraction of 38% of primary outlays. This reduction should be less dramatic, though nonetheless important, in Guyana, Antigua and Barbuda, and Dominica (near 30% of the level recorded in 2004-2006), and in Saint Lucia and St. Vincent and the Grenadines (almost 25%).

All in all, this analysis highlights the importance of reducing volatility in fiscal revenue so as not to have to implement massive curtailments of primary spending in the presence of a fiscal crisis. In this situation, given the current levels of public debt, primary outlays should be contracted in significant amounts in most countries. Reductions of 25-30% in primary spending would bring about substantive economic, social and political costs for any government. Moreover, adjustments of these magnitudes would be very difficult to implement given the

downward rigidity of public expenditure. Indeed, in this situation most countries have relied on the contraction of public investment that becomes the variable of adjustment. The long-term growth implications of this policy are not hard to realise.

VII. Conclusions

This study analyses fiscal sustainability in the Caribbean countries using different theoretical approaches. The objective has been to provide a regional panoramic view on various aspects related to public debt sustainability.

The analysis of traditional public debt indicators reveals that all countries exhibit levels of public indebtedness far above the 40% of GDP that is considered the limit for fiscal sustainability. Debt-to-GDP ratios are above 100% in six of the 10 countries under scrutiny, ranging from 71.3% in Saint Lucia to 182.9% in St. Kitts and Nevis at the end of 2006. In general, the Caribbean countries fare better in terms of external debt as a share of exports of goods and services than in terms of total public debt as a share of fiscal revenue. In only three countries the former ratio exceeds the limit of 150% considered by the HIPC Initiative as prudent: Dominica, Grenada and St. Kitts and Nevis. In Guyana, this indicator is just below the threshold. On the contrary, in all 10 countries the latter indicator is above the 250% deemed to be safe within the same initiative and in St. Kitts and Nevis, Antigua and Barbuda and Jamaica it is above 430%. Finally, interest payments consume significant portions of fiscal revenue, especially in St. Kitts and Nevis, Antigua and Barbuda and St. Vincent and the Grenadines (between one third and 40% in 2006).

Following the approach developed by the IMF (2005) to evaluate fiscal sustainability in countries with access to foreign private market financing, defined as those that have managed to issue sovereign bonds in recent years, it is found that both Belize and Jamaica are able to maintain their current (although high) debt-to-GDP ratios constant if the recent values of primary balance, interest rates, inflation and GDP growth remain in the future. However, only the former would be able to reduce its public debt as a share of GDP to 40% in 10 years. Jamaica would need to implement a fiscal adjustment of 3.2% of GDP to do so. Meanwhile, the primary deficit of 3.1% of GDP posted by Barbados in 2005-2007 would require a fiscal adjustment of 0.9% of GDP to keep the current debt-to-GDP constant and of 5.8% to bring debt down to 40% of output in a decade. The solid primary balance posted by Belize and Jamaica in 2005-2007 would allow both countries to reduce their debt-to-GDP ratios to 40% in 20 years without any fiscal adjustment. However, these results should be taken carefully inasmuch as these countries have accumulated huge amounts of public debt in the past so that their capacity to sustain primary surpluses for a long period of time should not be taken for granted.

In highly indebted countries that have not been able to issue sovereign bonds in recent years, the application of the analytical framework developed by Edwards and Vergara (2002) – with the modification that domestic debt as a share of GDP declines at the same rate as the external debt-to-GDP ratio – reveals a clear division of countries in two groups. On the one hand, all ECCU countries considered in this study, except for Grenada, require primary surpluses at

least until 2020. Fiscal demands consistent with the reduction of debt as a share of GDP at approximately the same rate of real output growth are especially high in St. Kitts and Nevis, St. Vincent and the Grenadines, and Antigua and Barbuda. In the first country this is explained basically by its high level of debt, whereas in the second one the driving force is the high interest rate on external debt. In the case of Antigua and Barbuda, high fiscal demands are due to a combination of significant domestic debt and high interest rate on this type of debt. On the other hand, and in contrast, Guyana and Grenada would be able to reduce their debt-to-GDP ratios at the same pace running primary deficits thanks to the low interest rates they pay on both external and domestic debt.

