THE LACK OF FISCAL CONSOLIDATION IN AN INFLATIONARY ECONOMY: URUGUAY 1970-2006

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Different from the papers presented in this session, this one analyzes the lack of fiscal consolidation within a framework of tensions between the objectives of consolidation and price stability. By using a model of time inconsistency with fiscal objectives and a Government's budget constraint similar to the Uruguayan one, it is shown that the existence of nominal debt in domestic currency and the possibility of reducing real expenditure generate incentives in addition to seignorage *for the fiscal use of inflation, avoiding a more lasting consolidation process. By analyzing Uruguayan data between 1970 and 2006 it is evidenced how the real adjustment of Primary Expenditure through inflation has been the key in the fiscal stabilization episodes of the past 35 years. Through the analysis of episodes, correlations and OLS regressions, it is shown that inflation acceleration has played a major role in improving the fiscal balance owing to its effect on real expenditure. Nonetheless, such improvements have been transitory, while real expenditure has bounced back once the adjustment phase was over. This paper offers an institutional reading, since it suggests that the setting of inflation objectives by the Government together with a bias against fiscal consolidation may result in a relative high inflation level.*

1 Introduction

Successful fiscal stabilization episodes have been rare in the Uruguayan economy during the last 35 years, and almost always the length was short. As a result, there is a strong deficit bias, with a primary deficit on average, which ends on debt accumulation. Beyond the well-known political economy reasons for this behavior, inflation seems to play an important role in adjusting the fiscal balance without the pain of a consolidation process. Moreover, there are some fiscal incentives for the generation of inflation linked to the inflation tax, the reduction of the *ex post* real value of nominal debt and especially the decrease of real Primary Expenditure.

As a result, there have been some structural changes in the economy. First, after long decades of chronic inflation, indexation mechanisms to the US dollar were generated, that limited, through the elimination of nominal debt in domestic currency, the Government's capability to default public debt holders. Furthermore, the virtual disappearance of domestic currency, with broad monetary aggregates

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The authors are grateful to Silvia Vázquez, Javier Milei and Hubert Kempf for their helpful comments. Any views or opinions expressed in this work are of exclusive responsibility of the authors thereof, and do not stand for the institutional position of the Central Bank of Uruguay.

achieving almost 5 per cent of the GDP in 2002, and with Monetary Base that in the 1990s is reduced to half its level of the previous decade, also show the reduction of the use of domestic currency for transactional purposes. Finally, the Organic Act of 1995 limited the Central Government financing by the Central Bank to 10 per cent of the Primary Expenditure of the previous year, an institution which was tested in the hardest stress test: the crisis of 2002.

This work tries to draw the attention to the fact that, in spite of the structural changes previously described, there are still today and there could emerge in the future, incentives to the use of inflation with fiscal purposes, preventing fiscal consolidation. During the financial crises suffered by Uruguay over the period (1982 and 2002), a big part of the fiscal adjustment was accompanied by the effect of inflation on real salaries and pensions. In addition thereto, active policies of reconstruction of markets in UY Pesos, that should stimulate the domestic-currency denomination of banking credit and nominal public debt, and the recovery of the transactional role of domestic currency, are liable to generate incentives for the resurgence of the long-term inflationary phenomenon. This issue is important, as it could give rise to a conflict between the institutional design and the policy of reduction of the financial fragility by the reconstruction of nominal debt markets.

The rest of this paper is designed as follows: Section 2 presents a conceptual framework based on the Government's Budget Constraint to identify the different effects of inflation on public finances. Then, we include the constraint in a simple model of time inconsistency of monetary policy, showing, in addition to the real sector motives, fiscal incentives to inflationary financing that could be preferred to the rise in traditional taxes. Section 3 shows the historical evolution of these channels, putting the stress on the structural disappearance of nominal debt in domestic currency, and on the structural reduction of the inflation tax base. Furthermore, the role of inflation is established as a way to improve the primary balance through the reduction of real indexed primary expenditure above the erosion in real tax revenue. It is shown that this adjustment tool has deep but transitory effects: when it is intended to reduce inflation, it generates an endogenous increase of the aforementioned expenditure. Section 4 discusses the permanent and future role of inflation as a fiscal tool, draws some conclusions and suggests the remaining agenda.

