Public debt
sustainability

Ricardo Martner and Varinia Tromben

Although in Latin America public debt-to-GDP ratios continue to be generally lower than in other emerging countries, it has nevertheless not been possible to avoid liquidity problems, which some authors attribute to the low level and high volatility of public revenue, the weakness of domestic financial systems, and the mediocre quality of fiscal institutions. This article also emphasizes some exogenous factors, however. The combination of low economic growth rates and devaluations in a context of dollarized liabilities has given rise to a huge "snowball effect", which is what has come to be called "original sin": the impossibility for an emerging country of borrowing abroad in its own currency. Although the effort to control the dynamics of the public debt will continue to be mainly at the internal level, the medium-term sustainability of that debt will depend on actions by international financial institutions aimed at improving the public debt conditions of emerging countries.

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I

Introduction

In 1998-2002, which has been called the "lost half-decade", the public debt grew considerably in a number of Latin American countries. On average, coinciding with the reversal of the macroeconomic cycle, central government public debt rose from 35.6% to 51.9% of GDP (excluding Nicaragua). This situation illustrates the ongoing vulnerability of public finances in Latin America: when capital flows fall drastically, public-sector borrowing requirements increase, both because the level of activity drops and because the local-currency cost of the public sector's external debt rises in countries with flexible exchange-rate regimes.

In addition to the cessation of payments by Argentina and the restructuring of the external public debt in Uruguay, there have been serious liquidity problems in many other Latin American countries, to such a point that there were no sovereign bond issues during much of 2002. Could this situation have been foreseen? Probably yes, because public finances have become very vulnerable to short-term conditions due to the combination of heavy short-term external borrowing and fixed or over-valued exchange rates. There is no doubt that an appraisal of debt sustainability cannot be separated from a country's capacity to generate foreign exchange and the solidity of prevailing exchange rate regimes.

Although many countries made significant efforts to reduce their indebtedness in the early 1990s, the simultaneous existence of high interest rates,[1] higher exchange rates (in cases where the public debt has a significant external component) and episodes of recession has had devastating consequences for public finances. In a number of countries, the fiscal budget has been caught up in an explosive spiral of increasing indebtedness —a "snowball effect" in which the debt generally absorbs a growing proportion of fiscal revenue.

The combination of scanty economic growth and sharp depreciations of the local currency, in a context of dollarized liabilities, has played a preponderant role in recent crises. Much of this "snowball effect" comes from "original sin",[2] which may be defined as the

impossibility for an emerging country of borrowing abroad in its own currency or obtaining long-term loans in general, even on the domestic market. Incomplete financial markets are characterized by structural fragilities due to currency mismatches (when projects which generate resources in local currency are financed in foreign exchange) and maturity mismatches (when long-term projects are financed with short-term loans).

Original sin thus explains the "fear of floating" attitude characteristic of the authorities in the 1990s (Calvo and Reinhart, 2002). Exchange rate fluctuations have always been unavoidable, however, and generate strong wealth effects when there is a currency mismatch between assets and liabilities, which increases the risk of default by the public sector and severely limits the efficacy of monetary policy (Céspedes, Chang and Velasco, 2002).

Although, generally speaking public debt-to-GDP ratios —the usual indicators of the public sector's long-term solvency— have continued to be comparatively lower in Latin America,[3] the region has not managed to avoid the short-term liquidity problems which do so much harm to countries' credibility. In recent studies, this contrast is explained by the low level and high volatility of public revenue, the weakness of domestic financial systems, and the mediocre quality of fiscal institutions.

In the light of recent events, the International Monetary Fund (IMF) has given a central place among its concerns to the issue of the sustainability of the public debt and has prepared various studies on this subject.[4] A controversial conclusion of some of these and other studies is that, in order to be sustainable, the public debt of emerging countries should not be more than 25%-30% of GDP.[5] If this limit were applied, most of the Latin American countries would fall into the dubious category of "unsustainable", which would

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[1] Attributable largely to the turbulence of credit markets and the procyclical bias of country risk evaluation agencies.
[2] This expression was first used by Eichengreen and Hausmann (1999).

[3] On average, according to estimates by the International Monetary Fund (IMF, 2003c), the public debt amounts to almost 70% of GDP in the emerging economies of Asia, 90% in those of Africa and the Middle East, and 55% in the transitional economies.
[4] See, for example, IMF (2003c).
[5] Various recent articles have come to similar conclusions: see, for example, Reinhart, Rogoff and Savastano (2003) and Goldstein (2003).

mean that they would have to generate substantial primary surpluses in the coming years in order to absorb the public debt overhang.

The country studies are a good deal more cautious, since they place their emphasis on structural questions when appraising the sustainability of the public debt.[6] As Ter-Minassian (2004) points out, sustainability is a probabilistic matter by its very nature, since the dynamics of the public debt depend on uncertain physical and macroeconomic events. Models can indicate the probable upper limits of the debt, but they cannot indicate what level of indebtedness is too high. This approach, which is much more flexible, avoids general conclusions on the optimum level of the public debt.

This article describes the main trends and accounting problems that prevent us from having a suitable comparative base for the analysis of the public debt (section II). It then analyses the various components of public debt dynamics, with special emphasis on the snowball effect and the procyclical bias of fiscal policy (section III). It then goes on to look at the factors which explain public debt crises, first of all quantifying the impact of currency mismatches on fiscal sustainability and then estimating an early warning model which makes it possible to calculate the likelihood of a debt crisis on the basis of fiscal and macroeconomic environment variables such as growth, the degree of economic openness and capital flows (section IV). Finally, it reviews the various proposals that have been put forward for improving the financing conditions of the public debt, with the aim of ensuring its long-term sustainability in middle-income Latin American countries.
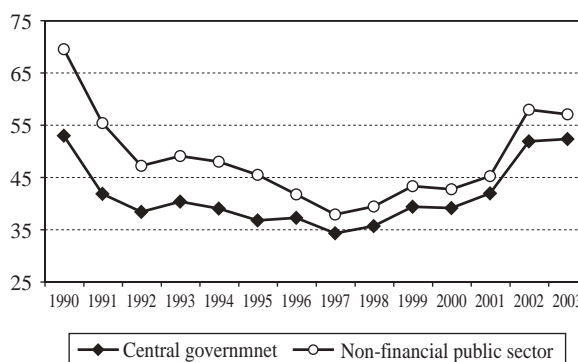
II

Main trends and accounting aspects

When we look at the trajectory of the average level of public indebtedness in Latin America and the Caribbean since 1990, we obtain a U-shaped curve (figure 1). The debt declines up to 1997 and then starts to rise again, but its 2003 level is lower than that of 1990, in the case of the non-financial public-sector debt. It is also observed that the levels of indebtedness of the central government and the non-financial public sector tend to converge, which reflects the limited borrowing capacity that subnational levels of government and public enterprises have had in the last few years.[7]

Tables 1 and 2 show the coefficients of public indebtedness, as a proportion of GDP, of the central government and the non-financial public sector. For the central government, the public debt-to-GDP ratio went down between 1990 and 2003 in 11 of the 19 countries

FIGURE 1

Latin America and the Caribbean: Public debt stock, by institutional coverage, 1990-2003
(As percentages of GDP)

Source: ECLAC, on the basis of official information.

of the region covered by the tables; in some of those countries (Chile, Ecuador, Mexico and the Dominican Republic up to 2002) the reduction was very significant. In seven countries, in contrast, this

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[6] See for example IMF (2003a).

[7] This evolution reflects the impact of the programmes supported by the IMF, which generally fix targets for the surplus and public debt that have a broad scope and include public enterprises. For an analysis of this question, see Martner (2003).

