FISCAL SUSTAINABILITY AND VULNERABILITY IN A SMALL OPEN ECONOMY: THE URUGUAYAN EXPERIENCE

Isabel Rial and Leonardo Vicente[*]

Introduction

The strongly volatile macroeconomic environment that characterizes countries like Uruguay, together with the level and structure of indebtedness results in a very vulnerable position. It can be asserted that the debt-to-GDP ratio is vulnerable to changes in relative prices, GDP evolution and reference interest rate. Within this framework, the analysis of fiscal policy sustainability based only on the dynamics of the debt-to-GDP ratio is clearly insufficient, reducing the possibilities of pertinent corrective measures. Therefore, in this paper we broadened the traditional analysis by developing a set of vulnerability indicators that quantify and evaluate the risks related to the volatility of debt determinants and access conditions to capital markets.

Starting from the traditional solvency indicators, in Section 2 we introduce some extensions in order to explicitly address the risks related to the debt structure by currency, maturity and interest rate. Based on the historical behavior of debt determinants, we develop vulnerability indicators that quantify the risks of deviation from trend values. Finally, we analyze liquidity problems that are implicit in the time profile of the debt and its financing possibilities.

The development of these indicators turned out to be very useful both for evaluating the recent debt dynamics, showed in Section 3, and for building medium and long-term simulations, which are shown in Section 4.

Historical analysis (1988-2002) shows that the reduction of debt-to-GDP ratio observed in the Nineties was an endogenous process due to favorable evolution of debt determinants: economic growth, real appreciation, and primary surplus. Later deterioration of macroeconomic conditions explained the sharp increase in this ratio, which reached 65 per cent of GDP after a four-year recession. We concluded that, in spite of the low levels of debt-to-GDP ratio observed at the beginning of the decade, vulnerability to shocks in debt determinants was very high during the whole period.

Projections (2003-15) presented in section 3, based on an inertial scenario suggest the need of corrective measures to assure sustainability. In this context we evaluate the policy measures that were taken by the authorities in 2003: primary fiscal adjustment and public debt restructure.

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[*] Banco del Uruguay.
The opinions expressed in this paper are those of the authors and do not necessarily represent the views of the Banco Central del Uruguay.

We conclude that only a permanent primary adjustment could change former debt dynamics and assure long term sustainability. Moreover, taking into account the short term liquidity problems due to deterioration of access conditions to capital markets, a debt restructure program should be considered as a first step towards the structural reforms needed to achieve a sustainable path in the long run. These findings tackle the issue of the restrictions that current debt level imposes over futures fiscal policies.

The paper is organized as follows: section 1 presents the conceptual framework; section 2 shows the indicators used for analysis; section 3 analyzes the recent evolution, while section 4 presents long-term simulations. Finally, we infer the conclusions. At the end of the document we have included three appendixes: the derivation of the main equations presented in section 2 appear on Appendix 1; Appendix 2 presents simulations taking into account the model broadened to endogenously-determined spreads, while Appendix 3 analyzes the financing gap in depth.

1. Conceptual framework

Public debt dynamics is linked with the concept of solvency, which is derived from the public sector intertemporal budget constraint.[1] A Government is solvent if its debt does not grow in an explosive way. Should the solvency requirement be fulfilled, the public sector intertemporal budget constraint shall be.[2]

$$d_{t-1}=\sum_{j=0}^{\infty}\left(\frac{(1+g)(1+\rho)}{1+i}\right)^{j}s_{t+j} \qquad (1)$$

Being: d_t the non-monetary public debt at the end of period t as a proportion of GDP; i_t the nominal interest rate on public debt; g_t the growth rate of real GDP; ρ_t the growth rate of GDP deflactor; and s_t the primary surplus.

The public sector intertemporal budget constraint shows that the discounted value of future primary surpluses should equal to the initial value of public debt. By using equation (1) we can define the following concept.

1.1 Solvency

A Government is solvent in period *t* if the planned trajectory of primary surpluses from *t* to infinity fulfills the intertemporal budgetary restriction for given values of *g, i,* ρ and d_{t-1}. That is to say that the discounted value of its current and

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[1] Many authors have developed the concept of public solvency; among several relevant works, Buiter (1985) and Blanchard (1990) influenced the approach in this section.

[2] Derivation of main equations in this section is presented in Appendix 1.

future primary surpluses should be higher than or equal to the initial stock of indebtedness.

The definition of solvency is a concept *ex ante* and not *ex post*, because it refers to the planned trajectory of primary surplus. Equation (1) is an identity, and in an *ex post* sense, the public sector will always comply with its budgetary restriction, either through adjustments in its income and expenses or through modifications in its debt value.

So, a Government ability to fulfill its obligations requires not only projections of future income and outlays, but also judgments about whether such projections are social and politically feasible. Therefore, not only the ability to pay is important, but also the will to do so. Likewise, the ability to pay depends not only on the public sector but also on its interaction with the private sector, for a negative perception of the latter about the recovery of its assets would result in an increase in the financing cost for the Government, which could affect the solvency requirement.

It is then necessary to introduce a new concept that gathers such considerations.

1.2 Sustainability[3]

A Government shows a sustainable fiscal policy if it fulfills the solvency requirement without need for a significant adjustment in its planned trajectory of future income and outlays, given the financial cost that it faces in the market.[4]

On the one hand, the concept of sustainability incorporates the notion that there exist social and political limits to possible adjustments required in the fiscal policy that determine the will beyond the ability to pay the public debt.

On the other hand, the financing cost is a determinant factor of the public debt dynamics and thus of the fiscal policy sustainability. Therefore, the concept of sustainability incorporates not only the concept of solvency but also the one of the public sector liquidity.

1.3 Liquidity

It is said that a Government is in an illiquid position, regardless of whether it fulfills the solvency requirement or not, if it's liquid assets and its available financing are not enough to face its liability maturities.

Therefore, depending on the financing possibilities, one of the aspects included in the concept of sustainability will be more relevant: solvency or liquidity.

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[3] See IMF (2002) , "Assessing Sustainability".

[4] This excludes the situation in which a significant adjustment may be necessary as a consequence of a shock.

Given a situation of restrictions in the credit markets and a low level of indebtedness, the concept of liquidity will be more relevant, while solvency will be important in the case of high levels of indebtedness.

Hence, the analysis of fiscal sustainability is based on projections of policy and exogenous variables, and on judgments about social and politic feasibility of possible adjustments required. The implicit risks in such projections connect the sustainability analysis with the concept of vulnerability.

1.4 Vulnerability

It refers to the risk of violation of liquidity and/or solvency requirements in the case of changes in the macroeconomic conditions.

Debt exposure to changes in the exchange rate, interest rate, level of activity or access-to-market conditions represents a complementary approach to the analysis of sustainability. Then, we are interested in analyzing the public debt dynamics given the expected trajectory of the main macroeconomic variables, and how discretionary fiscal policy would be affected by shocks in fundamentals.

This concept is especially relevant for countries that, like Uruguay, face a high level of volatility of its main macroeconomic variables. Risks connected with volatility of real GDP growth are high, becoming explicit in the cyclical downswing.[5] Therefore, sharp changes in relative prices affect the Government's debtor position, being able to reach unsustainable levels.[6] Likewise, changes in the conditions of access to credit markets could lead to an increase in the financing costs that would trigger a liquidity crisis or the failure in the fulfillment of the solvency requirement.[7] Finally, another source of risk connected with indebtedness and fiscal position projections is related to the existence of contingent liabilities in the Public sector. These are difficult to be measured and they are generally not noticed for long periods, being made explicit when a crisis occurs. Once they are explicit, they are introduced into the debt dynamics, meaning an additional burden on the fiscal policy sustainability.[8]

The empirical application of these concepts was made through some indicators presented herein below.

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[5] Fiscal performance is endogenously deteriorated in the cyclical downswing due to its effects on income, reducing primary surpluses and hence increasing the debt-to-GDP ratio.

[6] Net Debt increases after a real exchange rate depreciation, like the one occurred in 2002 in Uruguay.

[7] An exogenous increase in the interest rate, like the one occurred in the Eighties, or the closure of access to credit in international markets at reasonable rates, like the one occurred in 2002 for Uruguay, are good examples of this point.

[8] The contingent liabilities most studied in the literature are the ones referring to the Social Security System. Another important case is implicit collaterals given by the Government to deposits in the financial system. In the Uruguayan case, the financial crisis of 2002 made this contingent liability explicit, meaning for that year 15.3 per cent of GDP of additional financing needs.

2. Indicators

The most frequently used indicator in the analysis of the debt dynamics is the public debt-to-GDP ratio. It compares debt stocks, gross or net, in a particular moment with the production flow in a 12-month period. This indicator has many advantages, and it is considered as a standard in the analysis of the debt. Nevertheless, it presents important limitations that have been addressed by the traditional indicators of fiscal solvency: primary gap and medium term tax gap.

2.1 Primary gap

A simple way of approaching the relationship between fiscal performance and debt dynamics is to propose as a target a constant debt-to-GDP ratio. Looking back to equation (1), reorganizing terms, and after a few calculations[9] we arrive to the following equation:

$$k_t = s_t^* - s_t \tag{2}$$

where s^* is defined as the primary balance necessary to keep constant the debt-to-GDP ratio. From the comparison between s^* and the effective primary balance s we can obtain the *primary gap* indicator *(k).*[10] Such indicator measures the adjustment required in the primary balance in order to stabilize the ratio in a particular level (generally the current level).

A positive sign shows the need for a fiscal adjustment in order to keep constant the debt-to-GDP ratio, while a negative sign means a comfortable fiscal position.

2.2 Medium-term tax gap

Assuming that primary expenditures *(PE)* are not flexible in the medium term, the tax burden *(T/GDP)* is the only variable left for discretionary fiscal policy.

Including in the definition of primary balance $S = T–PE,$ with similar calculations[11] we can derived the tax gap (*TG*), defined as the difference between T^* and the effective rate T. It constitutes another indicator of potential problems of

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9 See Appendix 1.

10 See Blanchard (1990).

11 See Appendix 1.

public solvency by evaluating the need for, and the magnitude of, a tax-income-based fiscal adjustment.[12]

$$TG_t = \left(\frac{T^*}{GDP}\right)_t - \left(\frac{T}{GDP}\right)_t = t^* - t \tag{3}$$

These indicators constitute the traditional approach of public sector solvency. They exclusively focus on the indebtedness level, without taking into account its composition by currency, interest rate or maturity. However, the analysis of debt composition allows us to make explicit the risks related to variations in the exchange rate, interest rate and conditions of access to capital markets, bringing us closer to the concept of vulnerability. The following set of indicators considers these issues.

2.3 Primary gap by currency

This indicator incorporates the role that the exchange rate plays in the debt dynamics, by disaggregating total debt (*d*) into domestic currency debt (d^s) and foreign currency debt ($d^* = E.d^*_{ME}$) both expressed in domestic currency. After some calculations, the extended equation can be expressed as:

$$s_t^* = \frac{\left[\alpha \cdot (i-\pi) + (1-\alpha)\cdot(i^* + \delta - \pi)\right] - g}{(1+g)(1+\pi)} d_{t-1} \tag{4}$$

$$\alpha = \frac{d^s}{d} \;\; ; \;\; (1-\alpha) = \frac{d^*}{d}$$

where i^* is the dollar interest rate and δ is the devaluation rate.

This equation allows us to identify three effects on the foreign currency debt which affect both flows and stocks:

- reference interest rate effect: the debt grows when the foreign currency reference interest rate increases;

[12] Similarly, we can develop an indicator which determines the amount of the reduction needed in primary expenditure in order to keep constant the debt/GDP ratio, especially in countries with a high tax burden, like Uruguay. Both of them determine the same value, and give an idea about the effort that must be done from the fiscal front in order to assure solvency, both from the public income and outlays points of view.

- real devaluation on interest effect: the debt also grows ceteris paribus when real devaluation is positive, that is to say, when nominal devaluation surpasses inflation;

$$\frac{\delta - \pi}{(1+g)(1+\pi)}$$

- balance sheet effect, on the debt stock, this being the quantitatively most important factor. Equation (5) explicitly shows the role of relative prices in the foreign currency debt ratio d^*:

$$d^* = E.d^*_{ME} = \left(\frac{E}{P}\right)\left(\frac{D^*_{ME}}{dgp}\right) \tag{5}$$

Discrete variation of d^* may be expressed as:

$$\Delta d^* = d^*_t - d^*_{t-1} \cong \left[(\delta - \pi) + (\varpi - g)\right] \cdot d^*_{t-1} \tag{6}$$

where $\varpi = \frac{\Delta D^*_{ME}}{D^*_{ME}}$ is the growth rate of foreign currency debt.

In equation (6) we observe that debt denominated in foreign currency grows every time that relative prices change, although the remaining factors are canceled out. This equation incorporates the notion that in economies with dollarized debt, devaluation is not neutral.

Following this idea we make sensitivity analysis of the exchange rate, determining the exchange rate vulnerability of the debt. In equations (4) and (5) we observe that a real devaluation determines higher stocks and debt service in its component denominated in foreign currency.

In the same way we can analyze the debt vulnerability to its composition by currency. Equation (4) shows that the higher the proportion of foreign currency denominated debt (1–α), the greater the effect of a real devaluation on the debt ratio. Moreover, as long as rigidities in the adjustment of relative prices exist, dynamics will also depend on the timing of the real devaluation. The smaller the devaluation-to-inflation pass through is the more permanent the effect of real devaluation and the bigger the necessary fiscal effort will be.

2.4 Primary gap by type of interest rate

This indicator incorporates the effects on public debt of changes in the international interest rate. The debt has a fraction γ committed at a fix rate:

$r_F = i^* + \delta - \pi$, which once fixed is not affected by the evolution of the reference rate.[13] The rest of the debt, which weights $(1-\gamma)$, is indexed with a reference variable rate as follows: $r_{V,t} = (i_t^* + \delta - \pi)$ where i_t^* represents the international interest rate in force in each period (generally, the *Libor* rate). The variable rate faced by the economy is the former one plus a spread θ_t, agreed in the contract of each instrument. In this way, the extended equation can be expressed as:

$$s_t^* = \frac{\left[\gamma \cdot r_F + (1-\gamma) \cdot (r_{V,t} + \theta_t)\right] - g}{(1+g)(1+\pi)} \cdot d_{t-1} \qquad (7)$$

Using this equation we can determine the debt vulnerability to changes in the interest rate. Clearly, the higher the reference rate is, the higher the debt service will be and thus, the bigger the necessary fiscal effort in terms of primary balance. On the other hand, the bigger the spread θ_t and the share of debt issued at variable rate $(1-\gamma)$ are, the wider this effect will be.

Until now we have dealt with the concept of vulnerability within the primary gap framework. That is to say, given the debt composition by currency, interest rates, etc., we estimate the reaction of the primary balance in order to stabilize the debt-to-GDP ratio. Another approach to fiscal vulnerability is presented in the following set of indicators, which try to measure the effects on the debt-to-GDP ratio produced by changes in its main determinants.