2 Inflation on public finances: the conceptual framework

In this chapter we will derive the Government's Budget Constraint (GBC) in real terms, in order to show the different effects of inflation per category (income, expenses and financing), type of indexation (backward or forward looking), and degree of anticipation. Finally, we include this constraint in a simple time-consistency model so as to derive fiscal incentives for inflation.

2.1 The government's budget constraint in real terms

Following the classical literature on the subject, as Buiter (1985), Marfán (1988), or Blejer and Cheasty (1991), we start with the GBC, which equals needs with funding sources in nominal terms.

$$D + iB_n + Ei^*B^* + P.\bar{i}\bar{B} = \dot{H} + \dot{B}_n + E.\dot{B}^* + P.\dot{\bar{B}} \quad (1)$$

The left hand side of (1) presents the Public Sector's financial needs, determined by the difference between revenues and expenditure, where $D=G-T$ is the primary deficit, G being the expenditure that does not pay interest (Primary Expenditure), and T being the primary revenue, basically linked to tax receipts. The other terms account for payments of the interest bill on non-monetary net debt, which is denominated in nominal domestic currency ($i.B$); foreign currency expressed in domestic one ($E.i^*.B^*$), where E is the nominal exchange rate; and inflation-linked $(P.\bar{i}\bar{B})$, where P is the CPI index and the bars express constant units in domestic currency. The right hand side presents the net funding sources, given by changes in monetary debt $\dot{H}$, H being the Monetary Base or high power money, and non-monetary debt, whatever its denomination may be $(\dot{B}_n, \dot{B}^*, \dot{\bar{B}})$.

Starting from (1), breaking down nominal variables into real variables and prices, adding the Fisher parity for interest rates, and deflating by P we obtain the Public Sector's financial needs in real terms:[1]

$$d+(r+\pi)b_n+(\bar{r}+\pi)\bar{b}+(r^*+\pi^*)eb^* = (\pi h+\dot{h})+(\pi b+\dot{b})+(\pi\bar{b}+\dot{\bar{b}})+e(\pi^*b^*+\dot{b}^*) \quad [2] \quad (2)$$

Isolating real revenue and expenditure from the left hand side, we obtain the real deficit:

$$d + r.b_n + \bar{r}.\bar{b} + r^*.e.b^* = (\pi.h + \dot{h}) + \dot{b} + \dot{\bar{b}} + e.\dot{b}^* \quad (3)$$

Subtracting (3) from (2), the difference is given by:

$$\pi.b_n + \pi.\bar{b} + e.\pi^*.b^* \quad (4)$$

This equation reflects the (possible) monetary compensation to the debt holder because of the real loss caused by inflation.

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[1] The detailed derivation of this equation, as well as equations (10) and (15) can be found in Annex 1.

[2] $e=E/P$ is a relative price, its variation being the real devaluation (appreciation). If P^* is assumed constant, it also represents the real exchange rate.

On the other hand, the first term on the right hand side of both equations presents the nominal change of the Monetary Base in real terms, or seignorage *s*, broken down in its two components:

$$s = \frac{H}{P} = \dot{h} + \pi .h$$

Since real demand of money depends among other things on transactions, part of seignorage is linked to a "genuine" increase of real demand for money ($\dot{h}$), combined with economic growth. Meanwhile, another part is obtained through a transfer of real resources from the Private Sector to the Public Sector by the use of money, whose tax base is h and whose rate is π; this is the so-called inflation tax.

One can treat $\pi.h$ as another tax, on the left hand side of (3), isolating on the right hand side changes on real net debt; an alternative presentation is then (3'):

$$d + r.b_n + \bar{r}.\bar{b} + r^*.e.b^* - \pi .h = \dot{h} + \dot{b} + \dot{\bar{b}} + e.\dot{b}^* \qquad (3')$$

Finally, if debt structure per currency is composed of a θ participation of nominal debt, γ of foreign currency denominated debt and $(1-\theta-\gamma)$ of price-indexed debt, $\theta = \frac{b_n}{b}, \gamma = \frac{e.b^*}{b}; (1-\theta-\gamma) = \frac{\bar{b}}{b}$ *;* we can summarize (3') as follows:

$$d + b.\left(\theta .r + \gamma .r^* + (1-\theta-\gamma).\bar{r}\right) - \pi .h = \dot{h} + \dot{b} + \dot{\bar{b}} + e.\dot{b}^* \qquad (3'')$$

2.2 Effects of inflation on financing, revenue and expenses

Inflation affects different budget items, causing endogenous changes in the fiscal balance and in Public Debt. These "balance sheet" effects determine changes in the real value of assets and liabilities without necessarily changing flows of revenue and expenses.