TABLE 1

Latin America and the Caribbean: Central government public debt stock, 1990-2003

(As percentages of GDP)[a]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Argentina				29.4	31.3	33.8	35.7	34.5	37.6	43.0	45.0	53.7	145.9	138.1
Domestic								8.9	9.8	13.1	15.2	20.9	54.2	59.9
External								25.6	27.8	29.9	29.8	32.9	91.6	78.2
Bolivia	65.1	52.9	51.5	63.5	64.3	61.8	54.9	57.9	57.4	61.1	62.6	71.7	74.9	82.2
Domestic				14.4	14.1	13.8	13.9	13.5	13.7	16.7	19.4	26.4	28.1	26.7
External	65.1	52.9	51.5	49.1	50.2	48.0	41.0	44.4	43.7	44.4	43.1	45.3	46.9	55.5
Brazil		12.8	12.1	9.5	12.9	13.3	15.9	18.7	25.0	30.1	31.0	32.8	35.6	36.9
Domestic		-2.2	0.8	1.8	6.5	9.8	14.3	16.7	20.8	22.2	23.5	24.5	23.1	26.7
External		14.9	11.3	7.7	6.4	3.5	1.6	2.0	4.2	7.9	7.5	8.2	12.5	10.2
Chile	45.4	38.8	31.7	29.2	23.5	17.9	15.1	13.2	12.5	13.8	13.7	15.0	15.7	13.3
Domestic	26.4	22.0	18.2	17.5	14.2	12.1	10.9	10.0	9.3	9.8	10.0	10.5	10.0	7.7
External	19.1	16.8	13.5	11.7	9.4	5.7	4.2	3.2	3.2	4.0	3.6	4.5	5.7	5.7
Colombia	14.8	14.0	15.0	14.5	12.7	13.9	14.4	17.8	22.1	29.5	36.9	44.3	50.7	51.9
Domestic	1.9	1.5	2.9	4.5	4.6	5.8	6.6	8.8	10.6	14.4	18.7	22.1	25.2	26.2
External	12.9	12.5	12.1	10.1	8.1	8.1	7.8	8.9	11.5	15.1	18.3	22.2	25.6	25.7
Costa Rica		28.5	23.3	24.3	26.8	28.7	33.2	30.0	39.5	35.2	36.6	38.6	40.8	40.0
Domestic		9.9	9.0	11.5	15.0	17.1	24.0	22.2	31.4	26.6	26.4	27.7	28.6	26.9
External		18.6	14.2	12.8	11.8	11.5	9.2	7.8	8.1	8.6	10.1	10.9	12.2	13.1
Ecuador	67.1	64.5	72.2	85.1	71.1	59.1	58.7	51.7	56.3	83.6	71.8	58.0	51.1	47.9
Domestic	1.9	2.1	1.5	2.7	7.7	7.3	8.8	7.0	10.5	18.1	17.8	13.3	11.4	11.1
External	65.2	62.5	70.7	82.3	63.4	51.8	49.9	44.7	45.9	65.5	54.0	44.7	39.7	36.8
El Salvador	45.7	41.7	43.1	44.3	41.7	37.3	37.8	36.2	33.3	26.0	27.4	31.1	36.0	38.0
Domestic				16.0	16.3	14.5	13.4	12.0	11.2	7.9	9.8	12.0	11.7	11.5
External	45.7	41.7	43.1	28.4	25.4	22.8	24.4	24.2	22.0	18.1	17.6	19.2	24.3	26.5
Guatemala	23.1	17.5	16.5	15.5	15.4	14.0	13.5	14.0	14.6	17.5	16.9	18.0	16.4	18.5
Domestic	10.2	7.8	7.2	6.9	6.5	5.3	5.3	5.4	5.0	5.8	5.8	5.6	4.5	5.6
External	12.9	9.7	9.3	8.5	8.9	8.7	8.2	8.5	9.6	11.8	11.2	12.4	11.9	12.9
Haiti							37.9	40.0	36.6	38.6	43.8	46.2	60.3	58.3
Domestic							12.6	12.0	11.1	12.1	13.6	14.8	17.5	17.4
External							25.3	28.0	25.5	26.5	30.2	31.5	42.8	40.9
Honduras[b]	109.9	82.3	81.5	96.4	105.7	95.0	90.3	80.9	75.0	78.8	70.2	70.7	73.0	71.9
Domestic												3.7	4.0	3.8
External	109.9	82.3	81.5	96.4	105.7	95.0	90.3	80.9	75.0	78.8	70.2	67.0	69.0	68.1
Mexico	46.5	38.1	28.1	25.3	35.3	40.8	31.1	25.8	27.8	25.6	23.2	22.5	24.0	24.7
Domestic	22.4	16.8	11.9	10.7	12.6	8.5	7.6	8.6	9.1	11.1	12.1	13.5	13.8	14.8
External	24.0	21.3	16.3	14.6	22.7	32.4	23.5	17.2	16.6	14.6	10.8	9.6	9.1	9.6
Nicaragua					304.5	252.4	141.1	206.9	197.0	183.8	175.9	179.0	194.4	193.8
Domestic					14.9	10.8	15.0	85.5	72.9	67.4	63.3	66.8	81.7	79.5
External					289.6	241.6	126.0	121.5	124.1	116.4	112.6	112.2	112.7	114.3
Panama	67.7	60.8	56.0	62.3	61.7	58.9	79.9	75.7	74.5	80.5	76.0	82.2		
Domestic	20.9	18.5	16.4	26.4	25.3	22.7	24.1	21.9	20.5	23.9	20.9	20.7		
External	46.8	42.3	39.6	35.9	36.4	36.3	55.7	53.8	54.0	56.6	55.1	61.4	56.2	56.2
Paraguay	13.1	12.0	8.9	10.1	7.3	10.1	10.0	11.1	13.4	22.3	26.2	33.3	46.4	37.7
External	13.1	12.0	8.9	10.1	7.3	10.1	10.0	11.1	13.4	22.3	26.2	33.3	46.4	37.7
Peru	52.4	60.9	59.6	63.6	53.4	47.8	45.1	31.8	40.3	47.1	45.3	45.1	47.3	48.4
Domestic									5.9	9.3	9.4	9.5	10.3	10.3
External	52.4	60.9	59.6	63.6	53.4	47.8	45.1	31.8	34.4	37.8	35.9	35.6	36.9	38.0
Dominican Republic[b]	84.7	60.6	49.2	47.8	37.5	33.2	29.2	23.9	23.1	20.9	19.0	19.6	24.0	40.2
Uruguay			26.8	24.1	23.3	22.3	22.0	22.6	24.0	26.2	31.9	41.9	98.7	97.9
Venezuela (Bolivarian Republic of)[b]							45.2	30.9	28.4	28.2	26.2	29.9	41.0	42.9
Domestic							3.9	3.1	3.2	4.6	7.7	11.1	12.5	14.8
External							41.3	27.9	25.2	23.6	18.5	18.8	28.5	28.1
Latin America[c]	53.0	41.8	38.4	40.3	39.0	36.7	37.2	34.3	35.6	39.3	39.1	41.9	51.9	52.3
Domestic	13.9	9.6	8.5	11.3	12.3	11.7	12.1	11.6	12.3	14.0	15.0	15.7	18.2	18.8
External	46.0	36.3	34.3	34.2	31.9	29.6	29.2	26.1	26.1	28.6	27.1	28.1	34.3	34.3

Source: ECLAC, on the basis of official information.

[a] GDP data at current prices and in local currency were used to calculate the indicators in this table. The exchange rate at the end of each period was used.
[b] Corresponds to the public sector.
[c] Simple average, not including the public debt of Nicaragua.