2.5 Vulnerability indicators

All indicators previously presented require projections both of macroeconomic and policy variables, and thus they are exposed to volatility risk. As a way of quantifying the existing risk in each period, we propose a set of scenarios where changes in the main debt determinants can be analyzed: economic activity *(GDP)*, international interest rate in dollars *(i*)* and real devaluation *(e–p)*, taking as reference the historical variance around its mean.

We begin from a baseline scenario where a debt-to-GDP ratio (D/GDP_B) is determined. From there on, we define two additional sets of scenarios for which the debt ratio is calculated:

- We assume that debt determinants *(GDP, i^*, e–p)* vary in the first two years of projection by plus-minus its variance $(\pm\sigma)$, returning to the baseline scenario values in the third year. We define $AD/GDP_{+\sigma}$, as the average debt-to-GDP ratio of the three years in the case in which the determinants vary by $+\sigma$, and $AD/GDP_{-\sigma}$ in the case in which they vary $-\sigma$.
- We make the same analysis but considering variations of $(\pm 2\sigma)$.

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[13] Which in the Uruguayan case are Eurobonds and Global Bonds issued abroad.

In this way we define four scenarios, determining a variation range for the debt-to-GDP ratio. The probability of each scenario will depend on the probability distribution function, which is country-specific.[14]

Then we define $\mu, \lambda, \tau, \omega, \psi$ as the variations of average debt-to-GDP ratios of the 3 following years after a shock in relation to its current value in the five scenarios.

$$\mu = \Delta\frac{D}{GDP_B} \quad ; \quad \lambda = \Delta\frac{AD}{GDP_{+\sigma}} \quad ; \quad \tau = \Delta\frac{AD}{GDP_{-\sigma}} \quad ; \quad \omega = \Delta\frac{AD}{GDP_{+2\sigma}} \quad ;$$

$$\psi = \Delta\frac{AD}{GDP_{-2\sigma}}, \quad \text{with} \quad \Delta\frac{AD}{GDP} = \left(\frac{AD}{GDP}\right)_{t-1,t+3} - \left(\frac{D}{GDP}\right)_t$$

The comparison of variations determined by $\lambda, \tau, \omega, \psi$ with the one that occurs in the baseline scenario μ gives us a measure of the debt vulnerability to changes in the macroeconomic environment. This set of indicators, which we call ε_i, is defined as follows:

$$\varepsilon_1 = \lambda - \mu = \Delta\frac{AD}{GDP_{+\sigma}} - \Delta\frac{D}{GDP_B} \quad ; \quad \varepsilon_2 = \tau - \mu = \Delta\frac{AD}{GDP_{-\sigma}} - \Delta\frac{D}{GDP_B}$$

$$\varepsilon_3 = \omega - \mu = \Delta\frac{AD}{GDP_{+2\sigma}} - \Delta\frac{D}{GDP_B} \quad ; \quad \varepsilon_4 = \psi - \mu = \Delta\frac{AD}{GDP_{-2\sigma}} - \Delta\frac{D}{GDP_B}$$

ε_1 and ε_2 measure the $\pm\sigma$ variation range of debt-to-GDP ratio related to the baseline scenario, while ε_3 and ε_4 present a bigger variation range by considering $\pm 2\sigma$. The higher the value of ε_i is, the higher the vulnerability degree.

In this way, we construct vulnerability indicators for debt-to-GDP ratio to changes in its determinants, represented in this paper by the GDP growth rate, the interest rate, and the real devaluation.

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[14] We follow the general idea presented in the IMF sustainability template, IMF (2002).

2.6 Financing gap

Indicators presented above implicitly assume that the country has a permanent access to capital markets, succeeding in being financed at every moment regardless of its debt-to-GDP ratio. Nevertheless, it is not obvious that this assumption comes true in the whole simulated trajectory. Therefore, the analysis of solvency must be completed with another kind of indicators measuring potential liquidity problems.

The concept of *financing gap* (hereinafter FG) refers to the difference between needs and sources of financing.[15] The financing needs include the fiscal performance and total public debt amortizations,[16] while sources refer to future disbursements of international loans, placements of Government securities, sale of Government assets, deficit monetization and fiscal adjustment.

By taking into account the maturity profile of the debt, this indicator is useful for the analysis of liquidity problems. The FG evaluates the credibility of debt projections, determining whether the gap between needs and sources of the public sector can be financed.

We define a new indicator ***t***, which accounts for the number of years that the current and planned trajectory of public income and expenditures can be hold, given the conditions in force in the credit market.

To sum up, we have presented a set of indicators which allow us to evaluate fiscal policy sustainability. First, we have presented traditional indicators of public solvency. Second, we worked with some extensions in order to make explicit the vulnerabilities related to the debt structure. Third, we developed debt vulnerability indicators using the historical variance rate of main determinants of public debt dynamics. Finally, we have focused on liquidity problems through the analysis of the time structure of Public debt and its possibilities of financing.[17]

These indicators have proved to be very useful for the analysis of the recent evolution of the Uruguayan public debt, as it is presented in section 3, and for the construction of long-term simulations, presented in section 4.

3. Recent evolution: 1988-2002

The evolution of gross and net public debt figures for the Uruguayan economy in the last 15 years is showed in Figure 1. This evolution was determined

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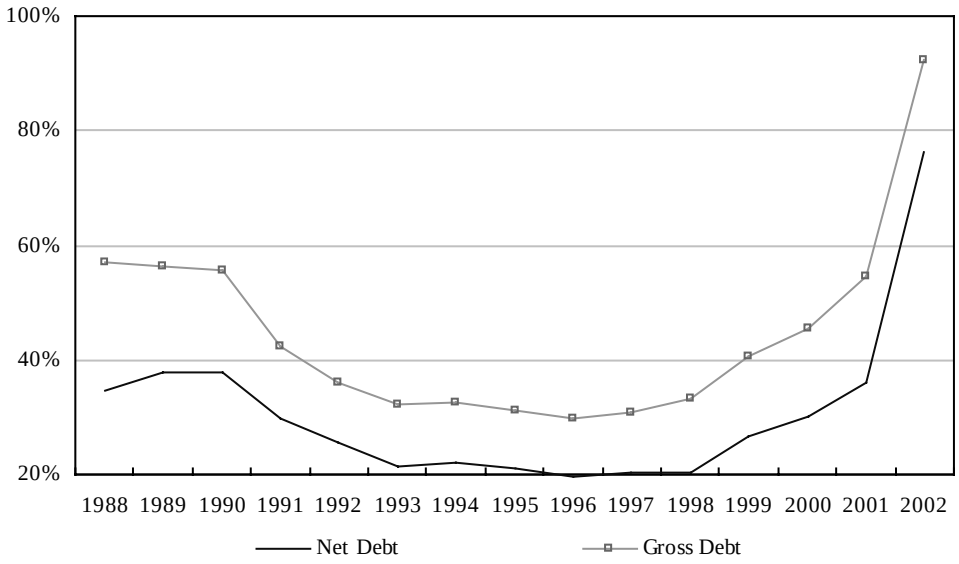
15 The development of the instruments used in this analysis was in charge of Mariana Sabates.

16 They are formed by amortizations already agreed and those that are being originated by future indebtednesses.

17 There are other indicators that could be included in order to improve the analysis of the Public debt dynamics; in this paper we will focus on the ones presented in this section. In Appendix 2 we present an additional indicator which corresponds to the Primary Gap with endogenous *spreads*.

Figure 1

Gross and Net Public Debt, 1988-2002
(percent of GDP)



by the interaction of both the policy measures, and the macroeconomic environment (Figure 2).

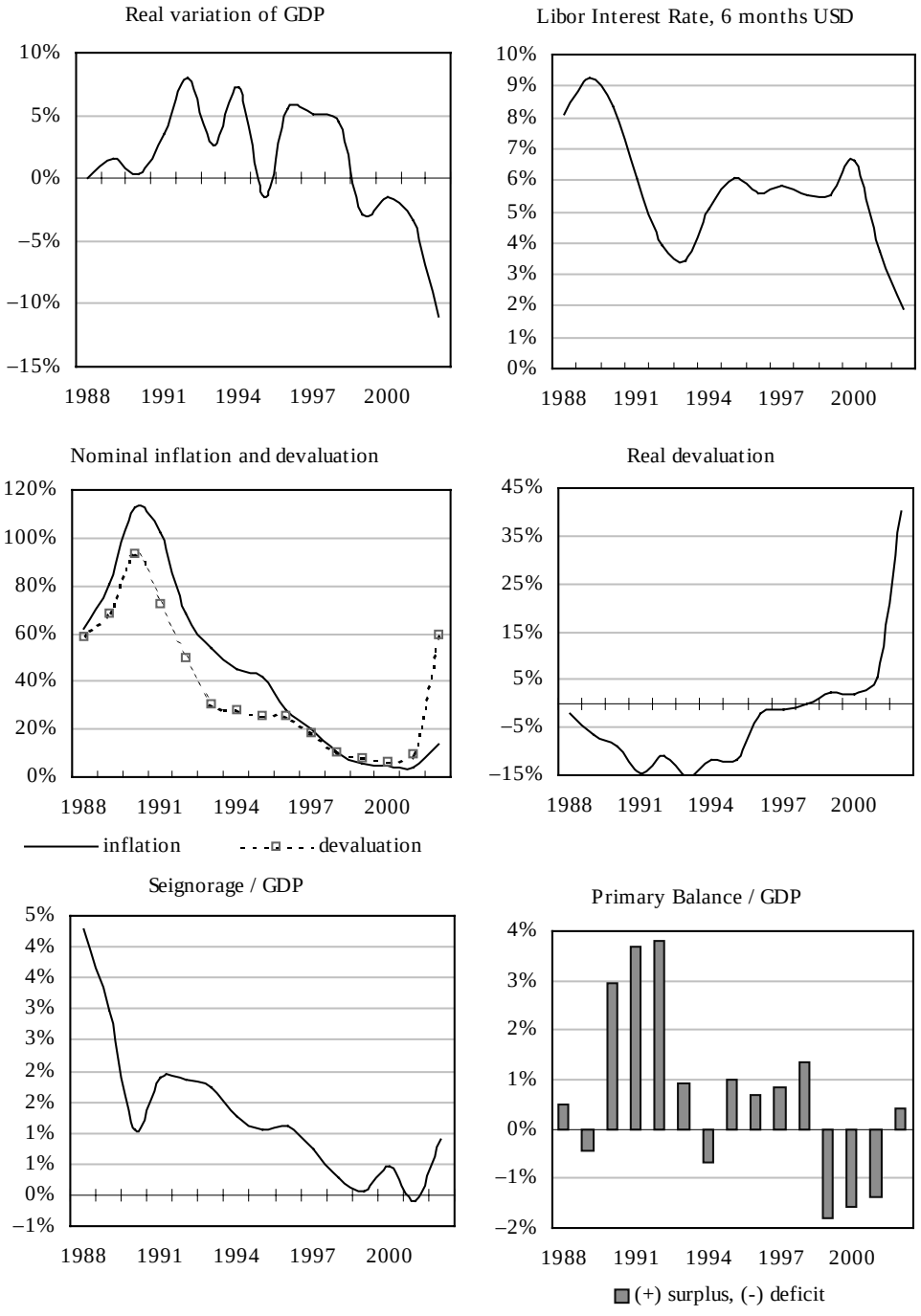
We identified four subperiods for analysis: 1988-1990, period of several debt renegotiations within a stagnation framework; 1991-1998, the return to growth with a particularly favorable combination of debt determinants; 1999-2001, a quick deterioration of macroeconomic conditions and the first warning signals of fiscal unsustainability; and 2002, when the materialization of previous risks took place.

A closer analysis of these periods will allow us to discuss the following issues:

- Which were the determinants of the public debt dynamics.
- How vulnerable was the public debt in this period.
- Which warning signals (if any) were provided by the indicators presented in section 2.
- How the Public debt sustainability and vulnerability were affected by the strategy followed by the authorities in this period.
- Which restrictions are imposed over future macroeconomic policy by the current level a structure of public debt.

Figure 2

Relevant Macroeconomic Variables
(1988-2002)



3.1 1988-90: debt restructure

Different refinancing episodes in a framework of limited growth situated the net debt-to-GDP ratio at about 40 per cent.[18] The primary balance was similar to the interest payments, while the high interest rate of the debt (close to 10 per cent in dollars) was countered by a moderate but growing real appreciation, in such a way that the change of debt-to-GDP ratio was negligible. It was in this context that a series of economic and policy changes began.

3.2 1991-98: the regional dynamism

At the beginning of the Nineties we can highlight three major economic events: the debt renegotiation in 1991, the return to economic growth, and the exchange rate-based stabilization plan, which was complemented with a fiscal adjustment.

In 1991, through the Brady plan agreement the Central Bank of Uruguay repurchased debt in the secondary market, reducing its gross stock by US$ 634 (5 per cent of GDP), and extended debt maturity by issuing new collateralized bonds.[19]

In addition to this stock reduction, the debt dynamic was favorably affected by the evolution of its determinants. On the one hand, within a framework of regional growth together with the implementation of the Mercosur free trade agreement, the Uruguayan economy returned to a sustained growth path during the whole period, which reduced endogenously the debt-to-GDP ratio.

The important capital inflow to the region, allowed the public sector to have broad access to international capital markets. In this context, the country achieved in 1997 the *"Investment Grade"*. The spread of gross public debt went from about 300 bp to about 50 bp in the second half of the decade. In addition, taking into account the low levels for the reference Libor rate, which stabilized at about 5.5 per cent at the end of the period, it is clear that the financing cost for Uruguay had substantially improved in relation to the previous decade.

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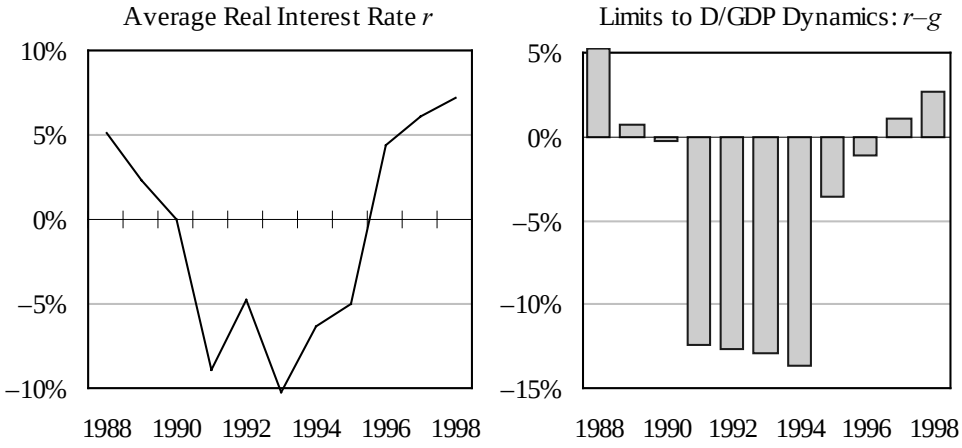
[18] After the 1982 crisis, Uruguay renegotiated its foreign debt in years 1983, 1986 and 1988, ending in a global refinancing in 1991, within the framework of the Brady plan.