Beyond debt levels as determinants of fiscal sustainability, it is important to consider other factors relevant to the evaluation of the vulnerability of public finance. Calvo, Izquierdo and Talvi (2003) highlight that currency mismatches between public debt and GDP is an important source of vulnerability which may generate a situation of insolvency of the public sector in the context of a significant real depreciation. This analysis indicates that seven of the 10 countries under evaluation manifest this type of vulnerability. The exceptions are Barbados, Jamaica and, to a lesser extent, St. Kitts and Nevis. In all others a real depreciation could bring about fiscal sustainability problems as it will further increase the debt stock than GDP in terms of local currencies. This effect appears to be more intense in Belize and Grenada, the countries with lower domestic debt relative to external debt.

Mendoza and Oviedo (2004, 2006) underscore that another source of fiscal vulnerability is the instability (variability) of fiscal revenue. Defining a fiscal crisis as a situation where fiscal revenue is two standard deviations below its average level no country would be able to finance the primary expenditure recorded in 2004-2006. However, Barbados, Belize, Jamaica and Dominica would be able to finance more than 92% of primary outlays even in a context of fiscal distress. In the other countries primary spending should be curtailed much more, between around 25% in Saint Lucia and St. Vincent and the Grenadines to a high 38% in St. Kitts and Nevis.

The various approaches applied in this study are complementary to one another and emphasize different aspects related to fiscal sustainability. Apart from achieving – or maintaining, if it is the case – a solid fiscal position, the Caribbean countries should seek to increase their fiscal revenue. This is so not just because during the last years the latter has been persistently outpaced by public spending – which of course explains the rapid accumulation of debt to finance the gap – as more resources are needed to augment public investment and social expenditure. The two are below current demands as evidenced by slow economic growth, infrastructure bottlenecks and high poverty rates.

The Caribbean countries should also reduce currency mismatches between their public debts and output. This requires, mainly, stimulating tradable activities in the economies. Notwithstanding, this task does not seem easy, due to the increasing difficulties faced by airlines worldwide that have jeopardized the prospects of the tourism sector, one of the main tradable sectors in the region. Indeed, the continuous escalation in oil prices has raised warning signs regarding the future of many companies that provide air transportation services.

Last, but not least, countries should also try to reduce the volatility of fiscal revenue. This is another source of vulnerability of public finance, and it is a necessary condition for the implementation of counter-cyclical fiscal policies. Although it is debatable the capacity of Caribbean countries to apply such policies, a very relevant goal would be to get fiscal policy to be at least not as pro-cyclical as it has tended to be so far.

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Annex

Values of variables used in the analysis of fiscal sustainability
(Percentage)

	External interest rate[a]	Domestic interest rate[b]	Inflation rate[c]	GDP growth rate[d]	Monetary base/GDP[e]
Barbados	6.9	5.0	5.6	2.6	19.0
Belize	6.6	9.3	3.4	6.1	19.1
Guyana	1.8	3.8	3.1	1.4	27.7
Jamaica	7.2	5.7	4.6	1.1	15.9
ECCU					
Antigua and Barbuda	10.1	8.2	2.4	4.9	24.6
Dominica	5.2	7.2	0.6	0.9	33.9
Grenada	3.1	2.2	3.2	3.5	37.9
St. Kitts and Nevis	11.1	7.9	6.3	3.5	40.1
St. Lucia	8.0	7.9	0.9	2.6	25.9
St. Vincent and the Grenadines	17.0	7.6	3.6	3.7	30.4

Source: Author's calculations on the basis of official data.

[a] Implicit interest rate on external debt in 2006 = (Interest payments on external debt in 2006/External debt stock at the end of 2005).
[b] Implicit interest rate on domestic debt in 2006 = (Interest payments on domestic debt in 2006/Domestic debt stock at the end of 2005).
[c] Percentage variation in GDP deflator in 2006. In Barbados, corresponds to CPI inflation rate (year end) in 2006.
[d] Average annual real GDP growth rate in 1997-2006.
[e] At the end of 2006.