TABLE 2

**Latin America and the Caribbean: Public debt stock
of the non-financial public sector, 1990-2003**

(As percentages of GDP)[a]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Argentina			27.6	30.0	31.8	34.4	36.4	35.4	38.2	43.5	45.6	53.7	162.5	138.1
Bolivia	88.9	75.8	75.0	87.7	90.2	87.1	78.0	71.2	69.8	73.5	74.3	82.0	85.6	92.4
Domestic				14.4	14.1	13.8	13.9	13.5	13.7	16.7	19.4	26.4	28.1	26.7
External	88.9	75.8	75.0	73.2	76.1	73.3	64.1	57.7	56.1	56.8	54.9	55.6	57.6	65.7
Brazil		38.1	37.1	32.5	30.0	30.6	33.3	34.4	41.7	49.2	49.4	52.6	55.9	58.2
Domestic		14.0	18.4	18.3	21.3	25.0	29.4	30.1	35.5	38.8	39.7	42.2	41.5	46.3
External		24.2	18.7	14.2	8.7	5.6	3.9	4.3	6.2	10.4	9.8	10.4	14.4	11.9
Chile	55.2	44.8	36.5	32.9	26.6	20.9	18.4	16.8	17.7	19.1	18.6	20.3	22.2	20.1
Colombia							22.9	26.8	29.3	38.7	44.3	48.7	57.1	55.3
Domestic							10.0	12.3	12.3	17.1	20.8	21.5	26.4	25.8
External							12.8	14.5	17.0	21.7	23.5	27.2	30.7	29.6
Costa Rica[b]		28.5	23.3	24.3	26.8	28.7	33.2	30.0	39.5	35.2	36.6	38.6	40.8	40.0
Domestic		9.9	9.0	11.5	15.0	17.1	24.0	22.2	31.4	26.6	26.4	27.7	28.6	26.9
External		18.6	14.2	12.8	11.8	11.5	9.2	7.8	8.1	8.6	10.1	10.9	12.2	13.1
Ecuador		74.2	81.2	85.1	77.6	64.7	64.4	56.6	61.9	92.0	79.7	63.4	55.6	51.8
Domestic		2.1	1.5	2.7	7.7	7.3	8.8	7.0	10.5	18.1	17.8	13.3	11.4	11.1
External		72.1	79.7	82.3	69.9	57.4	55.6	49.6	51.4	73.9	62.0	50.1	44.2	40.7
El Salvador										29.0	30.1	34.0	39.1	41.3
Domestic										7.9	9.8	12.0	11.7	11.5
External										21.1	20.4	22.0	27.4	29.8
Guatemala	33.2	24.8	22.3	20.4	19.4	17.5	16.3	16.5	17.3	20.2	18.9	19.4	17.5	19.5
Domestic	10.2	7.8	7.2	6.9	6.5	5.3	5.3	5.4	5.0	5.8	5.8	5.6	4.5	5.6
External	23.0	17.0	15.1	13.5	12.9	12.3	10.9	11.0	12.2	14.5	13.1	13.8	13.0	13.9
Haiti							43.3	45.3	41.1	42.7	49.1	50.7	66.6	64.4
Domestic							12.5	11.7	11.0	12.0	13.5	14.7	17.4	17.5
External							30.8	33.6	30.1	30.7	35.6	36.0	49.2	46.9
Honduras	109.9	82.3	81.5	96.4	105.7	95.0	90.3	80.9	75.0	78.8	70.2	70.7	73.0	71.9
Domestic												3.7	4.0	3.8
External	109.9	82.3	81.5	96.4	105.7	95.0	90.3	80.9	75.0	78.8	70.2	67.0	69.0	68.1
Mexico	45.1	32.4	21.8	18.8	31.2	35.8	25.8	20.7	22.6	21.0	18.1	18.1	21.4	21.9
Domestic	17.8	13.8	7.1	7.0	4.2	-0.7	2.9	6.3	8.0	10.5	9.3	12.0	16.5	18.1
External	27.3	18.6	14.7	11.9	27.0	36.5	22.9	14.4	14.6	10.5	8.7	6.1	5.0	3.9
Nicaragua					422.3	349.6	209.6	217.3	212.7	204.7	201.7	205.3	213.8	213.0
Domestic					6.7	9.9	15.5	29.6	26.5	22.2	28.2	41.9	50.3	48.7
External					415.7	339.7	194.2	187.6	186.2	182.5	173.5	163.4	163.5	124.1
Panama	123.4	114.2	89.9	97.8	94.5	95.8	84.0	78.2	75.8	79.8	77.2	83.3	76.0	74.8
Domestic	17.8	14.8	15.1	25.1	23.3	21.2	21.8	19.8	18.6	22.1	21.2	21.2	19.4	14.2
External	105.6	99.5	74.8	72.7	71.2	74.5	62.2	58.3	57.2	57.8	55.9	62.1	56.6	56.2
Paraguay	32.4	27.3	21.0	19.1	16.0	15.7	14.9	16.3	19.3	29.0	29.3	36.6	50.7	40.6
Peru[b]	52.4	60.9	59.6	63.6	53.4	47.8	45.1	31.8	40.3	47.1	45.3	45.1	47.3	48.4
Domestic									5.9	9.3	9.4	9.5	10.3	10.3
External	52.4	60.9	59.6	63.6	53.4	47.8	45.1	31.8	34.4	37.8	35.9	35.6	36.9	38.0
Dominican Republic	84.7	60.6	49.2	47.8	37.5	33.2	29.2	23.9	23.1	20.9	19.0	19.6	24.0	40.2
Uruguay			34.4	30.3	30.9	29.0	27.9	27.8	28.6	30.9	35.9	46.7	106.0	104.1
Domestic			4.1	3.5	3.9	3.3	3.0	4.1	4.6	7.7	8.6	15.6	25.4	22.5
External			30.3	26.7	27.0	25.7	24.9	23.7	24.0	23.2	27.3	31.1	80.6	81.6
Venezuela (Bolivarian Republic of)							45.2	30.9	28.4	28.2	26.2	29.9	41.0	42.9
Domestic							3.9	3.1	3.2	4.6	7.7	11.1	12.5	14.8
External							41.3	27.9	25.2	23.6	18.5	18.8	28.5	28.1
Latin America[c]	69.5	55.3	47.2	49.0	48.0	45.4	41.7	37.8	39.4	43.3	42.7	45.2	57.9	57.0
Domestic	11.9	10.4	8.9	11.2	12.0	11.5	12.3	12.3	13.3	15.2	16.1	16.9	18.4	18.2
External	67.8	52.1	46.4	46.7	46.4	44.0	36.5	32.0	31.7	33.5	31.9	31.9	37.5	37.7

Source: ECLAC, on the basis of official information.

[a] GDP data at current prices and in local currency were used to calculate the indicators in this table. The exchange rate at the end of each period was used.
[b] Corresponds to the central government.
[c] Simple average, not including the public debt of Nicaragua.

coefficient increased sharply, while in Bolivia it remained more or less unchanged.

The trend of the public debt-to-GDP ratio in 2001-2002 in Argentina and Uruguay warrants special mention. In both cases, the sharp rise in the ratio following the devaluations of these countries' currencies clearly illustrates the "original sin" hypothesis. In Argentina, the convertibility regime undoubtedly artificially reduced the size of the public debt relative to GDP. This indicator increased almost threefold as from 2002, after the devaluation and the deepening of the recession, although it could also be argued that the medium-term equilibrium exchange rate should be lower than the level registered during 2002. The reverse situation was observed in Ecuador, because the persistence of inflation in a dollarized regime pushed up the real exchange rate, thus reducing the burden of the public debt on the economy in relative terms.

In the case of the non-financial public sector (table 2), few differences are observed compared with the central government, except in the case of Brazil. There, the net public debt in 2003 was 36.9% of GDP at the central government level and 58.2% at the level of the non-financial public sector. This difference is due largely to borrowing by subnational levels of government.

There is a great deal of heterogeneity as regards public debt data. The *Government Finance Statistics Manual* published by the IMF defines the public debt in the following terms: "Debt consists of all liabilities that require payment or payments of interest and/or principal by the debtor to the creditor at a date or dates in the future. Thus, all liabilities in the GFS system are debt except for shares and other equity and financial derivatives" (IMF, 2001, p. 129). It should be noted that the *Manual* recommends treating future liabilities of the social security system and contingent liabilities as memorandum items rather than as public debt.