[19] Through an agreement signed in January 1991, Uruguay renegotiated part of its debt for a total amount of US$ 1,609. It did so through debt repurchase at a market value of 56 per cent for US$ 634 and issuance of Brady Bonds in dollars and pounds, with maturities in 2007 and 2021, for a total amount of about US$ 1,060, depending on the sterling pound arbitrage. As main guarantee, Uruguay purchased a *zero coupon bond* from the USA at an effective value of about US$ 50 and a nominal value of US$ 530, which was deposited with the Federal Reserve Bank of New York. As the Gross Debt and assets decreased effects on the Net Debt did not exist. A detailed analysis of the modality and the effects of this refinancing go beyond the aims of this paper.

Figure 3

Real Interest Rate and Budget Constraint



At the beginning of the Nineties a new exchange rate-based stabilization plan begun, having important consequences on several determinants of the debt dynamics: real exchange rate appreciation, and fiscal performance.[20]

The real appreciation, which in the period 1990-1995 was 12 per cent average per year, determined two favorable effects on the debt. First, the strength of the currency together with a high dollarization degree accounts for an endogenous reduction of the debt-to-GDP ratio through the balance sheet effect. Second, both the evolution of the Libor rate and the spreads, and the real appreciation resulted in a negative real interest rate between 1990 and 1995, as it is illustrated in Figure 3.

Moreover, the reasons for the improvement in the fiscal position observed in this period are twofold. The consumption boom occurred in the first stage of the stabilization plan explains the endogenous expansion in tax collection. In addition, important fiscal adjustment measures were taken at the beginning of the Nineties.[21]

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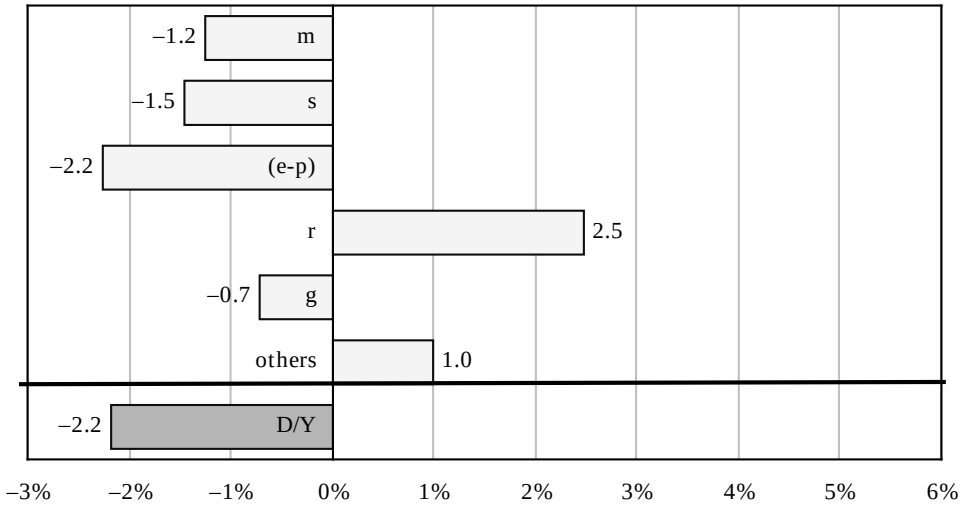
[20] Real appreciation (devaluation) is here understood as the difference between nominal appreciation (devaluation) and domestic inflation, without taking into account the evolution of international inflation. In other words, it is the inverse of prices in dollars. This is the relevant concept in the analysis of debt, determining levels, through assets and liabilities valuation in domestic currency; and flows, through its influence on the real interest rate.

[21] The fiscal adjustment, set on law 16.107 of March 3, 1990, was based on an increase in tax rates and baselines of main taxes. The most important measures were: increase in the VAT baseline rate from 21 to 22 per cent, increase for one year in the rent tax rates (*IRIC*, *IRA* and *IMAGRO)* from 30 to 40 per cent, increase in some tax rates on goods and services (*IMESI* and *IMABA)* (the applicable rate went from 0.75 per cent to the legal maximum, 1.75 per cent). On the other hand, there was an increase in labor tax rates (*IRP)*, both of the employer (from 1 to 4.5 per cent) and employee (maximum rates went from 2 to 7.5 per cent), together with a diversification in bands.

Figure 4

Marginal Debt Components, 1991-98

(percent of GDP)



As we can see in Figure 4 and Table 1, all debt to GDP determinants have acted favorably, accounting for a reduction in the debt ratio of 2.2 points of GDP for 1991-1998 on average.[22] The real appreciation was the most relevant factor that explained the decrease of the debt level, followed by the primary balance and seignorage. Economic growth reduced the debt-to-GDP ratio by almost 1 point on average, while the interest payments showed an average expansionary effect of 2.5 points of GDP.

These results, together with the traditional solvency indicators showed in Table 2, would lead us to the conclusion of a comfortable fiscal position for this period.[23]

Moreover, the analysis of the financing gap shows that due to the favorable conditions in the capital markets, between 1995 and 1998 Uruguay's gross issuances were enough to allow the rollover of previous debt, finance the fiscal deficit, and accumulate reserve assets (Figure 5).

Under these conditions, the public sector met the solvency requirement. As it has been mentioned, this is a necessary but not a sufficient requirement for

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[22] The contribution of a factor x to the dynamics of the relation $d = D/Y$ is given by xd; this is what is shown in Figure 5. A positive (negative) value indicates that it contributes to increase (decrease) the marginal debt.

[23] A negative Primary Gap shows that the effective primary balance was consistently above the necessary one to stabilize the debt-to-GDP ratio. Similar results are observed with the medium term gap.

Table 1

Determinants of Δ(*D/Y*) (Net Debt)
(percent)

	1991-1998 average	1999-2001 average	2002
Marginal debt	**–2.2**	**5.1**	**29.3**
Variation of GDP: *g*	–0.7	0.7	3.8
Interests: *r*	2.5	2.6	4.5
Real devaluation: *e* – *p* (1)	–2.2	0.9	15.9
Primary balance: *s*	–1.5	1.6	–0.4
Seignorage: *m*	–1.2	–0.1	–0.9
Others [24]	1.0	–0.9	6.5

(1) (+) devaluation (–) appreciation.

Table 2

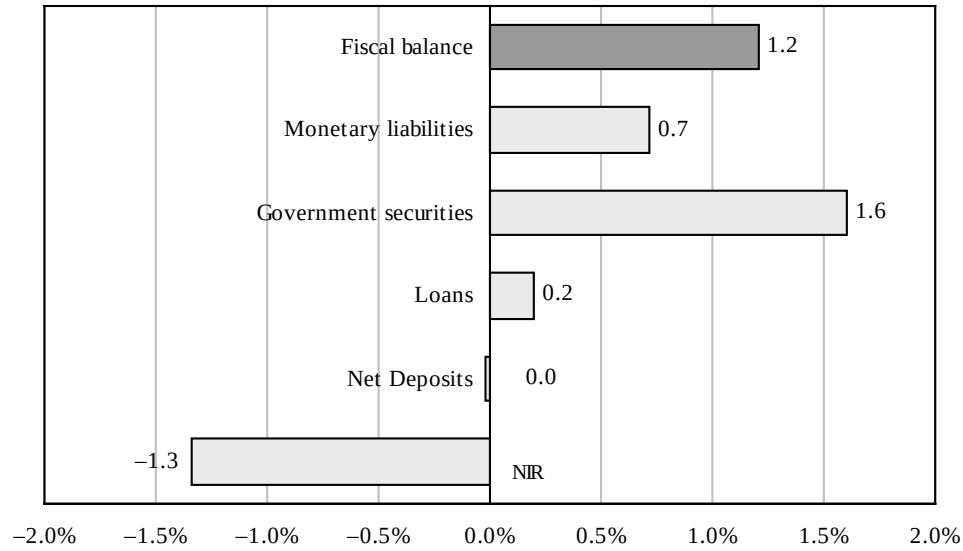
Solvency Indicators
(percent of GDP)

	1991-1998 average	1999-2001 average	2002
Gross Public debt	33.6	47.0	92.4
Net Public debt	22.5	30.9	65.3
Primary Gap *s** – *s*	–4.5	6.4	22.8
Medium-term tax gap *t** – *t*	–3.1	4.2	21.1

[24] This residual aroused from methodological adjustments made within the framework of reconciliation of flows of financing with debt stocks, in the spirit of the new IMF manual on Government Finance (2001). These differences mainly aroused by different valuation criteria between both statistics (exchange rates, arbitrages, valuation of Government Securities) and by differences in volume of net assets (adjustments in stocks). Readers interested in studying these criteria in depth can consult the BCU's website and access to the new methodology of debt and financing (November 2001 version) elaborated by the Fiscal Analysis Department of the BCU's Economic Policy Division.

Figure 5

Sources of Financing, Average 1995-98
(percent of GDP)



sustainability. The private sector should expect that the public sector meets its solvency restriction, without making major corrections in income and expenditure programs. These subjective requirements may be approached through the values of the Uruguayan debt in the secondary market, or through the country risk, measured by the *spreads* of sovereign debt. In this regard, 2027 Bond quoted with a *spread* between 200 and 300 bp for the years 1997 and 1998, which was a very low level in the context of emerging markets.[25] This illustrates favorable expectations from the private sector about the Uruguayan Government's capacity and will to pay, confirming the idea that the Uruguayan fiscal policy was sustainable.

To sum up, during this period where debt-to-GDP ratio adjusted very slowly and was kept at relatively low levels, none of the traditional indicators showed warning signals of possible sustainability problems.

Nevertheless, towards the end of this period this strategy began to nest the snake's egg. On the one hand, the structure of debt increased its concentration in Government securities, most of them denominated in foreign currency.[26]

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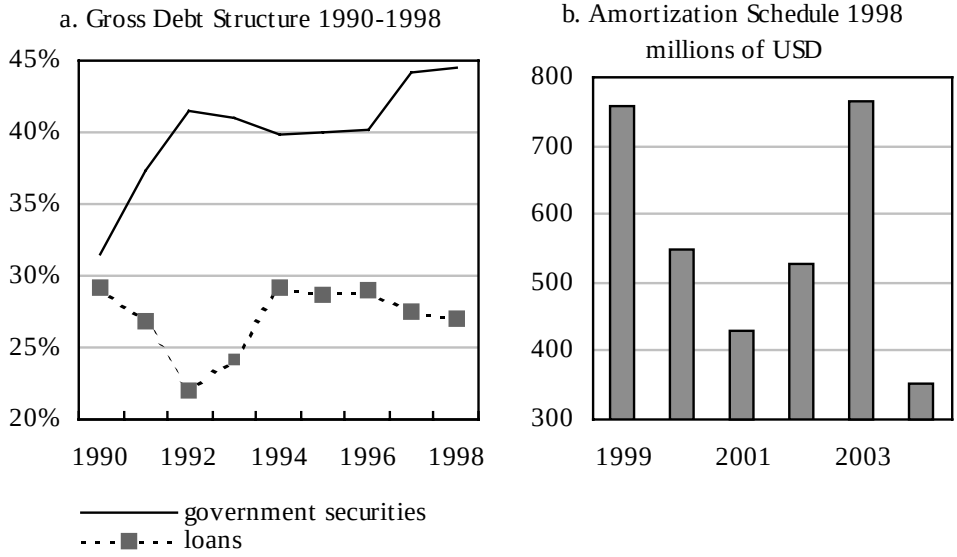
[25] The average *spread* for 1998 was of 253 bp, while the one of other emerging economies which issued at similar terms was of 562 bp for Mexico, 603 for Argentina, 893 for Brazil, and 1,052 for Venezuela.

[26] In addition to the 2027 Bond mentioned above, Uruguay made another 6 issuances in international capital markets since 1994 up to the end of this period, all of them in foreign currency (US Dollar, Deutsche marks and Yens), each one between US$ 100 and US$ 300, with maturities between 5 and 10 years.

Figure 6

Instrument and Maturity Debt Structure



On the other hand, this happened together with a maturity concentration in the year 2003. Therefore, this indebtedness strategy, although it had not consequences on the debt level, increased its vulnerability in terms of time structure and exchange rate.

3.3 1999-2001: The quick deterioration

This period was characterized by the deterioration of the macroeconomic environment. Economic recession promoted the deterioration of the endogenous-determined fiscal balance, while Uruguayan competitiveness was negatively shocked by the devaluation of the Brazilian currency in January 1999, and later by the Argentinean recession.

The economy experienced a recessive adjustment with low interest and devaluation rates. No significant changes in relative prices took place in this period, and the average interest rate was stabilized at low levels.

Fiscal deficit increased during these years, reaching 4 per cent of GDP on average (Table 3). The drop in tax collection under the influence of the economic downturn, and the rigidity of the primary expenditures accounted for this evolution.

Table 3

Selected Macro Indicators, 1999-2001

Data in variation rates	**1999**	**2000**	**2001**
Δ real GDP	–2.8%	–1.4%	–3.4%
Inflation	5.7%	4.8%	4.4%
Devaluation	8.3%	6.8%	10.0%
Libor rate (USD)	5.5%	6.6%	3.7%
Debt average interest rate (USD)	5.6%	6.0%	6.2%
Data in percent of GDP			
Consolidated fiscal balance (1)	–4.0%	–4.1%	–4.3%
Interest payments	2.2%	2.5%	2.9%
Primary balance	–1.8%	–1.6%	–1.4%
Primary public expenditure (2)	31.2%	30.7%	30.8%
Gross public debt	40.8%	45.5%	54.7%
Public Assets	–14.0%	–15.5%	–18.7%
Net public debt	26.7%	30.0%	35.9%

(1) (+) surplus, (–) deficit.
(2) Non-Financial Public sector.

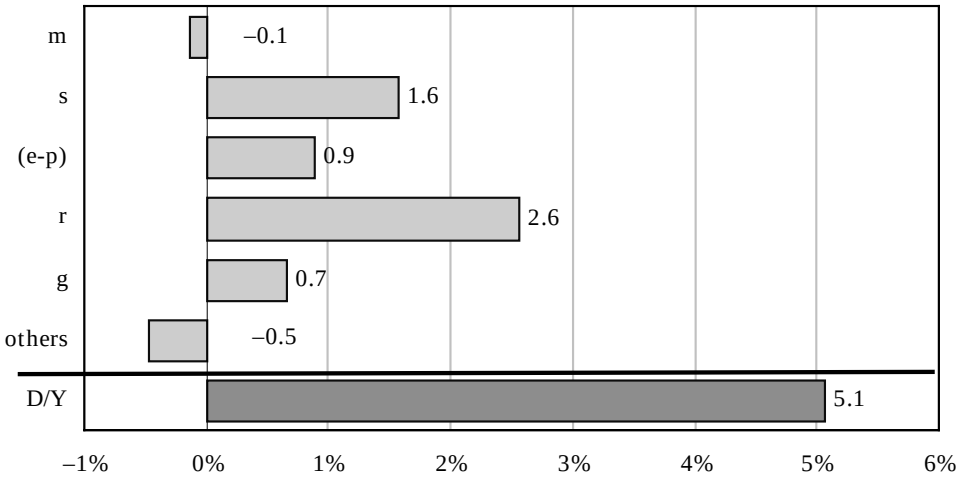
In spite of the increase in the fiscal imbalance, access to capital markets remained unchanged. Then, the financing of the deficit pushed the debt-to-GDP ratio up to 55 points of GDP in 2001 in gross terms.