The net effect of inflation on public finances is *a priori* indeterminate, depending on the anticipated nature thereof, and on the indexation degree of the different items. Non-indexed items are endogenously adjusted in real terms in the event of changes in π; on the other hand, inflation only has effects insofar as it is, at least partially, non-anticipated.

Equation (3'') shows three channels through which (non-anticipated) inflation can change the real value of debt:

- Inflation tax on money. This is a well-known item in the literature: the impact effect is positive, the final effect being indeterminate. It depends on the degree of adjustment of real demand of money to inflationary surprise; in particular, a positive effect arises when the inflation-elasticity of money demand is less than unity, a situation that is more probable in more stable countries.

- Inflation tax on nominal debt in domestic currency. In the same way as tax on money is collected, its close substitutes can also be taxed, depending on expectations (anticipated or non-anticipated inflation, π, π^e rate) and on indexation mechanisms (indexed or non-indexed debt). The inflation tax might possibly be collected on nominal (non-indexed) debt, since nominal interest rate is fixed *ex ante*, incorporating expected inflation. So, in (4) the term $\pi.b_n$ is then $\pi^e.b_n$. When there are differences between π^e, π, there is a transfer of resources, although of an uncertain nature: if $\pi > \pi^e$ ($\pi < \pi^e$) the net transfer is to the Public Sector (to the Private Sector). Nonetheless, an inflationary surprise improves the real fiscal balance without ambiguity. In countries with a history of high inflation this type of debt is not very frequent, linked to the *original sin* problem.[3] [4] The final effect of inflation on the flow of real interest is indeterminate, being lower in absolute value when indexation mechanisms are more developed.[5]
- Real primary deficit, *i.e.*, the difference between Primary Expenditure g and primary revenue τ, both in real terms. This is the bulk of the paper, so we deeply explain it as follow.

The final effect depends on the legal, institutional and administrative framework, where the central role is played by collection and expenditure lags, and indexation mechanisms.

Furthermore, the consequences of inflation are different on revenue and on expenditure: revenue is mechanically adjusted by effective inflation; primary expenditure implicitly or explicitly incorporates an adjustment to expected inflation. Another difference appears when we observe deflators: while revenue, when collected on the GDP, moves according to the GDP deflator, expenditure, when being determined by budget and/or discretionary increases, is adjusted by CPI.[6]

In a tax system based on expenditure like the Uruguayan one, where there are lags between tax accrual and its effective collection, an acceleration of inflation reduces real tax receipts; this is the so-called "Olivera-Tanzi effect", which is illustrated as follows:[7]

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[3] This problem has been studied at length after Eichengreen and Hausmann (1999).

[4] An inflation-indexed debt eliminates this problem, while the effect on debt in foreign currency depends on the difference between effective and expected real exchange rate. For more details, see Annex 1.

[5] The effects of inflation on debt denominated in foreign currency are left aside in this work, as relative prices issues are beyond of its scope. A detailed and recent analysis can be read in Rial and Vicente (2003).

[6] This introduces a "terms of trade" effect which adds new distortions even with a stable inflation rate. The gap between both deflators can be very important, especially in small open economies facing huge macroeconomic distortions and price adjustment. Nonetheless, this has not been sufficiently studied in the relevant literature, and is out of the purpose of this paper. For a succinct mention thereto, see Quinet and Bouthevillian (1999).

[7] This concept is fairly known in the literature. See Julio Olivera (1967); Vito Tanzi (1977). In progressive tax systems based on income there also appears the "fiscal drag" phenomenon, when inflation changes the real value of revenue categories.

$$\tau_t = \frac{T_t}{P_t} = \frac{\bar{\tau}_{t-n}}{(1+\pi)^n} \tag{5}$$

τ being the effective real collection, $\bar{\tau}$ the accrued tax receipt in real terms, n the lag period. Consequently, real revenue is deteriorated according to the magnitude of inflation, its acceleration, the lag between generation and collection, and the absence of indexation mechanisms.[8]