In addition to the importance of contingent liabilities in some cases, the following classification problems may also be noted:

i) *Consolidation of data within the same sphere of government.* The *Manual* does not make any reference to the treatment of central government debt with institutions belonging to other spheres of government of the same State (for example, social security funds or housing cooperatives which are holders of treasury bonds), so that some countries present both consolidated data

(sometimes as net indebtedness) and unconsolidated data. Which is the appropriate information? Some consider that what is important is the recording of the debt, regardless of the nature of its holder, since the obligation to pay exists in all cases. Others, however, consider that consolidation (for example, between social security funds and the central government) reflects a recognition of the fact that financial flows within the public sector do not have the same macroeconomic effects as borrowing by that sector from the private sector. At all events, doubt remains about the best methodology to use at the central government level, which is what most of the data refer to. The problem disappears, of course, if the coverage is expanded to embrace general government or the non-financial public sector.

ii) *Integration of central bank debt.* In some cases, liabilities are included, but not assets (international reserves), leading to inflation of the debt in countries with a significant monetary base.

iii) *Differentiation between direct and indirect public debt.* Should not the granting of loan guarantees and other types of backing be considered as a contingent liability rather than a certain public debt?

iv) *Domestic public debt.* Three countries of the region (Honduras, Paraguay and the Dominican Republic) do not publish official data on their domestic public debt.

As regards the composition of the debt, the data show a clear tendency to make more intensive use of domestic debt instruments, which should reduce countries' exposure to exchange rate fluctuations, at least in the case of instruments which are not indexed to the dollar. Among the countries which have followed this trend are Brazil, Colombia, Costa Rica and Mexico.

In the IMF and World Bank guidelines on public debt management (World Bank/IMF, 2001), it is stated that the "main objective" of such management is "to ensure that the government's financing needs and its payment obligations are met at the lowest possible cost over the medium- to long-run, consistent with a prudent degree of risk". In this respect, the use of a theoretical framework of asset and liability management for administering the public debt is a useful method (box 1), since the cost and risk analysis of the portfolio of public-sector debt instruments is directly linked with fiscal income. In this analysis, the characteristics and

Box 1
PUBLIC DEBT MANAGEMENT STRATEGIES

Debt management strategies that involve excessive reliance on foreign-currency or short-term loans (including those with variable interest rates) are very risky. For example, while foreign-currency debt may appear, ex ante, to be less expensive than local-currency debt with the same maturity (since the latter may involve higher liquidity risk and liquidity premiums), it could prove to be costly in volatile capital markets or if the currency depreciates. Furthermore, the choice of exchange-rate regime can affect the links between debt management and monetary policy. Foreign-currency debt may appear to be cheaper under a fixed-exchange-rate regime because the regime limits exchange-rate volatility. However, such debt can prove to be very risky if the exchange-rate regime becomes untenable.

A framework should be developed to enable government debt managers to identify and manage the trade-offs between cost and risk in the debt portfolio. Debt managers usually handle various types of risks; an important role of the debt manager is to identify these risks, assess (to the extent possible) their magnitude, and develop a preferred strategy for managing the trade-off between expected cost and risk. This means that debt managers should have access to a range of financial and macroeconomic projections. In order to assess the risks, they should regularly conduct stress tests of the debt portfolio on the basis of the economic and financial shocks to which the government —and, in more general terms, the country— are potentially exposed, including the risk that the government will not be able to roll over its debt and be forced to default, since this situation has costs that affect more than just the government's budget. Moreover, debt managers should consider the interactions between the financial situation of the public sector and that of the financial and non-financial sectors in times of stress in order to ensure that the government's debt management activities do not exacerbate risks in the private sector. In general, the models used should make it possible to undertake the following types of risk analysis:

• Project debt-servicing costs over the medium/long term on the basis of assumptions regarding factors that affect debt-servicing capacity, such as new financing requirements, the maturity profile of the debt stock, the interest rates and currencies of new debt, projected future interest rates and exchange rates and the behaviour of relevant non-financial variables (such as commodity prices).

• Generate a debt profile consisting of key risk indicators for the existing and projected debt portfolios over the projected horizon. These indicators should include the ratio of short-term to long-term debt and of foreign exchange to local-currency debt, the currency composition of the foreign-exchange debt, average debt maturity and the profile of maturing debts.

• Calculate the expected cost of debt in terms that are relevant to the government's objectives (for example, in relation to the effects of the debt on the public budget).

• Calculate the real risk of future debt-servicing costs by summarizing the results of stress tests formulated on the basis of the economic and financial shocks to which the government and the country are potentially exposed.

• Summarize the costs and risks of alternative strategies for managing the government's debt portfolio to provide a basis for making informed financing decisions.

In countries with well-developed financial markets, debt managers typically follow one of two courses: either they periodically determine what debt structure is desired and use this to guide new issues of debt instruments for the subsequent period or they set strategic benchmarks to guide the day-to-day management of the government's debt portfolio. These benchmarks are generally expressed as numerical targets for key portfolio risk indicators, such as the ratio of short-term to long-term debt or the ratio of foreign-currency to local-currency debt. The key distinction between these two approaches is the extent to which government debt managers operate in financial markets on a regular basis to ensure that those benchmarks are reached.

Source: World Bank/IMF (2001).

risks of cash flows are examined and, as far as possible, liabilities with similar characteristics are chosen in order to minimize the possibility of liquidity constraints due to maturity and currency mismatches.

Since the 1980s crisis, public debt management has been a constant concern for the Latin American and Caribbean countries. Accounting difficulties still exist, however, in terms of definition and coverage. Risk rating agencies show a systematic bias, since they always use the highest figures in making their assessments and often include some contingent liabilities. Thus, for example, Brazil's unconsolidated public-sector debt represented more than 70% of GDP

in 2002, while the consolidated debt was only slightly over 50% of GDP. Although the goal agreed upon with IMF refers to the second of these indicators, most of the analysts use the first one.

In the absence of a homogeneous methodology that permits a complete accounting of assets and liabilities, the usual practice should be to record, for comparison purposes, the gross consolidated public debt of the general government (i.e., without including the central bank or public enterprises). Indebtedness in respect of contingent liabilities, even if those contingencies are highly probable, should be listed separately.

III

Public debt dynamics

The sustainability of the public debt is equivalent to the long-term solvency of the government. The dynamics of the public debt may be broken down according to the following definition:

$$D_t = D_{t-1} - SG_t + SF_t \qquad [1]$$

where D is the public debt stock, expressed in local currency, SG is the overall government balance, the subscript t corresponds to the current year, and SF is the stock/flow adjustment that ensures consistency between net indebtedness and variation in the public debt stock.[8] The stock/flow adjustment includes a number of variables, such as the variations in the public debt due to exchange-rate fluctuations in the local currency and between the currencies in which the debts are denominated, government acknowledgement of debts owed by the rest of the economy, and other statistical discrepancies, which in some cases can represent the accounting registration of "skeletons in the cupboard".[9]

The equation can be presented in such a way as to use the primary balance[10] as an indicator:

$$D_t = D_{t-1}(1+r) - SP_t + SF_t \qquad [2]$$

where SP is the primary balance and r is the implicit real interest rate, calculated as debt interest payments expressed as a percentage of the debt stock in the preceding period.[11] As regards GDP (Y_t), the equation may be reformulated as follows, where n corresponds to the real growth rate of the economy:

$$\frac{D_t}{Y_t} = \frac{D_{t-1}}{Y_{t-1}} \cdot \frac{1+r}{1+n} - \frac{SP_t}{Y_t} + \frac{SF_t}{Y_t} \qquad [3]$$

Reordering the terms, we have:

$$\frac{D_t}{Y_t} - \frac{D_{t-1}}{Y_{t-1}} = -\frac{SP_t}{Y_t} + \frac{D_{t-1}}{Y_{t-1}} \cdot \frac{r-n}{1+n} + \frac{SF_t}{Y_t} \qquad [4]$$

or, if the lower case letters represent proportions of GDP:

$$\Delta d = -sp_t + d_{t-1} \cdot \frac{r-n}{1+n} + sf_t \qquad [5]$$

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[8] For an example of the application of this methodology to the European countries, see European Commission (2003).