Although debt levels were similar to those observed at the beginning of the Nineties, the increase by 22 points of GDP in gross terms (15 points in net terms) relative to 1998, raised questions of concern. In Figure 7 and Table 1 we can see that, contrary to what happened in previous years when all debt determinants helped to reduce the debt-to-GDP ratio, from 1999 onwards they contributed to its expansion.

Recession and real devaluation, though moderates, became expansive factors added to the permanent pressure of interests, leading to a significant deterioration of the primary balance together with an increase in debt-to-GDP ratio. This situation undermined private sector confidence.

Figure 7

Marginal Debt Components, 1999-2001
(percent of GDP)



Some indicators started to show warning signals, as it is clear from Table 2. It happened so with the primary gap: it turned up to a positive value of 6.4 per cent of GDP on average, showing the magnitude of the adjustment needed to keep constant the debt-to-GDP ratio relative to the previous year. The feasibility of an adjustment of such magnitude was very low, taking into account both the tax burden level (31 per cent of GDP, one of the highest in America Latina), and the rigidity of expenditures, at least in the context of low inflation rates and price stability.[27]

Furthermore, given the economic recession, a fiscal adjustment would be procyclical and therefore would not necessarily ensure an improvement in the fiscal position or in the debt dynamics.

In addition, even though these were soundness signals to the markets, the new issuances increased the share of foreign currency-denominated debt that reached 98 per cent of total debt in this period, and concentrated maturities between 2003 and 2006.[28]

After three years of recession the financing of a persistent fiscal imbalance with an increasingly high level of indebtedness left the Uruguayan Government in a

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[27] In the short term public expenditure can only be reduced significatively through its liquefaction promoted by a strong and non-anticipated inflation increase, reducing public wages and social benefits in real terms, which represent 2/3 of primary expenditure.

[28] The resulting structure at the end of 2001 showed that the Uruguayan Public sector should serve debt for US$ 1,746 in 2003 and for amounts slightly higher than US$ 1,000 in each year of the period 2004-2006.

very vulnerable position. The risks related to the volatility of the main debt determinants, and to changes in the conditions of access to credit markets became more evident after Argentina abandoned the *Convertibility Plan* in December 2001.

Nevertheless, no clear signals of lack of confidence from the private sector could be recognized, since the Uruguayan economy continued to access the international markets at relatively comfortable rates, as shown in Table 4.

Within this framework, the debt strategy followed by the authorities was to increase the level of indebtedness beyond the needs of fiscal financing in order to accumulate foreign assets. In doing so, they deepen the previous debt structure and therefore increased debt vulnerability.

3.4 Latent vulnerability in the Nineties

The vulnerability to changes in the macroeconomic environment can be explicitly addressed by the use of the indicators εi developed in section 2. From Table 5 we can conclude that relative prices ($e–p$) and economic growth g are the variables that show higher volatility ratios:

$$cv = \frac{\mu^2}{\mu^2 + \sigma^2}$$

The main statistics of the determinants of public debt are summarized in Table 6.

Based on actual debt-to-GDP ratios in four different moments of the Nineties, we simulated the impact effects on such ratios caused by shocks in each of the main debt determinants (output growth, real devaluation and interest rates).[29]

Table 4

Uruguayan Bonds Spreads
(Basis points, annual average)

	1998	**1999**	**2000**	**2001**
2027 Bond	253	225	266	316
2010 Bond	-	-	286	276
2009 Bond	-	205	250	267

[29] Note that the simulated shock lasts for two years, returning to its mean values in the third year.

Table 5

Volatility Ratios
(1974-2003)

Variable	*e–p*	*g*	*p*	*e*	*i**
CV	0.01	0.09	0.55	0.66	0.81

Table 6

Main Statistics
(1974-2003)

	g	*e–p*	*i**
Mean $\overline{X}$	1.6%	–2%	7.5
Standard deviation σ	5.1%	18%	3.6
$\overline{X}+\sigma$	6.7%	17%	11.1
$\overline{X}-\sigma$	–3.5%	–20%	3.8
$\overline{X}+2\sigma$	11.8%	34%	14.7
$\overline{X}-2\sigma$	–8.6%	–38%	0.3

We can see in Figure 8 that a negative shock on output growth of two standard deviations during two years (which means a real drop of 8.6 per cent per year) would determine an increase of less than 5 point on the debt-to-GDP ratio. In the case of changes in the interest rate, the results are similar: a negative shock of two standard deviations (which would mean a Libor rate close to 15 per cent) would increase the debt-to-GDP ratio between 2 and 4 points, depending on the moment chosen to simulate the shock. We can conclude that debt vulnerability to changes in output growth and interest rate is relatively low.

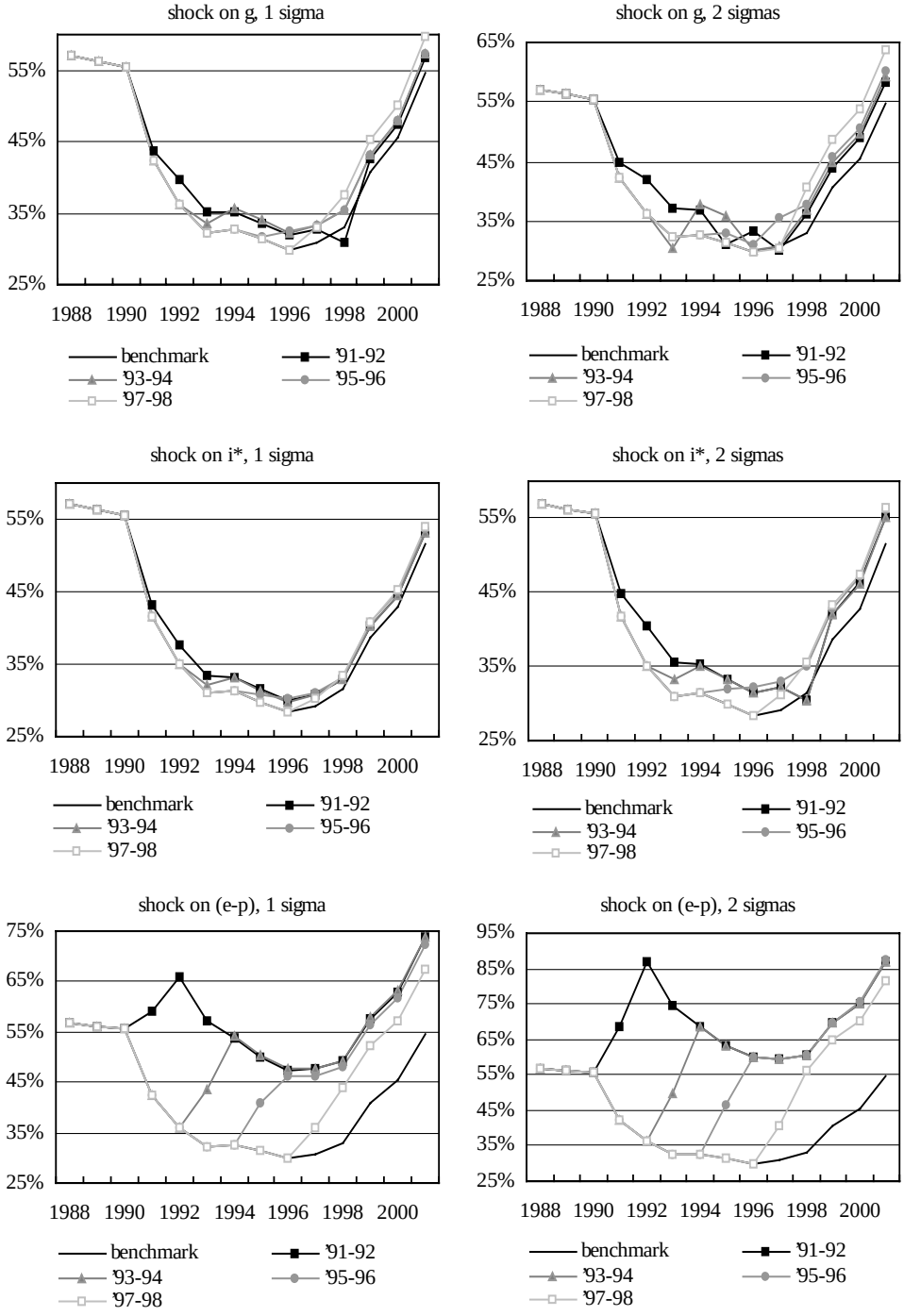
Finally we present the vulnerability to changes in relative prices. We found that in the case of a shock of 2σ (34 per cent real devaluation for two years)[30] the average increase in debt-to-GDP ratio would be of 35 points. These figures make explicit the debt vulnerability to changes in relative prices in the whole decade.

---

[30] Real devaluation of 2 σ for 2 years accumulates 80 per cent, a similar figure to the one experienced in the period 1982-1983. On the other hand, in 2002-2003 it reached 60 per cent. The effects on the debt in these historical events follow the line of the ones we found here; in particular, in 2002 the real devaluation effect was 24 per cent of GDP.

Figure 8

D/GDP Evolution after a Shock on *g*, *i, (*e*–*p*)**



3.5 2002: Materialization of latent risks

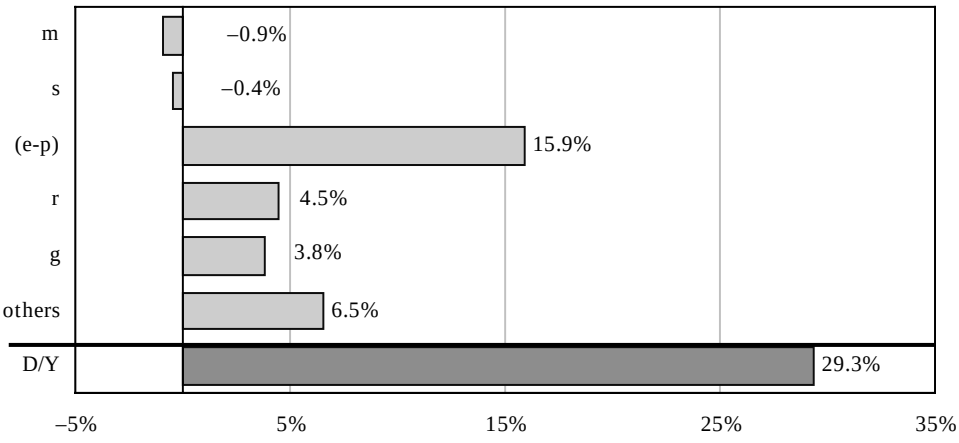
The private sector perception of Uruguayan fiscal sustainability quickly deteriorated during the first months of 2002, after a new round of negative regional shocks. The economic activity dropped for the fourth consecutive year, this time by 11 per cent in real terms. The nominal exchange rate devaluation that followed the announcement on June, 20 of the free floating regime caused a significant distortion in relative prices: real devaluation reached 40 per cent on average for 2002.

In spite of the strong measures both in public income and expenditures, the fiscal position remained unchanged, with a deficit of 4 per cent of GDP.[31]

In this framework, public debt increased almost 30 points of GDP; first, as a result of the adverse evolution of all its determinants, second, due to the outcome of the banking crisis. This dramatic increase in just one year is mainly explained by the real devaluation, which represented 16 points of the total, the drop in the economic activity, which explains almost 4 points, and interest payments, that explains close to 5 points (Figure 9). We can conclude that a real devaluation is not neutral it increases the debt burden together with the probability of fiscal insolvency.

Figure 9

Marginal Debt Components, 2002



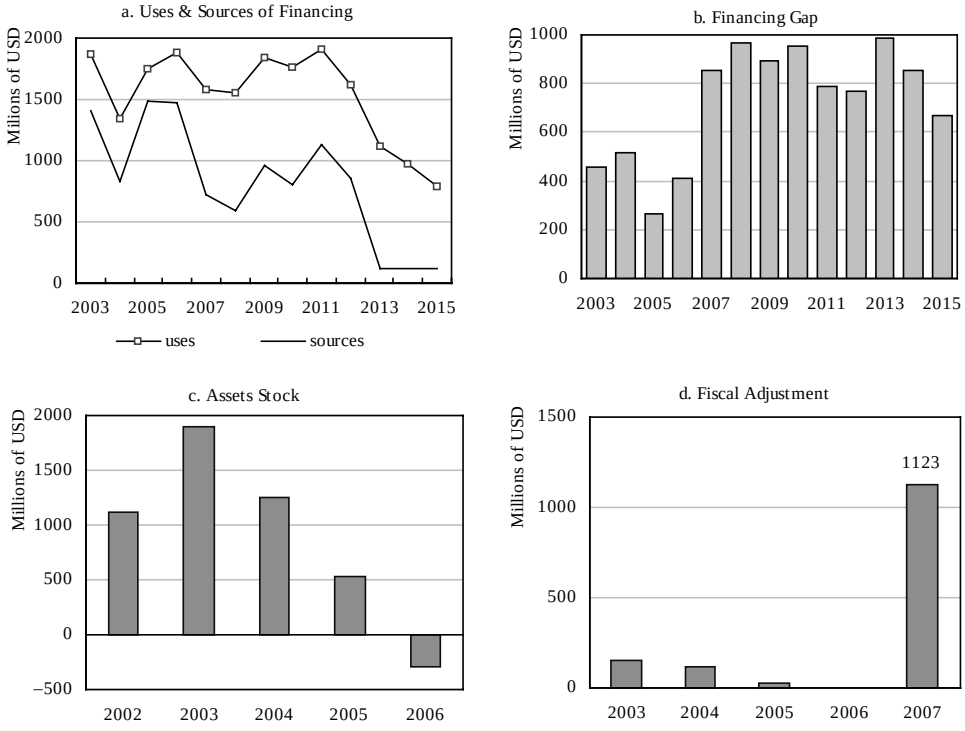
[31] The main tax measure adopted was the multiplication of bands and the broadening of labor tax rates (IRP). Law 17.453 of the Februaty 28, 2002 extends the upper ancient band to 5 bands, while creating differential additional rates between public and private workers up to a maximum of 16 per cent (previously, the maximum rate was 9 per cent). IRP regulations will suffer a new amendment through law 17.502 of the May 31, 2002, creating new bands and taking the maximum rates up to 20 per cent.