Something similar occurs with Primary Expenditure; the lag appears between the budgetary or readjustment time, and the actual financial disbursement. Within Primary Expenditure there are discretionary expenses that do not explicitly depend on inflation, such as public investment and purchases, which are assumed to be constant in real terms, being represented by α. The rest of the items are indexed with a certain lag, in some cases in a discretionary way, mainly public salaries and social transfers to the Social Security System; they will be called Indexed Primary Expenditure (IPE) and represented by $\boldsymbol{\omega}$. The IPE is inflexible in quantities, changing its real value when nominal adjustment differs from inflation. Incorporating these elements:

$$g_t = \frac{G_t}{P_t} = \frac{\bar{\omega}_{t-s}}{(1+\pi)^s} + \alpha_t \tag{6}$$

Primary Expenditure's real dilution will positively depend on its weight ω, on the inflation rate and its acceleration, and on the lag in nominal adjustment s.[9]

Generally, and this is how it happens in the Uruguayan case, the lag in tax receipts is shorter than in Primary Expenditure ($n<s$). Consequently, we can combine (5) and (6), expressing taxes in terms of period t, updating the IPE n periods, to show the net effect on expenditure:

$$d_t = g_t - \tau_t = \alpha_t + \frac{\bar{\omega}_{t-s+n}}{(1+\pi)^{s-n}} - \tau_t \tag{7}$$

IPE is adjusted according to expected inflation, whereby the net effect of an inflation surprise (acceleration) is positive, since it reduces primary deficit d.

Finally, we can summarize the effects of inflation on the GBC in continuous time as follows:

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[8] If tax collection is fully indexed there is no loss for fiscal lags; consequently, both real collections coincide.

[9] This effect is called in recent literature "the Patinkin effect", after Patinkin (1993) used it to analyze the Israeli stabilization of 1985. However, this effect is older, as many authors developed this concept previously. See Cardoso (1998).

$$\left[\underbrace{\alpha + \frac{\overline{\omega}}{(1+\pi)^{s-n}}}_{[A]} - \underbrace{\tau}_{[B]} \right] + \underbrace{b.\left(\theta.r + \gamma.r^{*} + (1-\theta-\gamma).\overline{r}\right)}_{[C]} - \underbrace{\pi.h}_{[D]} = \underbrace{\dot{h} + \dot{b}}_{[E]} \tag{8}$$

The effects of inflation on public finances are indeterminate, depending on many factors, *inter alia* the ones described above: inflation expectations, structure of assets and liabilities in domestic currency, structure of revenue and expenses, degree of monetization, reaction of money demand to changes in expected inflation, and indexation mechanisms.

Equation (8) summarizes the effects of non-anticipated inflation on public finances. *Ceteris paribus*, it makes it possible for real expenditure to be diluted beyond the reduction of real tax receipts, reducing the primary deficit ([*A*] and [*B*]). In addition, it reduces real interest payments of nominal debt [*C*], while the final effect on inflation tax and *seignorage* is indeterminate, though it has a positive impact [*D*].[10] Inflation perfectly anticipated has no real effect but the inflation tax. All these factors cause financial changes, reflected on the change in real net debt, even if stocks remain unchanged [*E*].

In view of these effects, there is an apparent inflationary bias from public finances. This issue is studied in the following section.

2.3 The model

To illustrate the fiscal incentives to generate inflation we use a framework similar to the one proposed by Calvo and Guidotti (1992), and Goldfajn (1997). A two-period version is presented where the Government, after deciding the amount of debt financing, chooses the optimal mix of policy instruments to finance the budget of year 2. We will assume that debt structure is given, and that it can include three types of liabilities: nominal debt in domestic currency, debt indexed to domestic inflation, and debt in US dollars. The Government can pay expenditure with increases in taxes – which are assumed to be indexed at nominal income level – or with inflation. Additionally, the economy presents a structure consistent with a Phillips curve. The Government's problem can be summarized as follows: choose the inflation rate so that:

$$\text{Max } V = E\left[\lambda(y - \bar{y}) - \frac{\pi^{2}}{2} - \rho\tau \right] \tag{9}$$

where λ and ρ are positive constants that indicate the relative weights of the different arguments of the Government's utility function.

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[10] On impact, it also reduces interest on foreign currency-denominated debt in $\gamma.b$, *via* real appreciation of the domestic currency, while it has no effect on the indexed debt $(1-\theta-\gamma).b$.