[9] One example has been the acknowledgement of commitments in respect of pension system benefits.

[10] The primary balance is defined as the global balance, less outlays in respect of interest payments on the public debt.

[11] The implicit interest rate should be understood as an approximation to the real interest rate paid by the country. Using the spread between the interest rates on sovereign bonds issued by countries of the region as compared with the rates on United States treasury bonds may be misleading, because it only expresses the interest rate paid at a given moment, whereas what is being analysed here is a balance which includes all the debts generated in the past.

Debt dynamics (Δd) are then separated into three components: the primary balance (sp), the "snowball effect" (that is to say, the effects of the interest burden on the accumulated debt stock) and the stock/flow adjustment (sf). We will analyse the first two of these components in detail below.

1. The procyclical bias of fiscal policy

In the recent debate, there has been broad acceptance of the criterion of the unhindered operation of automatic stabilizers in normal circumstances, as a guiding criterion in fiscal policy. This principle was adopted by ECLAC quite some time ago, when it recommended the use of a structural indicator of the public balance instead of the effective balance (ECLAC, 1998). If this were so, the public debt-to-GDP ratio would be constant throughout the macroeconomic cycle.

It has been observed, however, that the fiscal policy of various countries of the region displayed an anomalous form of behaviour in the 1990s, resulting in a rise in the public debt-to-GDP ratio even in periods when growth was higher than the trend levels.[12] One way of analysing this bias is to compare the changes in the cyclically adjusted public balance with the GDP gap (figure 2). If the automatic stabilizers had operated symmetrically, that is to say, if discretional policies had been neutral throughout the economic cycle, then the points should be spread along the abscissa axis. In the case of countercyclical policies, the points should be located in the upper-right and lower-left quadrants. If the points are concentrated in the upper-left and lower-right quadrants, this shows a tendency to apply procyclical discretional policies.

In Latin America and the Caribbean, examination of 45 episodes of variation in the global public balance adjusted for the business cycle shows that 12 of them were neutral with respect to the cycle, in 25 cases fiscal policy exhibited a procyclical tendency, and only 8 cases reflected a countercyclical form of behaviour. To be more exact, in 13 of the 17 cases in which GDP grew at a higher rate than the trend level, the change in the cyclically adjusted public balance was negative, which reflects an expansionary fiscal policy. In contrast, when the economies grew at a slower rate

FIGURE 2

Latin America and the Caribbean: Procyclical policy episodes, 1990-2001
(Changes in the cyclically adjusted global balance and the GDP gap)
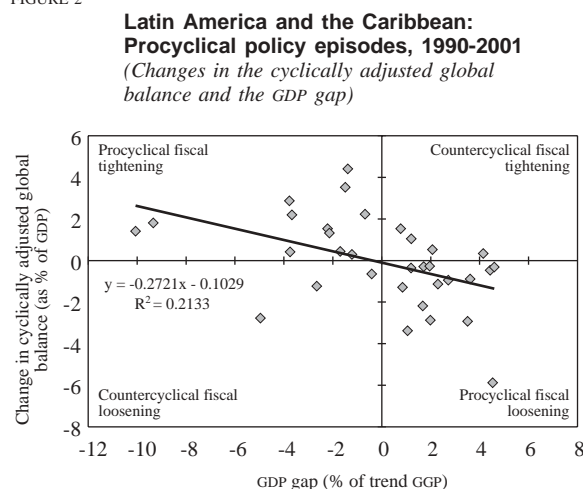
Source: Martner and Tromben (2003). Only episodes in which the absolute values of the annual average GDP gap and the annual average change in the cyclically adjusted balance were over 0.25% for two years or more were included. The central government coverage was used.

than the medium-term trend, the change in the cyclically adjusted public balance was positive in 12 of the 16 episodes in question, reflecting a restrictive fiscal policy.[13] Similar conclusions are reached when we analyse the changes in the cyclically adjusted primary public balance (also called the non-financial balance). These exercises illustrate the usual form of behaviour of the fiscal authorities of Latin America and the Caribbean, which is of course not much different from that of other countries.

Figure 3 compares the economies' position in the cycle (for the same 45 episodes) with the changes in the public debt, at the central government level.

In this case, there are 15 significant countercyclical episodes of reductions in the public debt in the context of a positive GDP gap, with particularly notable cases including those of Chile (1992-1998), Ecuador (1991-1998), Peru (1994-2000), Mexico (1990-1994 and 1998-2001) and the Bolivarian Republic of Venezuela (1991-1993 and 1997-1998), among others.

There were other episodes of reductions in the public debt in the context of a negative GDP gap, especially in the Dominican Republic (1990-1996), Uruguay (1990-1991) and Paraguay (1990-1991). In a number of episodes there was an increase in the public
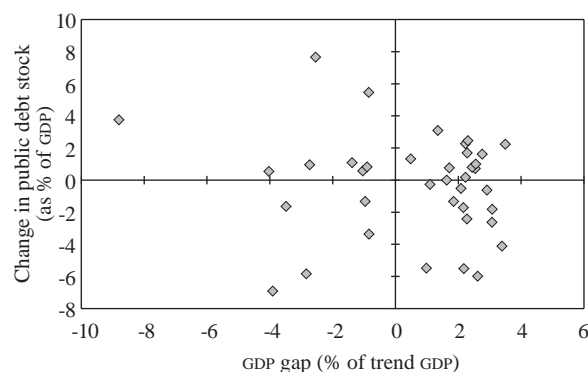
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[12] A study on the evolution of the cyclical and structural components of the public debt in terms of the GDP gap between 1970 and 1997 in the member countries of the European Union reveals the existence of a procyclical bias in fiscal policy (European Commission, 2001).

[13] In this case, countries generally have no option but to adjust, so that it is more a question of a result than of a policy.

FIGURE 3

Latin America and the Caribbean: Procyclical financial policy episodes, 1990-2001
(Changes in the central government public debt stock and the GDP gap)

FIGURE 4

Latin America and the Caribbean: Effective and debt-stabilizing primary balances
(Average for 1998-2002, as % of GDP)

Source: Prepared by the authors.

Source: Prepared by the authors. Only episodes in which the absolute values of the annual average GDP gap and the annual average change in the public debt stock were over 0.25% for two years or more were included.

debt in boom periods, which has naturally resulted in greater fiscal vulnerability during recent recessionary situations. The case of Argentina (1996-1998) is particularly clear in this respect, with an increase in the debt at rates higher than the medium-term growth rate for several years running. In recent years the same thing has occurred, albeit on a smaller scale, in Brazil (1995-1998), Colombia (1994-1998), Costa Rica (1998-2001) and Paraguay (1993-1998).