In Table 2 we see that all traditional indicators deteriorate even further, reinforcing the perception of unsustainability. Within this framework, the country lost the "*Investment Grade"* and later the access to international credit markets.[32]

By the end of 2002, loans from multilateral agencies: IMF, IDB and IBRD were the only source of financing left to the Uruguayan Government. The financing gap was closed by sales of reserve assets and new adjustments to the primary balance. Given the stock of reserve assets, the fiscal position and the debt payments schedule, a simulation exercise showed that the public sector would have become insolvent by no longer than 2006 (Figure 10).[33] [34]

Figure 10

The Financing Gap



[32] The *spread* of 2027 Bond averaged in 2002 1,009 bp, while the ones corresponding to 2009 and 2010 Bonds rose to 1,314 and 1,334 bp respectively. These averages took in a growing evolution in the year; maximum values were reached in October, being 1,617, 2,017 and 2,110 bp respectively.

[33] Conceptually there exists another alternative to close the gap, which is the *seignorage*; nevertheless this analysis did not take it into account given its quantitatively low relevance.

[34] Assumptions for simulation as well as a detailed analysis of the different alternatives for closing the gap are presented on Annex 3.

Few policy options were left to the authorities: whether income or expenditure programs were changed (fiscal adjustment), or higher seignorage was collected through higher inflation (deficit monetization), or changes to the value of the debt were negotiated (write off, maturity extensions, etc.). Any of these options implied the unsustainability of the public sector and would impose severe restrictions to future macroeconomic policies. Finally, a new debt renegotiation was carried out in May 2003.[35]

4. Long-term simulations

Based on effective data as of December 2002, previous to the debt restructure of May 2003, we analyzed the sustainability of the fiscal policy through simulations of the public debt dynamics. The analysis covers up to 2015, when all exogenous variables are supposed to reach their long term values.

We present three scenarios with different assumptions:

- A **baseline scenario,** which incorporates the short term official projections included in the renegotiation with the IMF at the beginning of 2002. Then it assumes the most probable transition to the long term values of its fundamentals. It is considered as an inertial scenario because it shows the results that would have been obtained if no further measures were taken place. As a way of eliminating the restrictive assumption of independence between fiscal performance and interest rate, these simulations are extended to an endogenous spreads scenario. Even though it enriches the analysis and relies on a more solid theoretical baseline, main conclusions are not substantially changed; therefore its analysis is derived to Appendix 2.
- A **primary adjustment scenario**, which includes corrective measures in the primary balance as a way of stabilizing the debt-to-GDP ratio. It shows the kind of measures included in the letter of intent signed by the Government and the IMF in 2003.[36]
- A **debt restructure scenario**, which analyzes the policy measures undertaken in May 2003.

Finally we present a debt vulnerability analysis to changes in its main determinants: economic activity, interest rate, and real devaluation.

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[35] Public debt rescheduling determined the constitution of 3 big bonds, called *benchmark Bonds*: 2011 Bond for US$ 500, and 2015 and 2033 Bonds for some US$ 1,060 each.

[36] The first agreement was signed on the 24th February, being revised on the 27th of June. Both are available on the BCU's website (www.bcu.gub.uy).

Table 7

Main Assumptions(1)

	2002	2003	2004	2005	2006	> 2006
Δ real GDP	–11.0%	–1.0%	3.9%	3.3%	2.5%	2.5%
Average inflation	14.0%	20.0%	11.5%	7.6%	6.0%	3.0%
Average devaluation	59.6%	40.3%	10.0%	6.2%	2.0%	1.0%
Δ prices in US$	–28.6%	–14.5%	1.4%	1.3%	3.9%	2.0%
Libor interest rate (USD)	1.9%	1.3%	2.2%	3.4%	4.2%	growing slowly
Primary fiscal surplus	0.0%	1.7%	2.3%	3.0%	3.6%	growing slowly

(1) Actual values for 2002.

4.1 The baseline scenario

This scenario incorporates official projections included in the negotiations with the IMF at the beginning of 2003. Table 7 shows the main assumptions used in the simulation analysis.

After a moderate contraction in real terms projected for 2003, we assumed that economic activity slowly recovers, reaching in 2006 its long term trend of 2.5 annual real growth. Prices in US$ keep falling up to 2003, when they start to recover to finally get to its last-twenty-years average level. The reference interest rate, 1.3 per cent for 2003, increases slowly and stabilizes at 6.5 per cent at the end of the period, close to its historical mean.[37]

No discretionary measures where included in the projection of the primary balance in this stage. While the components of the discretionary fiscal balance were assumed constant at their average levels of the last twenty years, the endogenous-determined deficit is mainly explained by the dynamics of the social security system.[38]

Further assumptions used in the simulation are related to the evolution of public assets derived from the financial assistance during the banking crisis in 2002, as well as to the liabilities structure by currency, interest rate and type of instrument. We assumed that total financial assistance, which represented about 11 per cent of GDP in 2002, will not be recovered. Therefore we assumed that it will reduce the

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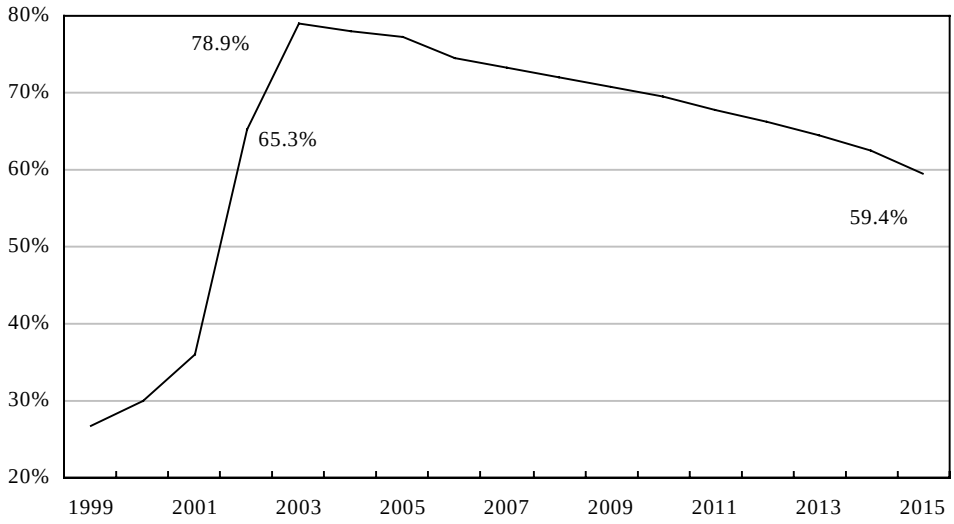
[37] We assumed that the average flat rate remains fixed on its current level of 6.2 per cent in dollars terms. Average floating rate was projected by forward rate plus a constant spread on 270 bp.

[38] The analysis of these dynamics is explained on Masoller and Rial (1997).

Figure 11

Net Public Debt/GDP, 1999-2015



level of public assets by 1 per cent of GDP per year. Finally, the structure of public liabilities by currency, interest rate and instrument was kept constant at 2002 values.[39]

Recession, real devaluation and small primary surpluses make the worst combination for 2002-2003, explaining the sharp increase in public net debt (Figure 11). From 2004 onwards, macroeconomic conditions (economic activity, inflation and devaluation) improve, leading to a gradual reduction of the debt-to-GDP ratio, even though it stabilizes at very high levels.

The analysis of the contribution to this debt dynamics shows that the sharp increase in 2002-2003 is mainly determined by the strong adjustment in relative prices *(e–p)* given the high share of foreign currency in debt composition (Figure 12).

Real growth *(g)* accounts for similar effects: in the short term recession contributes significantly to increase the debt-to-GDP ratio; then it looses relevance when it takes up its trend values. In contrast, interest payments *(r)* show an opposite evolution, preventing the debt-to-GDP ratio to converge to lower levels. The evolution of the primary balance is endogenously derived from the dynamics of the

[39] More specifically, published data corresponding to December 2002 show that foreign currency-denominated debt is 96 per cent of the whole amount, while the debt at flat rate is 53 per cent of the total, while at floating rate is the remaining 47 per cent. Finally, structure by instrument is formed by Government Securities (51 per cent), loans (44 per cent) and net deposits (5 per cent).

Figure 12

Debt/GDP Dynamics: Components, 1999-2015

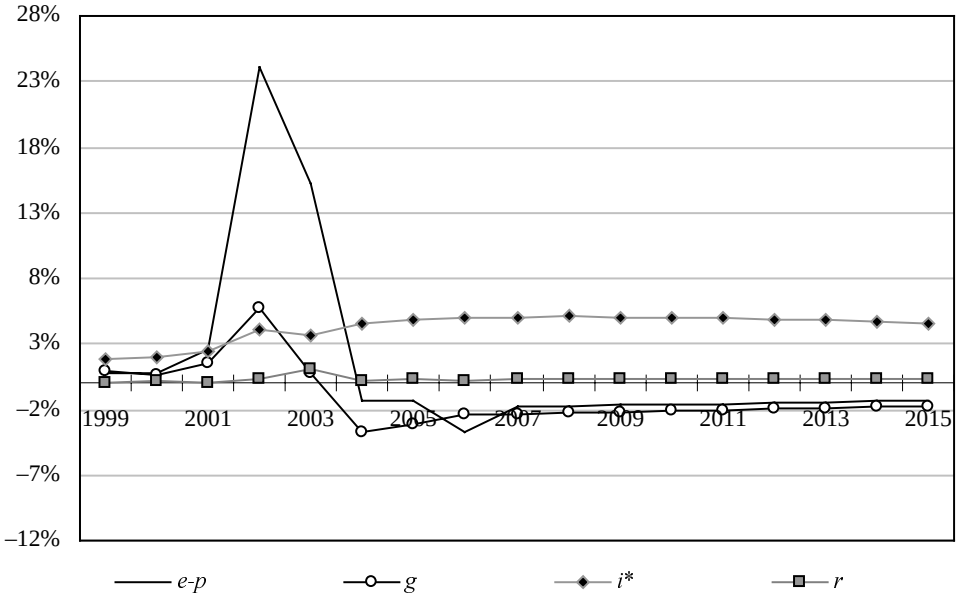
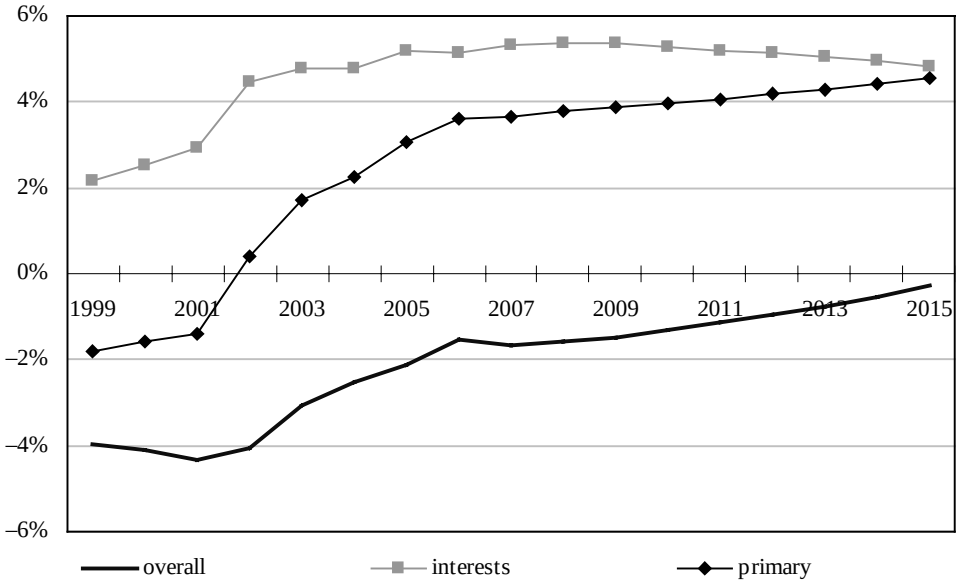


Figure 13

Fiscal Balance/GDP, 1999-2015



social security system. This determines a growing primary surplus just enough to compensate the interest burden (Figure 13).

Even though technically this scenario does not show an explosive public debt behavior, and no absolute or relative benchmark exist for debt-to-GDP ratio, stability at high levels for such a long period would probably deteriorate the conditions of access to capital markets. Therefore, it would be considered an unsustainable path. Consequently, corrections to previous dynamics began to be suggested. The first option proposed was a fiscal adjustment that would result in higher primary surpluses reducing the debt level. Second, the solvency problems could be approached through a change in the maturity of outstanding debt. Some measures in these directions were actually taken by the authorities in 2003, which are presented below.

4.2 Changes in dynamics: primary adjustment

We considered the simplest case of improving the primary balance by a fixed amount *k* each year. This parameter *k* is set to 1 and 2 per cent of GDP. Table 8 presents the evolution of the primary balance for selected years, while Figure 14 shows the evolution of the debt-to-GDP ratio in each simulation.

An adjustment in the primary balance, either by higher revenues or lower expenditures, of 1 per cent of GDP each year, generates a "pleasant arithmetic" in the dynamics of the debt. However, not significant changes can be seen in the short run; by 2010 the debt would still be higher than 60 per cent of GDP. Therefore, it is not until the end of the period that we can observe significant results.

We can say that in order to achieve a quicker convergence to lower debt levels, it is required a permanent fiscal adjustment of at least 2 points of GDP. The

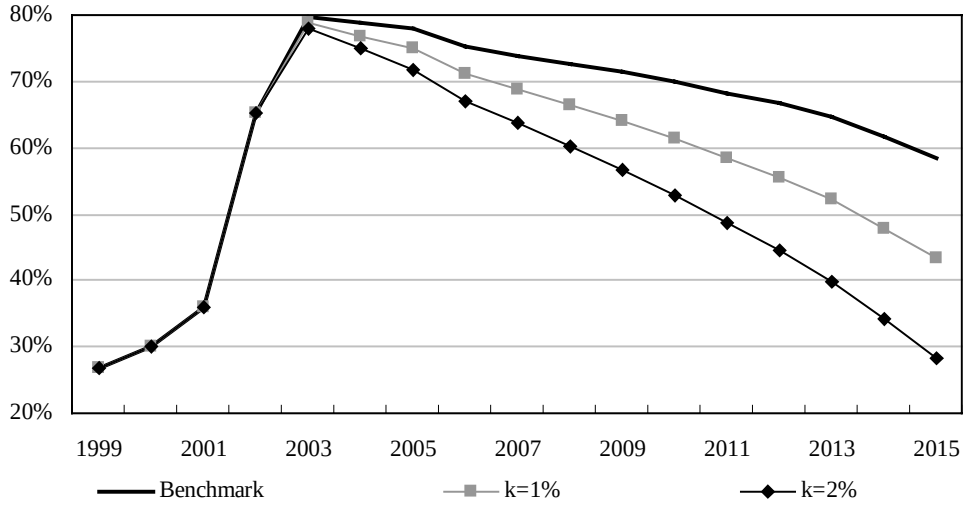
Table 8

Primary Balance for Alternative Scenarios of Fiscal Adjustment *k*
(percent of GDP)

	2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2015**
Baseline	1.7%	2.3%	3.0%	3.6%	3.6%	3.8%	3.9%	4.5%
K=1%	2.7%	3.3%	4.0%	4.6%	4.6%	4.8%	4.9%	5.5%
K=2%	3.7%	4.3%	5.0%	5.6%	5.6%	5.8%	5.9%	6.5%
***Memo*: IMF agreement**	3.2%	3.3%	3.3%	3.5%	3.7%	3.9%	4.0%	4.0%

Figure 14

Fiscal Adjustment and Net Debt, 1999-2015



agreement signed by the authorities with the IMF, where the government committed to achieve a primary surplus of 4 per cent of GDP in the medium term, took into account similar considerations.