The GBC in period two is a simplified discrete time version of equation (8). Thus, finding the value of τ; incorporating the transversality condition for non-monetary debt (zero debt at the end of t=2) and of long run equilibrium for Monetary Base; imposing, to simplify, that all expenditure is indexed (α=0); and specifying the components of the real rates, we obtain:

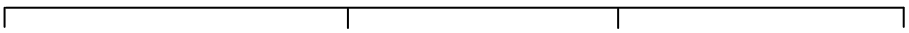
$$\tau = \frac{\varpi_1\left(1+\pi^e\right)}{(1+\pi)(1+g)} + \frac{b_1}{1+g}\left(\theta\cdot\frac{1+i}{1+\pi} + \gamma\cdot\frac{\left(1+i^*\right)(1+e)}{1+\pi} + (1-\theta-\gamma)\cdot\frac{(1+r)(1+\pi)}{1+\pi}\right) - \frac{k\pi}{1+\pi} \quad (10)$$

All variables refer to period 2 unless otherwise indicated; all variables are measured in terms of GDP. Here g is the real growth rate of the economy, i is the nominal rate of interest in domestic currency, e is the rate of change of the nominal exchange rate, and i* is the reference international rate of interest.[11] We have assumed that inflation does not affect real balances, k, in order to avoid emergence of multiple equilibria resulting from the existence of a Laffer curve.

Consumers are assumed to be risk-neutral in consumption.[12]

$$1+i = \left(1+i^*\right)\left(1+e^e\right) = (1+r)\left(1+\pi^e\right) \quad (11)$$

Where e^e and π^e refer, respectively, to expected devaluation and inflation rates. The timing of the game is as follows: the game starts once financing with debt and its composition per currencies have been decided. The Government then chooses the way how financing is completed, through taxes and inflation.



We will assume, for the sake of simplicity, that the Government directly controls the inflation rate. Additionally, we will assume that the purchasing power parity (PPP) holds.

$$\pi = e + q \quad (12)$$

where $\boldsymbol{q}$ is the real exchange rate, which is assumed to be constant.

GDP is determined by the existence of a Phillips curve.

$$y = \alpha + a\cdot\left(\pi - \pi^e\right) \quad (13)$$

where α and a are positive constants.

In the way it is considered, the optimization problem of the Central Bank includes two main types of incentives to generate inflation above the expected one.

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[11] Introducing the sovereign risk premium would not affect the analysis.

[12] Fixed risk premiums would not affect the results.

- Real motives. The Phillips curve in this case can represent the channel through the wage agreements of the traditional literature, or a subtlest beggar thy neighbor type of effect.
- Fiscal motives.
  a. Inflation reduces current expenditure in real terms.
  b. Inflation reduces the real weight of nominal debt in domestic currency.
  c. Monetary financing.

Below we show the inflation rates that are obtained with these incentives in the case of a discretionary central bank, that is, which takes as given the decisions of the private sector. In order to show this process, first we have to work in the simplification of the Government's budgetary equation.

Starting from (10), if we replace interest rates with their equivalents in terms of the real interest rate, and then we linearize by a degree-one Taylor series around zero in its determinants, we obtain:

$$\tau = \varpi_1\left(1-\left(\pi-\pi^e\right)\right)+b_1\left[r-\theta\left(\pi-\pi^e\right)-\gamma\left(q-q^e\right)\right]-k\pi \qquad (14)$$

We can replace (13) and (14) in the utility function of the Central Bank, derive with respect to inflation, and impose purchasing power parity, to obtain that discretionary inflation can be represented as:

$$\pi^D = a\lambda+\rho\left(\varpi_1+\theta\cdot b_1+k\right) \quad [13] \qquad (15)$$

On the other hand, if the PPP is not complied with, when $q<q^e$, the deficit increases endogenously, both because of the flows of interests and because of the debt stocks. These effects are out of the study of this paper; see Rial and Vicente (2003) for a discussion and quantification thereof.

This shows that discretionary inflation positively depends on: the effectiveness of inflationary surprise to increase activity,[14] the importance of GDP growth motive in the Central Bank's utility function, the importance of the tax reduction motive for the Central Bank, the amount of Indexed Primary Expenditure, the amount of debt in domestic currency, and the monetization of the economy.