The countries that gained degrees of freedom during the 1990s by reducing their public debt burden during periods of economic buoyancy were better prepared to cope with the reversal of the cycle. During 1998-2002, some countries systematically registered negative primary balances, causing a build-up of debt —this time countercyclical— which was equally dangerous. Figure 4 shows, for each country, as an average for the 1998-2002 period, the effective primary balance and the primary balance required to stabilize the public debt, calculated as the standard short-term sustainability indicator developed by Blanchard, Chouraqui and others (1990). The required primary balance is calculated as that which stabilizes the public debt balance as a proportion of GDP.
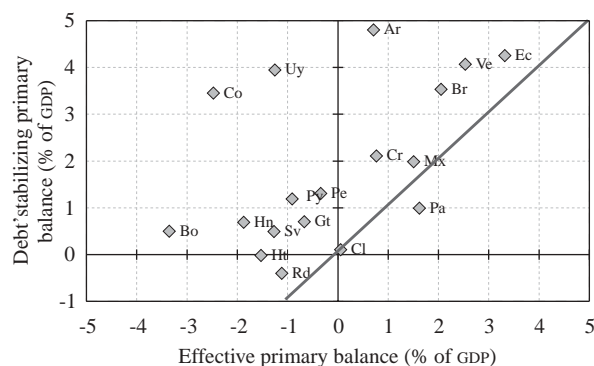
In terms of equation [5], it is assumed that $\Delta d = 0$, $sf = 0$, thus giving the primary balance needed to stabilize the public debt:

$$sp_t = d_{t-1} \cdot \frac{r-n}{1+n} \qquad [6]$$

In this way, a significant negative difference may be observed between the two concepts, except in the cases of Chile, the Dominican Republic, Mexico and Panama. The gap (to reach the isoline on the figure which represents the meeting point) averaged more than five points of GDP in Colombia and Uruguay, and more than three points in Argentina and Bolivia. In this way, we seek to quantify the primary balance needed to stabilize the public debt, as if this were a policy variable independent of the macroeconomic environment. The problem with this kind of indicator is that it does not take account of the wealth effects which result, for example, from changes in relative prices reflected both in the snowball effect and in the stock/flow component.

2. The snowball effect

The objective of reducing the public debt is thus practically unattainable in a situation of low growth and high interest rates. In Latin America during 1990-2002, the maximum snowball effect reached 4.5 points of GDP, associated with a public debt stock of 55.1% of GDP (table 3). The highest levels registered were 12.2 points of GDP in Ecuador, 8.8 points in Argentina, 8.5 points in the Bolivarian Republic of Venezuela, and over 5 points in Brazil, Honduras and Mexico. In contrast, the maximum average for the same period came to 3.8 points of GDP, with a much higher public debt balance of 72.8% of GDP.

Figure 5 gives a quantitative expression of debt dynamics as a proportion of GDP (Δd), separating the contribution of the primary balance in relation to GDP

TABLE 3

**Latin America and the Caribbean and the European Union:
Magnitude of the snowball effect**

	Maximum of snowball effect snowball effect	Public debt associated with maximum	Cumulative snowball effect	Change in public debt
	1990-2002		1998-2002	
Latin American countries	*4.5*	*55.1*	*9.4*	*17.5*
Argentina	8.8 (2002)	145.9	24.0	108.3
Bolivia	1.3 (2001)	61.1	2.5	17.5
Brazil	5.6 (1998)	25.0	17.7	10.6
Chile	0.4 (1999)	13.8	0.5	3.2
Colombia	4.3 (1999)	29.5	17.3	28.6
Costa Rica	4.4 (1996)	33.2	10.5	1.3
Ecuador	12.2 (1999)	83.6	21.3	−5.2
El Salvador	0.9 (2002)	36.0	2.5	2.7
Guatemala	1.0 (2001)	18.0	3.5	1.8
Haiti	0.6 (2001)	46.2	−0.1	23.6
Honduras	5.9 (1994)	105.7	3.4	−2.0
Mexico	6.4 (1995)	40.8	9.9	−3.8
Panama	3.7 (2001)	83.3	5.0	0.2
Paraguay	2.3 (2002)	46.4	5.9	33.1
Peru	4.7 (1992)	59.6	6.5	7.0
Dominican Republic	0.4 (2002)	24.0	−2.0	0.9
Uruguay	10.3 (2002)	98.7	19.7	74.7
Venezuela (Bolivarian Republic of)	8.5 (2002)	41.0	20.4	12.6
European Union	*3.8*	*72.8*	*3.2*	*−7.2*
Belgium	7.2 (1993)	138.2	13.5	−13.5
Denmark	6.4 (1993)	78.0	11.6	−10.7
Germany	2.7 (1996)	59.8	9.7	−0.1
Greece	2.8 (1993)	110.1	0.3	−1.1
Spain	1.7 (1996)	68.1	−3.6	−10.8
France	3.0 (1993)	45.3	5.4	−0.5
Ireland	1.1 (1992)	100.2	−19.5	−22.5
Italy	9.9 (1993)	118.1	11.0	−9.6
Luxemburg	0.2 (2002)	5.7	−0.6	−0.6
Netherlands	4.3 (1993)	79.3	2.3	−14.4
Austria	2.5 (1993)	61.8	7.1	3.0
Portugal	5.1 (1993)	59.1	−1.6	3.1
Finland	3.9 (1993)	55.9	2.0	−5.9
Sweden	4.7 (1996)	73.5	7.5	−15.3
United Kingdom	1.7 (1992)	39.2	2.4	−9.1

Source: For the Latin American countries the figures were prepared by the authors on the basis of ECLAC data. For the European countries the data were taken from European Commission (2003).

(-*sp*), the snowball effect and the stock/flow adjustment (*sf*). This breakdown covers the period from 1998 to 2002, with the countries divided into three groups. Group A consists of the countries that have issued sovereign bonds, which therefore have access to international capital markets, and whose public debt increased. Group B comprises the countries which have access to capital markets but whose public debt has gone down or remained unchanged. Group C consists of the countries which are not included in the J.P. Morgan Emerging Markets Bond Index.
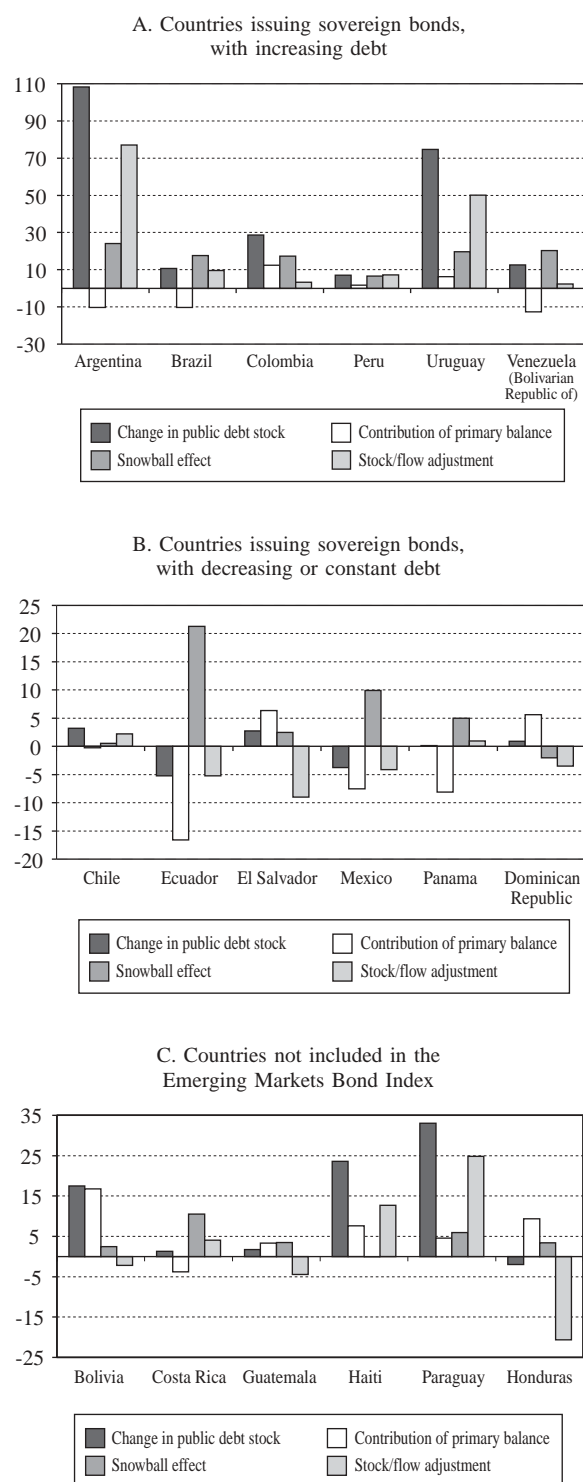
In the first group, the main source of increase in the public debt was the devaluation in 2002, which is reflected, above all, in the size of the adjustment in wealth in Argentina and Uruguay. In Brazil, the primary surplus accumulated during the period was not enough to offset the exogenous increase in the public debt. In Colombia, these exogenous factors came on top of persistent primary deficits. In Peru and the Bolivarian Republic of Venezuela, the increase in the public debt was slight and is attributable exclusively to this kind of factor.