These results raise attention towards the restrictions that current level of public debt imposes over future policies, as well as the feasibility of the adjustment required to overrun this situation.

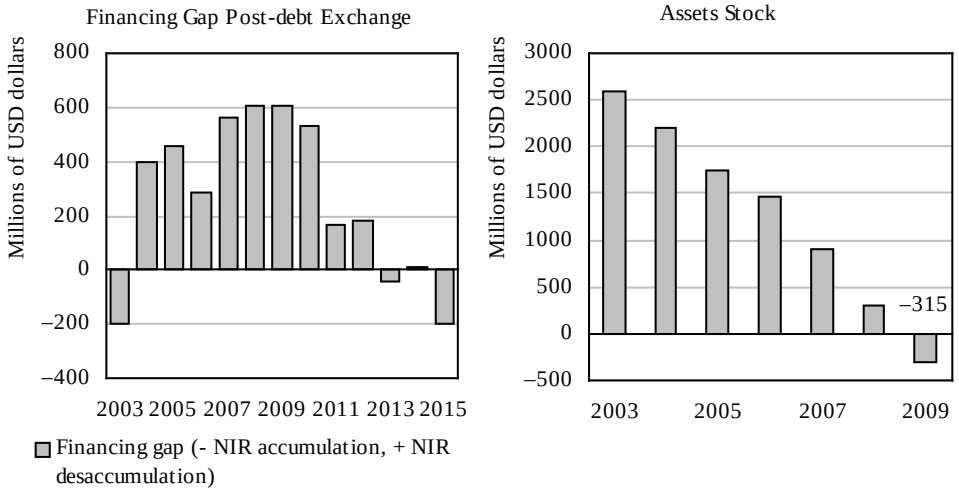
On the one hand, Uruguay has already a very high tax burden, so future adjustments will have to be done through contractions in expenditures. This is in contradiction with the increase in social demands that will likely appear in the next political cycle. On the other hand, even with a contractionary fiscal policy, debt level will continue to be high in the short run. Therefore the fiscal adjustment is considered as a first step towards a major solution that would be a time restructure of public debt. That was made effective in May 2003, and is presented in the next section.

4.3 Changes in financing gap: time restructure

As a way of overcoming the liquidity restriction, in May 2003 the Uruguayan government went through a major public debt exchange. The total amount of the exchange involved some US$ 5.000 in Government securities whose maturity was

Figure 15

Post-exchange Financial Gap



extended by 5 years on average.[40] The debt exchange was considered to be very successful with an acceptance ratio of 93 per cent.[41]

By loosening the short term financial restrictions, the debt exchange determined a less vulnerable fiscal position. Figure 15 shows that by 2008, previous to the debt exchange, the financing gap would have reach US$ 1.000, decreasing to US$ 600 after it took place. Nevertheless, interest payments are higher than in the baseline scenario, and the dynamics of debt-to-GDP ratio has not been significantly changed. The financing gap would have collapsed sometime around 2009 when public assets were exhausted or the required fiscal adjustment reached 2.3 per cent of GDP.

Therefore, in order to not only postpone financial problems, the debt exchange should be accompanied by a restrictive fiscal policy.

The sustainability requirement is linked not only with the restructure of the debt service but also with the achievement and maintenance of a primary surplus higher than the endogenous one. The debt reprofile is useful to the extent it allows to make the necessary structural adjustments to change debt dynamics. Therefore, in order to return to a sustainable path both measures must be combined, which is analyzed next.

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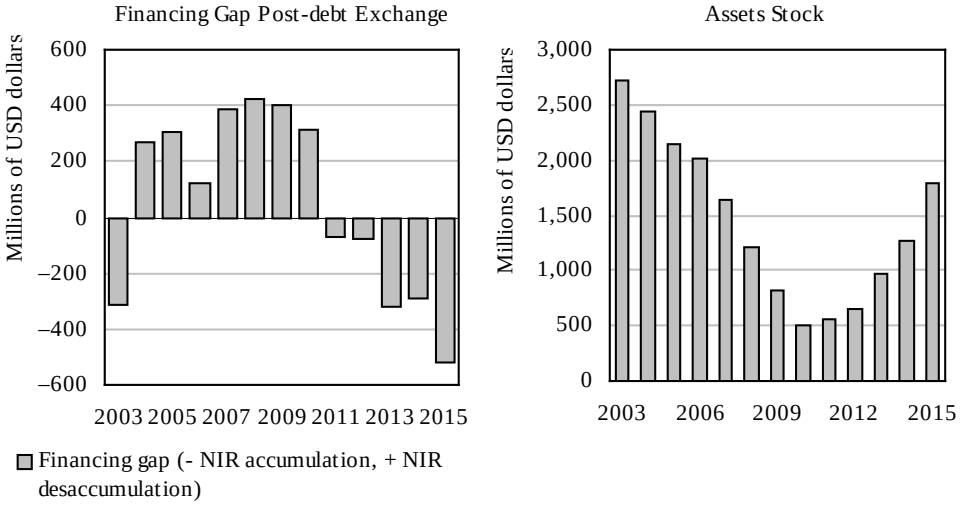
[40] Maturity of government securities increased from 8 to 13 years, while total debt maturity increased almost in 3 years from 5.9 to 8.7 after the exchange.

[41] Readers interested in details of this operation may consult the BCU's website at: http://www.bcu.gub.uy/autoriza/pepmaf/deudapublica/canje.xls.

This simulation picks up the previous one and includes an additional fiscal adjustment of 1 per cent of GDP each year in relation to the endogenous result, as it was done in section 4.2. While the effects on debt dynamics were analyzed in that section, here we focus on the financing gap (Figure 16).

Figure 16

Post Exchange Financing Gap and fiscal adjustment of 1 per cent of GDP



A higher primary surplus reduces the financing gap to a maximum value of US$ 400. Consequently, the stock of public assets, although still showing a downward evolution, is enough to close the gap in the whole period.[42]

Therefore, a combination of time restructures and permanent primary adjustment of 1-2 per cent of GDP would allow the Uruguayan Public sector to return to a sustainable path.

Meeting this requirement, however, implies several costs. On the one hand, a primary adjustment imposes restrictions to the future fiscal policy. On the other hand, the debt restructure determines higher interests payments, both due to the time extension and to higher interest rates at which securities were refinanced; these interest rates are presented on Table 9.

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[42] In fact, these assets reach a minimum of some US$ 400 (3 per cent of GDP) in the period 2010-2011. There should be remarked that this scenario supports the shortest maturity of the *benchmark* bond for US$ 500, bond which is due precisely in 2011.

Table 9

Average Interest Rate of Public Debt

	Pre-exchange	Post-exchange	Variation
Securities	5.7%	6.9%	1.2%
Loans	4.2%	4.2%	0.0%
Global rate	5.2%	5.9%	0.8%

4.4 Vulnerability analysis

Picking up the vulnerability analysis presented in section II we developed a set of simulations where we studied the effects of different evolutions of GDP growth, relative prices and *Libor* rate, on the level and structure of public debt.

The baseline scenario presented above shows the most probable medium-term evolution of debt-to-GDP ratio, primary gap and tax gap. It is a partial analysis because it is only based on debt levels without taking into account its structure. Therefore, it must be completed to include the analysis of changes in debt determinants.

4.4.1 GDP growth

By introducing the volatility of GDP into the analysis, and taking as a reference the evolution of debt-to-GDP ratio in the baseline scenario, we can see that while in the most favorable scenario a quick convergence is achieved, in the most negative one debt remains at high levels towards the end of the period (Figure 17).

The right panel of Figure 17 presents the vulnerability indicator ε. We can see that if the economy grows σ times above its historical average for two consecutive years, the debt-to-GDP ratio would decrease by 5 per cent on average for 2003-2005. If GDP grows σ times less than its average, the debt-to-GDP ratio would be almost 6 per cent higher than in the baseline scenario for the same period. In this way we calculated a measure of debt vulnerability to changes in GDP growth by one standard deviation that is represented by a range of –5 and +6 point of GDP.

4.4.2 Relative prices

The evolution of future real exchange rate according to its historical average and standard deviation is presented in Figure 18.[43]

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[43] Keeping constant the international inflation rate, the evolution of domestic inflation and devaluation determines the real exchange rate equivalent to the last 30 years average.

Figure 17

Vulnerability of Debt-to-GDP Ratio to Changes in *g*

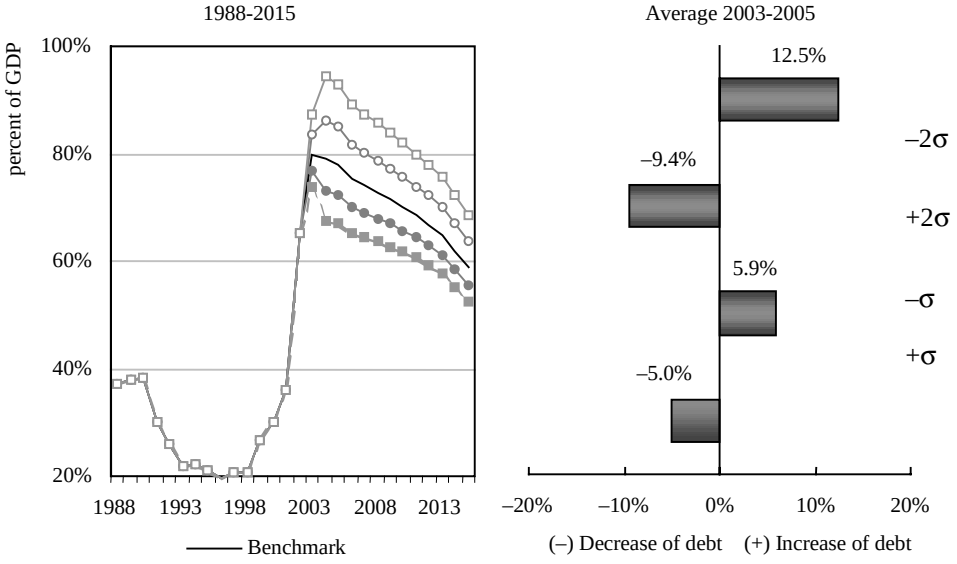
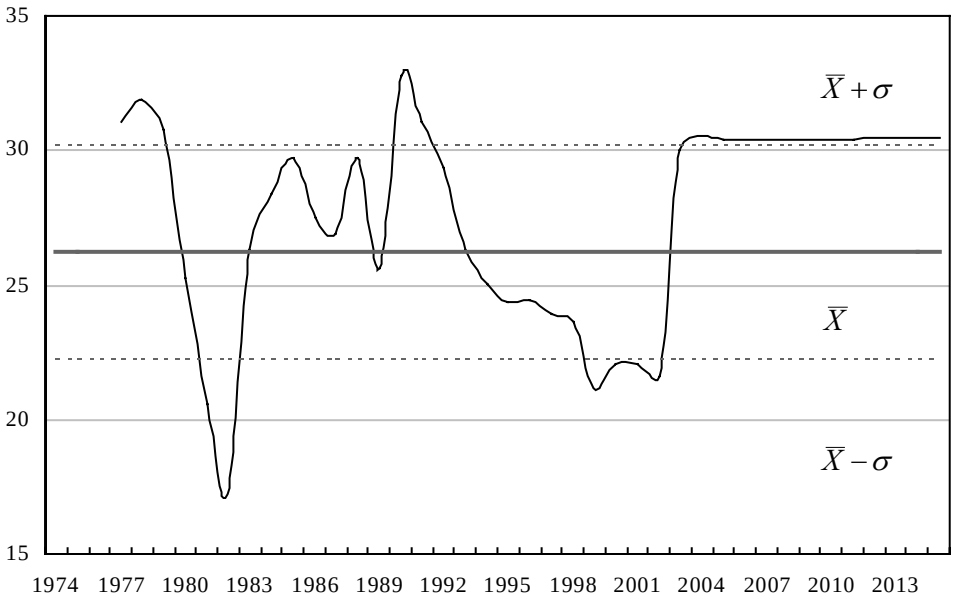


Figure 18

Real Exchange Rate, 1974-2015



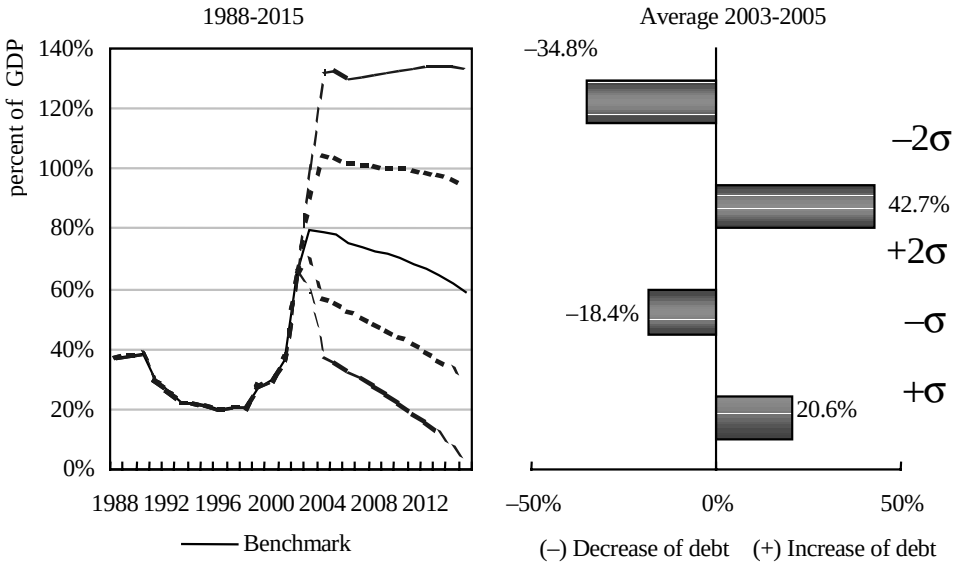
$\overline{X} - \sigma$ (real appreciation) simulates the effect on the debt ratio of a quick convergence of prices in dollars;

$\overline{X} + \sigma$ (real devaluation) represents a scenario where prices in dollars keep increasing in the two following years.