So that, fiscal variables can determine inflation in the case of a Government that prefers this way to stabilize the budget against the rise in taxes and/or the reduction of nominal expenditures. From a political economy point of view, this mechanism is less harmful for the Government's position.

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[13] These results are robust to other utility functions of the Central Bank and other specifications of the weight of taxes, as for instance a quadratic form. These changes affect the commitment inflation rate, which is not the purpose of this work.

[14] Alternatively, it would be the effectiveness to improve net exports under the assumption of nominal rigidities.

3 Inflation and public finances in Uruguay, 1970-2006

This chapter begins with a short description of the behavior of inflation over the period. Section 3.2, after reviewing the financing structure, focuses on the effects of inflation on deficit financing, including dilution of nominal debt and *seignorage*. Subsequently, in Section 3.3 the main stylized facts linked to primary revenue and expenses are analyzed, starting by a description thereof, then presenting some econometric results, to finally analyze in-depth the endogenous adjustment of Indexed Primary Expenditure (IPE). Section 3.4 summarizes and concludes this chapter.

3.1 Inflation over the period

Average annual inflation over the period was 46.5 per cent. The standard deviation of inflation was 30 per cent, and it ranged between 4.4 per cent (2001) and 112.5 per cent (1990). Along the sample Uruguay had three exchange rate-based stabilization plans (ERBSP) (1968-71, 1978-82, and 1990-2002), which were abruptly abandoned to return to high inflation.

The period 1970-74 presents an acceleration of inflation from 20 per cent, linked to the 1968 heterodox stabilization plan, until almost 100 per cent (annual averages). The 1974-82 period is characterized by a gradual decrease, intensified by the 1978 plan based on an active crawling peg for the exchange rate, which succeeded in lowering inflation to 20 per cent *per annum*. High inflation returned after the abandonment of the plan leading to an average of 60 per cent in the first years; towards the end of the period inflation accelerated, reaching 112.5 per cent in 1990. From 1990 and on, a new ERBSP starts which would bring down inflation to below the 5 per cent mark in 2001. The 2002 crisis causes a temporary increase in inflation (20 per cent in 2003), which will later converge to the present level of 6 per cent. This volatility is a favorable framework to assess the effects of inflation on public finances.

3.2 Inflation and General Government financing[15]

3.2.1 Defaulting nominal debt

Nominal debt in domestic currency was, regardless of the existence of interest rate ceilings and until the emergence of chronic inflation in the fifties, an important financial instrument for the Uruguayan Government. Since then, although some

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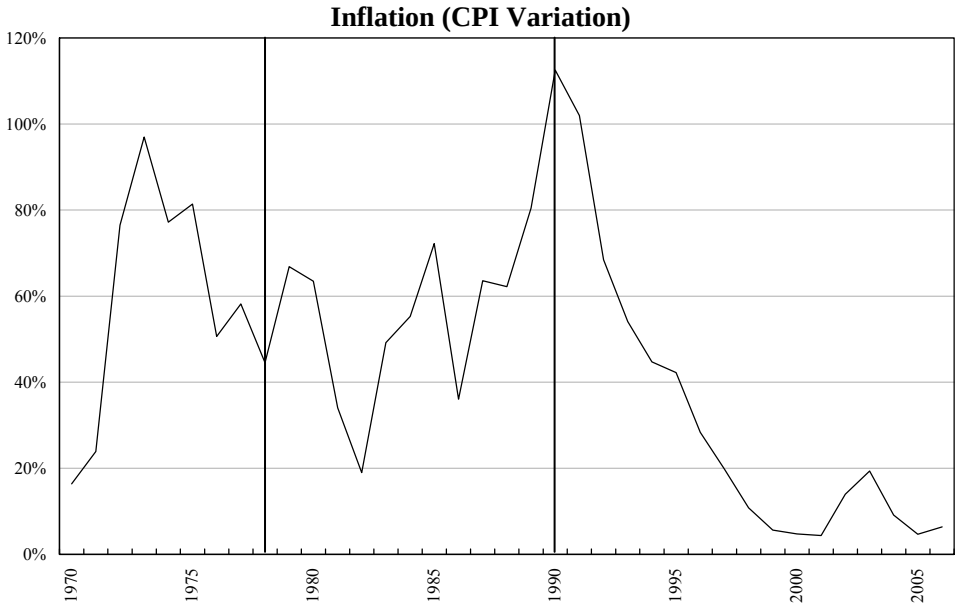
[15] Here we present a proxy of the General Government, represented by the consolidated Central Government and Social Security System (a public pension fund (BPS) and military and police social security funds), through the transfers from the former to the latter. We do not have information of Local Governments for the whole period. An interesting extension would be to analyze revenue and expenses of the BPS; moreover, to expand the coverage of the Public Sector, including Public Enterprises and the Central Bank.