The case of Brazil is instructive. This country began to generate systematic primary surpluses from 1999 on. The Fiscal Responsibility Act, passed on 4 May 2000, established primary surplus targets for the

FIGURE 5

**Latin America: Public debt dynamics,
1998-2002**

A. Countries issuing sovereign bonds,
with increasing debt

■ Change in public debt stock	□ Contribution of primary balance
■ Snowball effect	▨ Stock/flow adjustment

B. Countries issuing sovereign bonds,
with decreasing or constant debt

■ Change in public debt stock	□ Contribution of primary balance
■ Snowball effect	▨ Stock/flow adjustment

C. Countries not included in the
Emerging Markets Bond Index

■ Change in public debt stock	□ Contribution of primary balance
■ Snowball effect	▨ Stock/flow adjustment

Source: Prepared by the authors on the basis of ECLAC data.

following three budget years. Even so, the effort made in 1998-2002 to build up a primary surplus of over 10 points of GDP failed to contain the growth of the public debt, due to low economic growth and the deterioration in financing terms. The establishment (agreed with IMF) of primary balance targets instead of global balance or debt targets represented a great achievement in itself, since it made it possible to separate the fiscal objective from fluctuations in interest and exchange rates. As this meant that the global deficit and the public debt were higher than expected between 1999 and 2002, the reversal of the poor financial conditions seen from 2003 on is thought to represent the beginning of a virtuous circle leading to a reduction in the public debt-to-GDP ratio. Thus, the public debt ceases to be a binding short-term target, since it is recognized that its trend depends on exogenous factors.

In group B, there was a decline in the public debt in Ecuador, Mexico and Panama, while in the other countries the public debt-to-GDP ratio remained relatively constant. In El Salvador, there was an intense positive wealth adjustment due to the recent dollarization process. In Ecuador it was necessary to accumulate primary surpluses of almost 17 points of GDP to achieve a reduction of 5 GDP points in the country's public debt over the period, which affects to the strong negative impact of the snowball effect; as in El Salvador, there was a wealth adjustment due to the dollarization process. In the Dominican Republic, the decline in the public debt as a proportion of GDP was completely reversed by the financial crisis of 2003. Thus, the consolidated public debt balance came to 40% of GDP in 2003, whereas in 2002 this indicator had been only 24%. In the cases of Mexico and Panama, the fiscal authorities managed to neutralize the negative impact of the snowball effect by generating primary surpluses. The total absence of a snowball effect is very noteworthy in Chile, which is a country that has maintained very low levels of public debt and interest rates.

In group C, the snowball effect was much smaller, except in the case of Costa Rica. In Bolivia, Guatemala, Haiti and Honduras, the implicit interest rate was relatively low. In these countries, much of the external finance is concessional financing provided under the support programmes of international lending agencies. In Honduras, the external debt reduction initiative was reflected in a strong wealth adjustment.

In countries that have increased their indebtedness, events which have nothing to do with public debt dynamics or stock/flow adjustments have been very

important, reflecting strong variations in relative prices and the recognition of contingent debts[14] of other levels of government or of the financial system.[15] These factors, which illustrate the pressures placed on the central government to assume debts of other economic agents, endanger the sustainability of the public debt from one day to another and result in bigger adjustments than planned, with the consequent negative effects for the economy as a whole. These anomalies can only be combated by strengthening fiscal institutions and those responsible for regulating the financial systems.

IV

Factors underlying fiscal crises

As we can see, the primary balances needed to stabilize the public debt are extremely volatile owing to sharp variations in interest rates exchange rates, and economic growth rates. Although the above analysis shows the importance of exogenous factors, it does not make it possible to identify the factors which set off fiscal crises. This is what we will seek to investigate below.

1. An indicator of currency mismatches

Currency mismatches correspond to a situation where the currency composition of the assets of a country or sector differs from that of its liabilities, so that the net balance is sensitive to variations in exchange rates. In Latin America, the public debt is generally expressed in foreign currency, while government revenue depends largely on domestic output. This situation gives rise to a currency mismatch in the public-sector balance, causing fiscal sustainability to be very sensitive to exchange-rate movements.

In order to analyse fiscal sustainability, Calvo, Izquierdo and Talvi (2002) propose an indicator which incorporates the currency composition of the debt and GDP. The public debt, as a proportion of GDP, is defined as follows:

$$d = \frac{D}{Y} = \frac{D^{NT} + eD^T}{Y^{NT} + eY^T} \qquad [7]$$

where e is the real exchange rate (defined as the relative price between tradable and non-tradable goods); D^{NT} is the debt in terms of non-tradable goods; D^T is the debt in terms of tradable goods, Y^{NT} is output in terms of non-tradable goods; and Y^T is output in terms of tradable goods (approximated by exports). The measure of the currency mismatch between the public debt and GDP is then calculated as $(D^{NT} / eD^T) / (Y^{NT} / eY^T)$. This measure can take any value between 0 and 1. If that value is close to 0, the public debt is totally external (or denominated in foreign currency) or the tradable GDP is infinitesimal, so that devaluation leads to a proportional deterioration in fiscal sustainability. If the value is close to 1, there is a perfect match in the currency composition of the public debt and the product. In this case, devaluation has no effect on fiscal sustainability. Table 4 gives two calculations of measures of the currency mismatch of the public debt and GDP: in the first one, the external debt is defined as the debt in terms of tradable goods, while in the second the domestic debt denominated in foreign currency is added.

This indicator may not seem appropriate in dollarized countries such as Ecuador and El Salvador, while does show a high degree of mismatch in Argentina, Brazil, Colombia, Peru, Uruguay and the Bolivarian Republic of Venezuela. The majority of these countries have relatively low degrees of trade openness (measured as exports-to-GDP) compared with their levels of external public indebtedness. Mexico and Chile are in a better position.

The public-private composition of exports is also important, although in recent years many countries have been collecting taxes on the export of certain primary commodities and royalties in the mining sector, which tends to reduce the public sector's currency mismatch. What would be the ideal value of this

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[14] The 2005 Brazilian Budget Guidelines Act, for example, provides for the recognition of "skeletons" (debts of the housing finance system, among others) amounting to close to 0.8 GDP points per year up to 2007.
[15] For a recent estimate of the fiscal costs of the financial system crises, see IMF (2003a).

TABLE 4

**Latin American countries: Public debt mismatch
measurements, 2002**

	External debt/ total public debt (%)	Exports/GDP (%)	Public debt mismatch[a]	Public debt mismatch[b]
Argentina	62.8	27.7	0.23	0.12
Brazil	35.2	15.5	0.34	0.08
Chile	36.5	34.5	0.91	0.03
Colombia	50.3	17.5	0.21	0.20
Ecuador	77.7	25.4	0.10	…
El Salvador	66.9	26.7	0.18	…
Mexico	39.7	27.2	0.57	0.57
Peru	78.2	16.4	0.05	…
Uruguay	74.8	21.6	0.09	…
Venezuela (Bolivarian Republic of)	67.1	29.0	0.20	…

Source: Prepared by the authors.

[a] This measure takes account only of the external public debt.
[b] This measure also includes the domestic debt expressed in foreign currency.

indicator? If it were equal to 1, countries could pay off their external obligations in a single year if they devoted the whole of their exports to that purpose. This situation is not very plausible, however. Perhaps an indicator close to 0.5 would show a reasonable balance between the country's capacity to generate foreign exchange and its public-sector indebtedness.