From Figure 19 we can conclude that the effects on the debt-to-GDP ratio of changes in relative prices are much more significant than in the previous case. The magnitude of the impact is determined by the degree of dollarization of the debt level.

Figure 19

Vulnerability of Debt-to-GDP Ratio to Changes in *e–p*



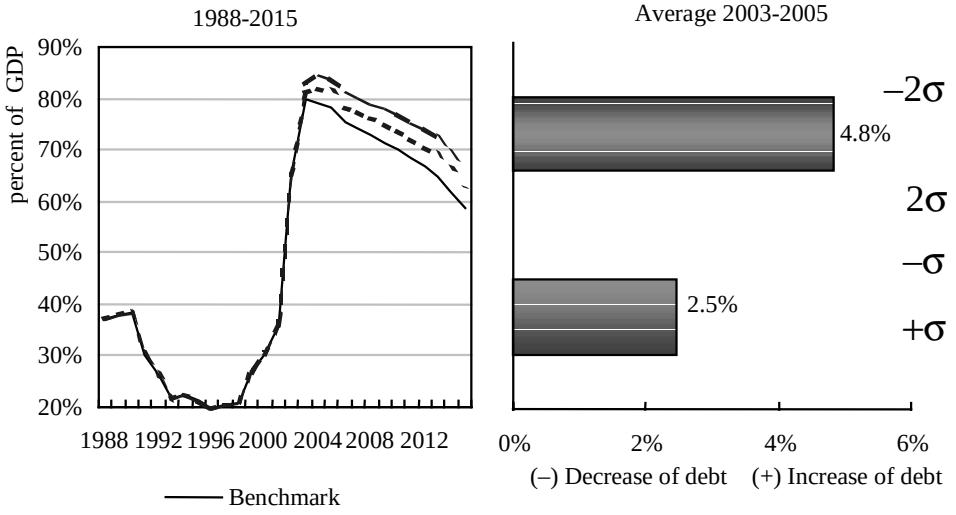
A real devaluation of $\overline{X} + \sigma$ that is to say 18 per cent, during 2 years determines a debt-to-GDP ratio almost 21 per cent higher than in the baseline scenario for the average 2003-2005. Similarly, a quick convergence of prices in dollars for 2 years ($\overline{X} - \sigma = -20\%$) reduces the debt-to-GDP ratio in 18 points in comparison with the baseline scenario. The debt vulnerability to changes in relative prices is clearly illustrated by the two divergent paths: after the real devaluation, *ceteris paribus*, the debt ratio is stabilized at around 100 points of GDP, while the dynamics originated by the real appreciation determines a convergence of debt-to-GDP ratio to levels lower than 30 per cent.

4.4.3 Interest rate

Finally we present the effects on debt ratio of changes in the interest rate. Results are presented in Figure 20.[44]

Figure 20

Vulnerability of Debt-to-GDP Ratio to Changes in *i



We conclude that the vulnerability of public debt to changes in the interest rate is very low. The reasons for this behavior are twofold: first, and as it was mentioned in section III, the interest rate shows the lowest relative volatility; second, the debt structure by type of interest rates, with similar shares at fix and floating rates, mitigates the impact.

The structure of the Uruguayan public debt by currency and interest rate together with the intrinsic volatility of its determinants, results in a high vulnerability to changes in relative prices, followed by the vulnerability to changes in GDP and interest rate (Table 10). As a result, a strategy that increases the share of debt denominated in domestic currency would reduce a major source of vulnerability.

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[44] Given the current levels of the *Libor* rate, lower than 2 per cent, cases of $-\sigma$, -2σ would determine negative nominal interest rates, being left aside of the economic logic. Therefore, they are not taken into account.

Table 10

Net Public Debt/GDP, Average 2003-2005

	g	e–p	i*
$\overline{X}+2\sigma$	70%	122%	84%
$\overline{X}+\sigma$	74%	99%	81%
Inertial	79%	79%	79%
$\overline{X}-\sigma$	85%	61%	–
$\overline{X}-2\sigma$	91%	44%	–

5. Conclusions

This paper presented a framework from which several indicators were derived to analyze issues of solvency, sustainability and vulnerability of public debt. This framework proved to be useful both in the historical analysis and in the simulations of the debt dynamics.

Based on the analysis of the evolution of the Uruguayan public debt in the last 15 years, we concluded that the use of traditional indicators of fiscal solvency showed no signal of stress while the economy was growing within a framework of regional dynamism and full access to capital markets. On the contrary, sustainability and vulnerability indicators did not show such a positive fiscal position, and therefore they turned out to be advance indicators.

The simulations of the debt level for 2003-2015 based on effective data as of December 2002 showed an unsustainable path, hence the need for corrections. Two different fiscal measures were analyzed. First, we concluded that a permanent primary fiscal effort of 2 per cent of GDP relative to the endogenous trend would be required in order to return to a sustainable path. The agreement signed by the authorities with the IMF, where they committed to achieve a primary surplus of 4 per cent of GDP in the medium term, advanced in this direction. Second, the debt exchange, even though necessary to loosen liquidity problems in the short term, did not change *per se* the long term restrictions; however it gives time to make the required fiscal adjustment.

The vulnerability analysis showed that given its current structure, the Uruguayan public debt shows the highest relative vulnerability to changes in relative prices, being lower in relation to the level of economic activity and interest rate. As a result, the increase in the share of debt denominated in domestic currency would reduce the major source of debt vulnerability.

To summarize, we conclude that in the case of a small emerging economy facing recurrent shocks of significant magnitude, the analysis of fiscal sustainability based on the dynamics of the debt level is a limited approach. Then, the debt *level* is as important as its *structure* by currency, interest rate, maturity, type of instrument, etc. Therefore, the sustainability analysis must be complemented with the study of debt vulnerability to changes in the macroeconomic environment.

APPENDIX 1
DERIVATION OF THE MAIN EQUATIONS

A.1.1 Public sector budget constraint (equation 1)

The current fiscal balance *(FB_t)* can be separated into primary balance S_t plus interests paid at a nominal rate i_t on the debt stock of the previous period D_{t-1}. Said there is a deficit; it can be financed by issuing non-monetary debt *(ΔD_t)* or printing money *(ΔM_t)*.

$$FB_t = -S_t + i_t \cdot D_{t-1} = \Delta D_t + \Delta M_t \quad \text{(i)}$$

Using $\Delta D_t = D_t - D_{t-1}$ we can solve for D_t:

$$D_t = -S_t + (1+i_t) \cdot D_{t-1} - \Delta M_t \quad \text{(ii)}$$

This equation can be expressed in terms of current GDP, designating with small letters the variables deflated by the GDP:

$$d_t = -s_t + (1+i_t) \cdot \frac{D_{t-1}}{Y_t} - \Delta m_t \quad \text{(iii)}$$

Finally, the term $\frac{D_{t-1}}{Y_t}$ may be expressed as:

$$\frac{D_{t-1}}{Y_t} = \frac{D_{t-1}}{Y_{t-1}} \cdot \frac{Y_{t-1}}{Y_t} = d_{t-1} \cdot \frac{P_{t-1}.y_{t-1}}{P_t \cdot y_t} = d_{t-1} \cdot \frac{1}{(1+\rho_t) \cdot (1+g_t)} \quad \text{(iv)}$$

being $\rho_t = \frac{P_t}{P_{t-1}} - 1$ the growth rate of the GDP deflator, and $g_t = \frac{y_t}{y_{t-1}} - 1$ the growth rate of real GDP.

Incorporating (iv) in (iii), and being: d_t the end-of-period non-monetary public debt as a proportion of GDP*;* i_t the nominal interest rate on public debt*;* g_t the growth rate of real GDP*;* ρ_t the growth rate of GDP deflactor; s_t the primary surplus and Δm_t the deficit monetization or *seignorage*, both expressed as percentage of GDP; then, the public sector budget constraint for a sole period may be written as:

$$d_t = \left(\frac{1+i_t}{(1+\rho_t) \cdot (1+g_t)} \right) \cdot d_{t-1} - s_t - \Delta m_t \quad \text{(v)}$$

In order to simplify the presentation we will hereinafter ignore *seignorage* ($\Delta m_t=0$), and we will assume *i, g,* ρ as constants. The solution to this equation in differences is obtained by repeating (v) towards the future.

$$d_{t-1}=\sum_{j=0}^{n}\left(\frac{(1+g)(1+\rho)}{1+i}\right)^{j}s_{t+j}+\left(\frac{(1+g)(1+\rho)}{1+i}\right)^{n}d_{t+n-1} \qquad \text{(vi)}$$

A government is solvent if its debt does not grow in an explosive way, in this case the last term of the equation (vi) tends to zero when *n* tends to infinity. The solvency requirement imposes that:

$$\lim_{n\to\infty}\left(\frac{(1+g)(1+\rho)}{1+i}\right)^{n}d_{t+n-1=0} \qquad \text{(vii)}$$

Should the solvency requirement be fulfilled, the public sector intertemporal budget constraint shall be:

$$d_{t-1}=\sum_{j=0}^{\infty}\left(\frac{(1+g)(1+\rho)}{1+i}\right)^{j}s_{t+j} \qquad \text{(viii)}$$

Equation (viii) corresponds to equation (1) of section 1.

A.1.2 Primary gap

Starting from (v) we ignore income by *seignorage* and we assume that *i, g,* ρ are constant, we propose the discrete variation of d_t, imposing the requirement of zero variation:

$$\Delta d_t = d_t - d_{t-1} = \left(\frac{1+i-(1+\rho)\cdot(1+g)}{(1+\rho)\cdot(1+g)}\right)\cdot d_{t-1} - s_t = 0 \qquad \text{(ix)}$$

The numerator on the right side of the equation can be approximated as:

$$1+i-(1+\rho)\cdot(1+g) = i-\rho-g-\rho\cdot g \cong i-\rho-g \qquad \text{(x)}$$

The "interaction term" $\rho\cdot g$ can be discarded in contexts of low rates of inflation and/or real growth of GDP.[45] Incorporating (x) in (ix) and finding s_t we have:

$$s_t = \left(\frac{(i-\rho)-g}{(1+\rho)\cdot(1+g)}\right)\cdot d_{t-1} \qquad \text{(xi)}$$

Finally, assuming that the growth rate of prices π evolves in a similar way

[45] This term could only be relevant if high rates of inflation and economic growth occurred simultaneously. In the case of Uruguay during the period under study this only happened in 1986-1987, when the error made for leaving this term aside is a bit higher than 2 per cent of GDP per year. In the rest of the period, the difference between approximation and the complete formula was lower than 1 point of GDP per year.

to the one of the deflactor ($\pi_t \approx \rho_t$) we come to the equation (xii), where the term *(i–π)* is a good approximation of the real interest rate *r*.[46]

$$s_t^* = \frac{i - \pi - g}{(1+g)(1+\pi)} d_{t-1} \quad \text{(xii)}$$

*s** is defined as the primary balance necessary to keep constant the debt-to-GDP ratio. Equation (xii) shows that the primary fiscal effort will be higher whether real interest rate is higher, real growth rate is lower and debt-to-GDP ratio is higher.

From the comparison between *s** and the effective primary balance *s* we can obtain the *Primary Gap* indicator *(k)*.[47] Such indicator measures the adjustment required in the primary balance in order to stabilize the ratio in a particular level (generally the current level).

$$k_t = s_t^* - s_t \quad \text{(xiii)}$$

Equation (xiii) corresponds to equation (2) of section 2.

A.1.3 Medium-term tax gap

Including in (xii) the definition of primary balance *S = T–PE*, we obtain a tax level *T**, that represents the necessary tax rate in order to keep constant the debt-to-GDP ratio, considering as given the projected average expenditure for the following *n* years.

$$\left(\frac{T^*}{GDP}\right)_t = \frac{\sum_{t=j}^{j+n}\left(\frac{PE}{GDP}\right)_j}{n} + \frac{(i - \pi - g)}{(1+g)(1+\pi)} d_{t-1} \quad \text{(xiv)}$$

The tax gap (*TG*) in equation (xv), defined as the difference between *T** and the effective rate at *t*, constitutes another indicator of potential problems of public solvency. Besides, it allows evaluating the need for and the magnitude of a tax-income-based fiscal adjustment.

$$TG_t = \left(\frac{T^*}{GDP}\right)_t - \left(\frac{T}{GDP}\right)_t = t^* - t \quad \text{(xv)}$$

Equation (xv) corresponds to equation (3) of section 2.

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[46] The nominal interest rate is broken down into real rate and inflation For low levels of inflation and/or real rate the interaction term $r.\pi$ can be neglected, resulting in the approximation herein presented. This one proved to be very useful in the empirical analysis, for the term $r.\pi$ has never been relevant in the period studied.

[47] See Blanchard (1990).

A.1.4 Primary gap by currency

We take up equation (i) of this appendix; the debt is separated into domestic foreign currency-denominated ones ($D^{\$}$, D*), both expressed in domestic currency. We assume again that $\pi_t \approx \rho_t$ and constancy of i, g, π, and we leave aside financing by *seignorage*.

$$FB_t = -S_t + i \cdot D^{\$}_{t-1} + E_t \cdot i^* \cdot D^*_{t-1} = \Delta D_t = (D^{\$}_t - D^{\$}_{t-1}) + E_t \cdot (D^*_t - D^*_{t-1}) \qquad \text{(xvi)}$$

Finding D_t,

$$D_t = (D^{\$}_t + E_t \cdot D^*_t) = -S_t + (1+i) \cdot D^{\$}_{t-1} + E_t \cdot (1+i^*) \cdot D^*_{t-1} \qquad \text{(xvii)}$$

Deflating by Y_t, expressing the resulting ratios in small letters we obtain:

$$d_t = -s_t + \frac{(1+i)}{(1+g)(1+\pi)} \cdot d^{\$}_{t-1} + \frac{(1+i^*)(1+\delta)}{(1+g)(1+\pi)} \cdot d^*_{t-1} \qquad \text{(xviii)}$$

Being $\delta = \frac{E_t}{E_{t-1}} - 1$ the devaluation rate.

The debt change in discrete terms appears given by:

$$d_t - d_{t-1} = -s_t + \underbrace{\left[\frac{(1+i)}{(1+g)(1+\pi)} - 1\right]}_{[A]} \cdot d^{\$}_{t-1} + \underbrace{\left[\frac{(1+i^*)(1+\delta)}{(1+g)(1+\pi)} - 1\right]}_{[B]} \cdot d^*_{t-1} \qquad \text{(xix)}$$

Numerator of [A] $\approx (i-\pi) - g$ once again leaving aside the term $g \cdot \pi$.

Numerator of [B] $\approx (i^* + \delta - \pi) - g$ leaving aside the terms $g \cdot \pi$, $i^* \cdot \delta$.