Figure 1



Source: Central Bank of Uruguay.

efforts to force debt placement through pension funds (Bertoni and Sanguinetti (2004)), the share of UY Pesos in the debt portfolio dimmed gradually.[16]

With the appearance of high inflation, the *original sin* problem arose; causing the disappearance of this instrument in practically the whole period. The 2002 financial crisis caused -among other consequences- the return of nominal debt as the only possible way of financing in a complicated environment: bills in UY Pesos were issued in 2002-03, but for short terms (15, 45, 75 days) and paying high interest rates: from 160 per cent falling to 20 per cent (nominal *per annum*), within a context of low inflation (14-19 per cent).

Simultaneously, the Government started to issue inflation-indexed debt in UI (Indexed Units) for longer terms (3 to 10 years), in a conscious attempt to enter a "road to redemption".[17]

As of December 2006, total debt in UY Pesos accounted for 8.7 per cent of GDP.[18]

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[16] See for instance Banda and Santo (1983), Bertoni and Sanguinetti (2004).

[17] For references, see Eichengreen, Hausmann and Panizza (2003).

[18] After 1996, some Bonds in nominal wage-indexed units (UR) were issued, exclusively allocated to the recently created private Pension Funds. Both because of the small amounts and its specific demand they cannot be considered as part of a de-dollarization strategy.

Table 1

General Government Debt[(1)]
(UY pesos, percent of GDP)

Year	Total	CPI-linked	Nominal	Linked/Total
2001	0.0	0.0	0.0	100
2002	3.0	1.9	1.1	63
2003	7.9	5.2	2.7	66
2004	6.6	6.1	0.5	92
2005	6.5	6.2	0.3	96
2006	8.7	8.7	0.0	100

(1) Amount Outstanding out of the Public Sector.
Source: Central Bank of Uruguay.

The figures in the table clearly state a fact and a dilemma. The fact is that, despite the recent "*pesification*" (nominal debt in UY Pesos), eroding the real value of nominal debt in domestic currency is not an effective tool to regain fiscal sustainability in the present. However, the ongoing process of *pesification* of debt might generate an element of tension between the objectives of price stability and fiscal sustainability in the future with an inappropriate institutional framework.

3.2.2 Seignorage and its components

From 1970 to 1985, within a context of high inflation only interrupted by the 1978-82 Exchange Rate-Based Stabilization Plan (ERBSP), the Consolidated Public Sector could finance up to 4 points of GDP through monetization of the deficit.[19] After the 1990 ERBSP, monetization and fiscal deficit fell simultaneously. Until 1998, seignorage could finance the reduced deficit, but since then, it represents a source of funds of 1-2 per cent of GDP, almost disappearing in the last few years, implying a structural change.[20, 21]

As a result, one of the main characteristics of deficit financing has been the structural loss of *seignorage*: its yield was on average 2.8 per cent of GDP in the Seventies, 2.6 per cent in the 1980s, 1.1 per cent in the 1990s, and 0.3 per cent in the present decade.