The public debt mismatch indicator becomes less favourable if we also take into account the domestic debt expressed in foreign currency.[16] In Brazil, for example, 30% of the total domestic debt is indexed to the exchange rate. In Mexico, the domestic public debt is expressed entirely in local currency. The traditional indicators of sustainability thus do not serve to reflect the crucial problem represented by currency mismatches.

1. The probabilistic nature of fiscal sustainability

As noted earlier, the assessment of fiscal sustainability is by its very nature probabilistic. A comparative view permits this matter to be approached by estimating fiscal policy reaction functions (IMF, 2003c) or probabilistic models (Manasse, Roubini and Schimmelpfenning, 2003). In the first case, the primary fiscal balance depends on the level of public debt in

the preceding period and on other factors such as the economic cycle, inflation and commodity prices. This approach makes it possible to estimate a primary balance target for each country which depends on the level of indebtedness but also on exogenous conditioning factors.

Another way of assessing sustainability is by estimating the probability of a fiscal crisis. According to the methodology developed by Manasse, Roubini and Schimmelpfenning (2003), it is assumed that a country is in a fiscal crisis if it is classified as being in default by Standard and Poor's, or if it has received the disbursement of over 100% of its quota during the first year of an agreement with IMF.

In a sample of 12 Latin American countries, 25 debt crisis episodes were identified during 1970-2002 according to the above criterion. Table 5 shows the averages for some of the variables used in the estimates and the values of the associated parameters for the 12 countries in question over the period 1980-2002.

During the 1990s the average total public debt was 47.5 points of GDP when the countries were in crisis and 30.8 points in "normal" circumstances (when the variable is the external public debt, the respective amounts are 42.1 and 25.4 for 1980-2002). These figures doubtless form the basis for the recommendation to keep the public debt within the range of 25-30 points of GDP. It is worth recalling that this reasoning only holds true if future external conditions are expected to be as unfavourable as those prevailing in the last two decades.

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[16] In the case of Chile, this indicator is distorted. The main creditor of the Treasury (as far as the domestic debt is concerned) is the Central Bank of Chile, and this debt is expressed in dollars and is of a long-term nature.

TABLE 5

Latin America: Results of estimates

	Average values of variables			Regression results		
	All	No crisis	Crisis	Marginal effect	Logit coefficient	z value
Fiscal variables						
Total public debt/GDP (1990-2002)	38.7	30.8	47.5			
Public debt interest payments/GDP	2.9	2.1	3.5	0.06	0.33	2.01
Short-term debt/GDP	9.1	7.6	10.2	0.012	0.07	1.82
Short-term interest/GDP	0.5	0.5	0.6			
Primary balance/GDP	1.0	0.6	1.3			
External variables						
External public debt/GDP	35.1	25.4	42.1	0.009	0.09	2.03
Current account balance/GDP	–2.4	–3.2	–1.8			
Financial account balance/GDP	0.9	3.7	–1.1	–0.029	–0.16	–2.71
Foreign direct investment (net flows)/GDP	1.9	2.6	1.3			
Reserves/GDP	7.7	8.8	7.0	–0.023	–0.12	–2.64
Interest on external debt/GDP	3.3	2.9	3.7			
Interest on external debt/exports	15.2	13.2	16.6			
Other variables						
Trade openness/GDP	52.2	53.9	50.9	–0.003	–0.02	–2.98
Real GDP growth (%)	2.4	2.8	2.1	–0.024	–0.13	–1.72
Inflation (%)	138.0	20.2	226.5			
Constant					–2.44	–2.6
Crisis indicator lag				0.762	4.42	7.3

Source: Prepared by the authors.

Liquidity variables, such as the short-term external public debt, the current account balance and the net flow of foreign direct investment, measured as a percentage of GDP, are significantly different when countries are in a crisis situation. Thus, for example, the financial account balance is equivalent to 3.7% of GDP in normal periods and –1.8% of GDP in crisis periods.

With regard to fiscal variables, it can be seen that interest payments on the debt and the short-term debt are higher in times of crisis. This result is probably endogenous, because maturities tend to be shorter and interest rates higher when payment difficulties are expected. The primary balance is higher in times of crisis, which reflects the (procyclical) adjustment effort made by governments in Latin America.

Finally, table 5 shows the result of the regressions, using a probabilistic model.[17] The coefficients have the expected signs and are significant. The calculations show that the marginal effects of liquidity variables,

such as the capital account balance, interest payments on the debt, and international reserves as a proportion of GDP, are greater than those connected with solvency variables, such as the external debt-to-GDP ratio. The degree of trade openness and the real growth rate are also important: the first of these incorporates an explanatory factor for currency mismatches, while the second captures the importance of the snowball effect in crisis periods. Finally, it may be noted that the lagged explanatory variable is of great importance. This points up the difficulty that countries have in extricating themselves from debt crises, probably due to "reputation" effects which prevent a rapid return to normality.

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[17] Using panel data for 12 Latin American countries which have access to capital markets for the issue of sovereign debt instruments, a binary choice (logit) model was estimated in order to identify the variables and maximum levels that cause countries to enter into a debt crisis.

V

How can public debt sustainability be ensured?

The results set forth in this article provide various clues to possible policy options for ensuring medium-term solvency. Naturally, countries must adopt laws or rules that ensure large enough primary surpluses to keep the public debt under control. A good deal of progress has been made in this respect, with the adoption of medium-term criteria that ensure control over public spending.[18] In this sense, the "reaction function" of the countries of the region for coping with debt dynamics have improved substantially in the last few years.

The need for a suitable safety margin indicates that the fiscal authorities should set their indebtedness indicators well below current levels. As the exogenous component of the debt is very high, thus generating snowball effects which threaten macroeconomic stability, the alternative is to prolong the adjustment processes indefinitely until a "safe" target can be reached in which the public debt-to-GDP ratio is not more than 30%. It is true that this alternative represents the "long way round" for melting the snowball.

There are other possible roads, however, if international financial institutions decide to take a hand in the matter. In addition to initiatives aimed at strengthening mechanisms for preventing and solving crises,[19] two recent proposals are particularly interesting.

As proposed by Eichengreen, Haussman and Panizza (2002), one way of securing "redemption" from original sin would be for international financial institutions to issue debt in a new unit of account comprising an index of a basket of developing-country currencies. Those institutions would lend in the new unit of account, or alternatively in the currency of each country, in proportion to the new unit of account's share in the basket. The institutions would thus act as intermediaries in the process of issuing sovereign bonds in local currency. This would eliminate the currency-mismatch effects generated by the loans, which would thus become a solution instead of a further source of imbalance.

The other proposal is designed to ensure the sustainability of debt by reducing the snowball effect in public finances. Thus, for example, Borensztein and Mauro (2002) argue that most debt crises are produced by a slackening of the economy's growth rate. Countries could protect themselves by issuing bonds indexed to GDP growth. This mechanism would help to reduce the procyclical bias of fiscal policy, since interest payments would decline during periods of recession and would increase in boom times, thus ensuring a sustainable public debt trajectory.

In general terms, a process that combines the systematic generation of primary surpluses, self-insurance mechanisms —such as stabilization funds or schemes for the prepayment of debt in periods of economic buoyancy or when interest rates are low— and improvement of financing terms seems to be the only way to achieve greater public debt sustainability.

In view of the devastating effects of public debt dynamics in a recessionary environment, it seems clear that, in addition to domestic efforts to generate primary surpluses on a regular basis, substantial contributions are also needed from international financial institutions in order to lower financial costs in middle-income countries, relax conditionality when appropriate, provide orderly procedures for restructuring the external debt, and promote mechanisms to encourage sovereign bonds issues indexed to a basket of currencies and to the countries' payment capacity.

(Original: Spanish)

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[18] For an analysis of the macro-fiscal rules in force in the region, see Martner (2003) and ILPES (2004).

[19] See, for example, the proposals contained in Martín and Ocampo (2003).

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