Introducing these approximations in (xix), imposing the requirement of $d_t - d_{t-1} = 0$ and finding s_t:

$$s_t = \left[\frac{(i-\pi)-g}{(1+g)(1+\pi)}\right] \cdot d^{\$}_{t-1} + \left[\frac{(i^* + \delta - \pi) - g}{(1+g)(1+\pi)} - 1\right] \cdot d^*_{t-1} \qquad \text{(xx)}$$

Finally, incorporating $\alpha = \frac{d^{\$}}{d}, (1-\alpha) = \frac{d^*}{d}$ and reorganizing terms we obtain the equation (4) of the paper:

$$s^*_t = \frac{\left[\alpha \cdot (i-\pi) + (1-\alpha) \cdot (i^* + \delta - \pi)\right] - g}{(1+g)(1+\pi)} \cdot d_{t-1} \qquad \text{(xxi)}$$

APPENDIX 2
SCENARIO WITH ENDOGENOUS SPREADS

A.2.1 Indicators

An interesting extension of the primary gap methodology is the endogenous determination of the country risk, measured through the spread of sovereign debt θ. The country risk can be incorporated through a simple equation linking the marginal spread to the fiscal balance (equation xxii), or the previous debt stock (equation xxiii).

$$\theta_t = \theta_0 + \phi \cdot fb_{t-1}, \phi < 0 \quad \text{(xxii)}$$

$$\theta_t = \theta_0 + \lambda \cdot d_{t-1}, \lambda < 0 \quad \text{(xxiii)}$$

Both equations state the direct relationship between the spread in a specific moment θ_t above a historical minimum level θ_0 and the fiscal variable chosen.

Incorporating this requirement to (xi) we obtain:

$$s_t^* = \frac{(r + \theta_0 + \phi \cdot fb_{t-1} - g)}{1+g} \cdot d_{t-1} \quad \text{(xxiv)}$$

$$s_t^* = \frac{(r + \theta_0 + \lambda \cdot d_{t-1} - g)}{1+g} \cdot d_{t-1} \quad \text{(xxv)}$$

Noting that the fiscal performance is formed by the primary balance plus interests (xxiii) can be seen as an equation in first differences in relation to the primary balance. Therefore, the fiscal effort of a period depends on the fiscal effort of the previous period. An initial primary deficit determines bigger spreads, bigger interest payments and thus the need for a better future primary balance in order to stabilize the debt ratio. Equation (xxiv) states the same idea but in relation to the debt-to-GDP ratio. Both equations allow simulating the effects on debt produced by changes in the conditions of access to capital markets through the analysis of sensitivity on ϕ, λ.

A.2.2 The endogenous spreads scenario

The determinants of sovereign spread are several and difficult to be easily incorporated to our model, as some empirical works of the Uruguayan case show.[48]

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[48] That is the case in A. Pena, (BCU) "Calificación de riesgo soberano-Análisis de sus determinantes", XV Jornadas de Economía – BCU, November 2000; and M. Larzábal, M. Valdés and S. Laporta, (República AFAP) "Spread soberano: evidencia empírica del caso uruguayo", XVII Jornadas de Economía – BCU, July 2002.

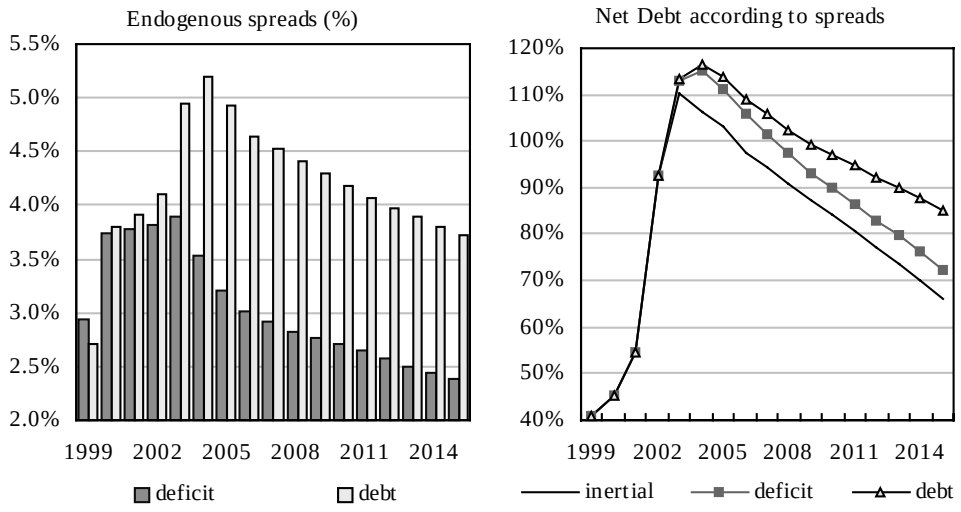
Therefore, we tried 3 ways of modeling them: two simple versions, in which the spread depends on a sole fiscal variable, whether the previous fiscal performance or the previous debt-to-GDP ratio, and a more complex version, which tries to capture a number of the fundamentals, as the quoted works do. Results in relation to the timing of spread were similar in the 3 versions, although they had differences in the levels attained. Endogenous spreads are incorporated to the floating rate in dollars iV, that depends on the Libor rate plus a variable spread. This variable spread in its turn inversely depends whether on the fiscal performance or on the debt-to-GDP ratio, starting from a minimum, which was fixed as the average of the last 3 international placements made in conditions of macro stability: 233 bp.[49] Finally, the value taken by the ratio linking the spread with its determinant variable was 0.26 for the deficit and 0.03 for the debt, values that arise from an average among the three results determined in the works quoted. Therefore, equations used where the following:

$$A: i_{V,t} = i_t^* + (2.33 + 0.26 \cdot rf_{t-1});$$

$$B: i_{V,t} = i_t^* + \left[2.33 + 0.03 \cdot \left(\frac{D}{Y} \right)_{t-1} \right]$$

Figure 21

Endogenous Spreads and Debt Dynamics



[49] This value arises from averaging the spreads of Global Bonds placed in 1998-1999. In 1998 two placements were made; a 10-years-maturity bond with a spread of 140 bp, and a 5-years-maturity bond, which paid 345 bp The placement of 1999, another 10-years-maturity bond, determined a spread of 212.5 bp. On the other hand, this average spread is very similar to the implicit effective one for 2001.

Resulting spreads are maintained above the benchmark case, but its evolution is not explosive. The immediate consequence is a higher payment of interests, determining "more unpleasant debt arithmetics", which brings to deepen the problem of solvency.

The resulting dynamics are similar but at higher levels: the chart illustrates that the debt-to-GDP ratio is situated, in the medium term, at around 10 per cent of GDP above the baseline scenario in any of the options of modeling spreads. Starting from there, the evolution is different for each scenario: in the case A the debt-to-GDP ratio is situated only 6 per cent of GDP above the benchmark in 2015, originating similar conclusions. In the case B, debt-to-GDP ratio is 19 per cent of GDP higher towards the end of the period, strengthening the conclusions referring to the necessary fiscal effort in the medium term.

This extension to variable spreads adds a bigger interest burden to the original dynamics, determining a debt-to-GDP ratio that reproduces the original dynamics but with higher levels. Therefore, these simulations strengthen and deepen the problems previously posed in the document.

APPENDIX 3
THE FINANCING GAP

A.3.1 The initial situation

First, we present the FG resulting at the end of December 2002, taking into account a projection of debt depending on the baseline scenario of section 4 and the following elements:

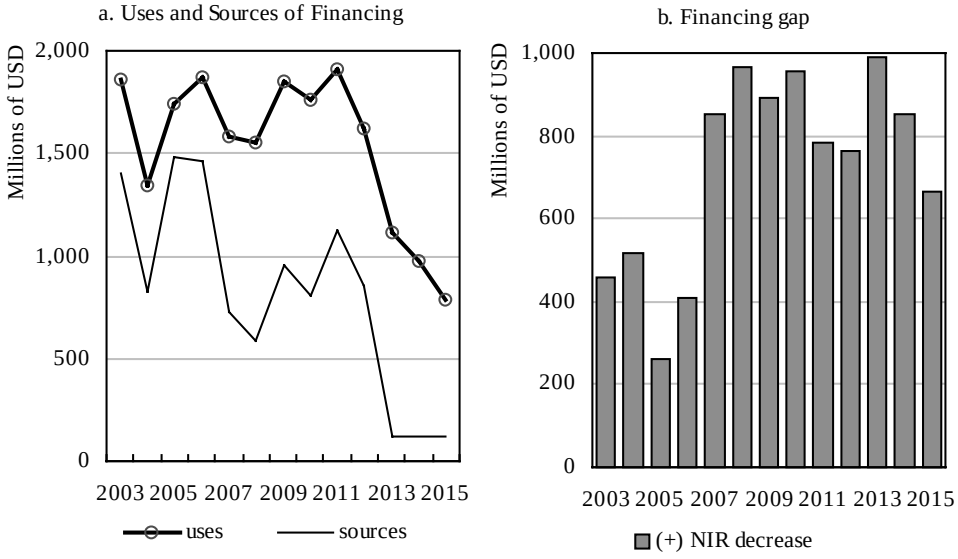
- the situation arisen after the reschedule of May 2003,

  schedule of loan disbursements of multilateral agencies negotiated at December 2002,
- amortization schedule for the disbursements of multilateral agencies already negotiated,
- no placement of Government securities, nor additional disbursements to the ones already agreed,
- no assumptions about the evolution of public assets have been done, and no discretionary fiscal measures have been projected.

Next we present uses and sources for the period 2003-2015, as well as the resulting financing gap. A positive gap means need for financing, while a negative sign shows excess of financing.

Figure 22

Uses, Sources and Financing gap



It can be observed that the gap is positive in the whole period, for the sources of financing are never enough to finance the fiscal deficit and debt amortizations. Therefore we need to think alternative scenarios for closing the gap. Such scenarios are presented as follows.

A.3.2 New disbursements and placements; closure through assets sale

This scenario proposes a financing based on placements of Government securities and disbursements of foreign loans modeled through its rollover ratios, closing a possible additional FG through the sale of Public Sector assets. This framework is constructed by incorporating the following elements:

- debt reschedule of May 2003 is not included as a way of presenting an inertial scenario,
- future placements of Government securities with a rollover ratio less than one (ϕ<1) for the following two years, being ϕ>1 as from 2005, reflecting a progressive softening of liquidity constraints. In particular, we assumed ϕ = 0.8 until 2004 and ϕ = 1.5 as from 2005. That means that for years 2003 and 2004 20 per cent of security stock is amortized in net terms, while from 2005, 50 per cent of the debt amount starts to be placed in net terms,
- this methodology explicitly incorporates the effect of the average maturity in the need for financing. In a first stage we assumed for new placements a maturity identical to the current one, which for Government securities is of 7.69 years,
- for loans of international agencies additional to the ones already agreed we assume a rollover ratio of ϕ = 1.5 for the medium term, as a way of reflecting a better access to these credits; this ratio is maintained until 2010, and after this year we assume ϕ = 1,
- for new disbursements the maturity is identical to the current one: 5.86 years,
- the potentially remaining gap after the new placements and disbursement is closed with the sale of public assets. If the gap is negative, there exists an excess of financing; in this case assets are accumulated,
- no discretionary fiscal measures are assumed.

This scenario determines the following evolution of the financing gap for the period 2003-2008.

Starting from the assets stock as of December 2002, given the assumptions and the simulation of net needs presented above, this scenario would collapse in the year 2006, because the asset stock is finished, while the financing needs are higher than placements and disbursements arisen from the rollover ratios.

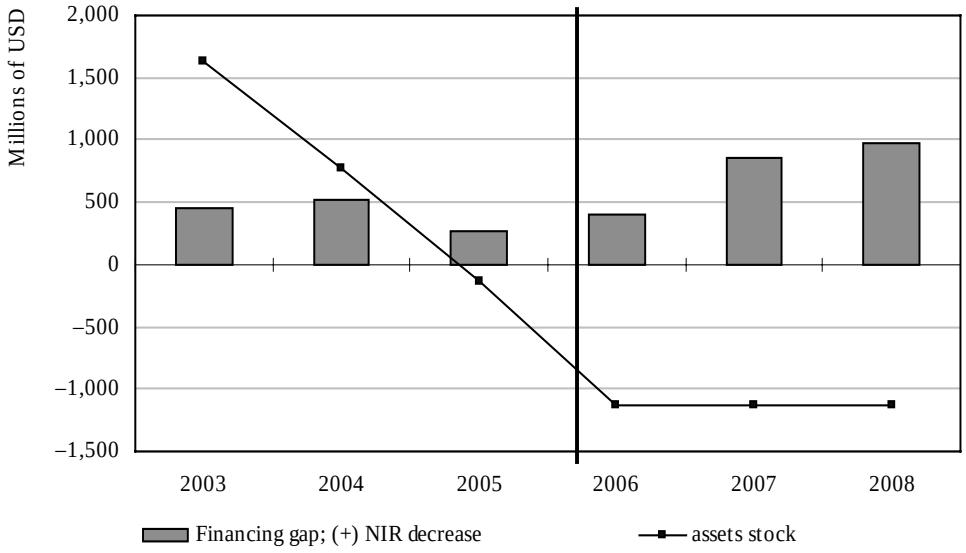
This scenario assumed an extreme case of assets sale only, while in a certain way it was optimistic in the assumptions of ϕ's values. However, even in these conditions, as early as in the year 2006 the Government would not be able to make the whole debt service. This invalids the traditional analysis of solvency made in

section 4.1 for the period after 2005 and warns about the need to make corrections in the time structure of the Public Debt.

The solution of closing the gap with a fiscal adjustment instead of with assets sale is analyzed in the following scenario.

Figure 23

Closing the Financing Gap with Assets Sales



A.3.3 New disbursements and placements, closure through the fiscal adjustment

Assumptions handled in this scenario are similar to the ones of the previous point, with some variants:

- the financing gap is closed with discretionary measures on fiscal income and/or outlays,
- public assets are maintained at its 2002 level.

Owing to presenting the same assumptions of uses, placements and disbursements, the financing gap is the same that the one for the previous scenario. Therefore, for the first year, a fiscal looseness of some US$ 1,000: would be accumulated, looseness that would be quickly lost in the year 2004, determining again that the FG would not be able to be closed in 2006: in that year, the fiscal

adjustment necessary to close the gap is 9 per cent of GDP, which is clearly unlikely.

A.3.4 Conclusions

- Both scenarios are closely related because they start form the same financing needs and, according to the baseline scenario developed in section 4, do not incorporate the debt exchange of May 2003. The difference between them consists in the way of closing the gap: assets sale or fiscal adjustment. A mixed scenario does not greatly alter the conclusions: the combination only defers the collapse in one year. So, this pre-exchange scenario showed that whatever the combination between assets and fiscal adjustment, the FG led to unsustainability in a close horizon, thus requiring some of the following corrections:
- bigger disbursements of international loans than the ones assumed, modeled by the rollover ratios,
- fiscal measures that succeed in improving the fiscal performance beyond what was assumed (analyzed in section 4.2),
- A reschedule of the current debt, modeled through improvements in its maturity (analyzed in section 4.3).

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