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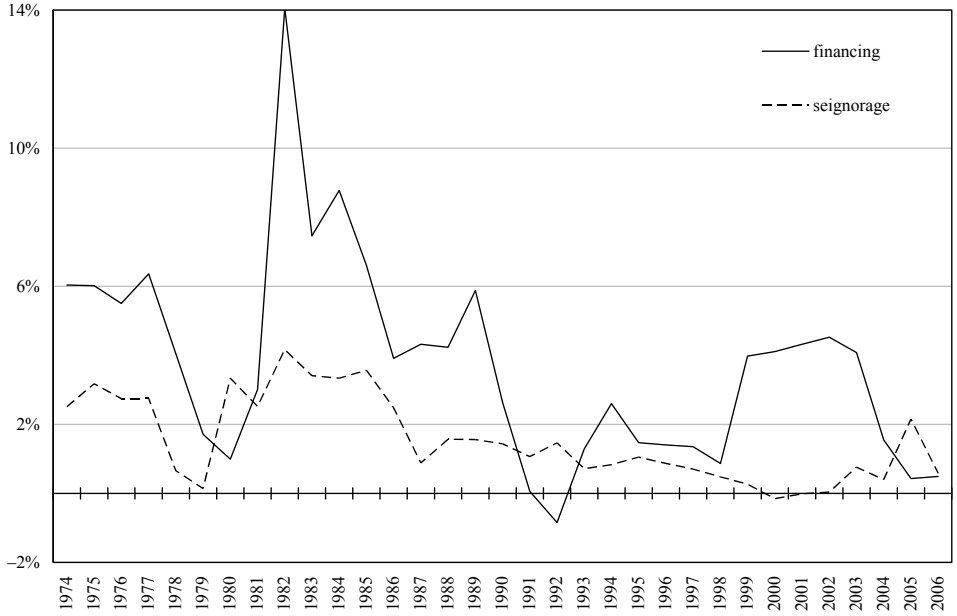
[19] Since fiscal deficit in those years was sometimes lower, and there were other financing sources, this tax enabled other uses, which in general were reserve accumulation. This phenomenon is documented, moreover, in Banda and Santo (1983) and Banda (1994).

[20] The increase in deficit was financed by Government bonds in foreign currency and, after 2002, with new multilateral loans.

[21] Annex 2 presents annual data of deficit financing, *seignorage* and its components.

Figure 2

Public Sector's Financing & Seignorage
(percent of GDP)



Source: Central Bank of Uruguay

This evolution can be noted in both *seignorage* components: the reduction of the inflation rate, especially in the 1990s, limits the amount of the inflation tax, while technological changes linked to the appearance of close substitutes for money reduce money demand in terms of GDP; this, in turn, contributes to reduce the tax base.[22]

Before the 1990s there were relatively high degree of monetization (some 9 per cent of GDP) and inflation rates. Nonetheless, inflation acceleration at the end of the 1980s causes a sudden fall of monetization to half its value, which constituted the traditional "high equilibrium" of inflationary finances. In the 1990s, however the gradual fall of the inflation rate, the more "genuine" *seignorage* component, the demand of Monetary Base in terms of GDP, has kept relatively constant in its new lower level, which averages 3.8 per cent in the period 1990-2004; this produces a structural change in money demand. At the same time there were institutional changes: the Organic Act of the Central Bank establishes an operational limit to monetary funding of the Central Government's deficit, which

[22] Bucacos (2003), using simulations for specific years, comes to the same conclusions.

Figure 3

Degree of Monetization
(MB/GDP)

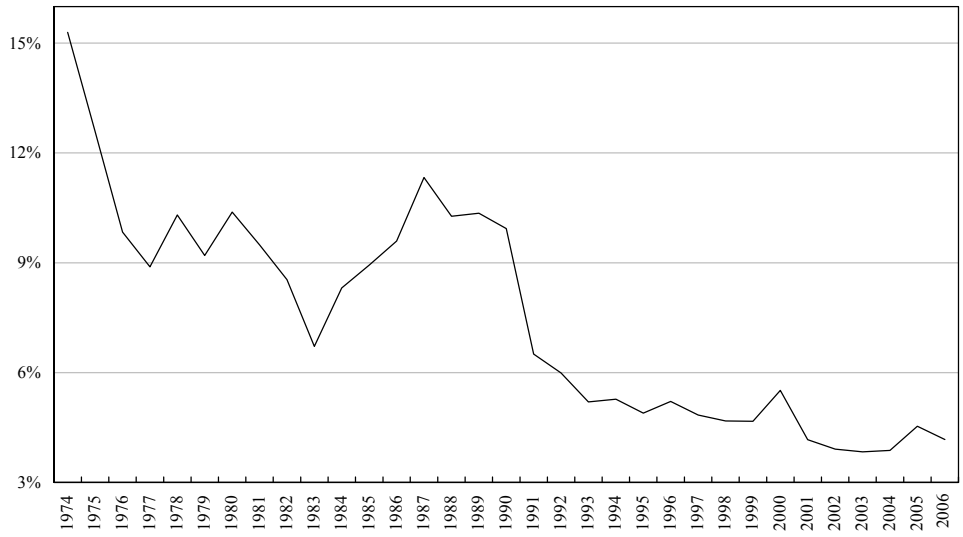
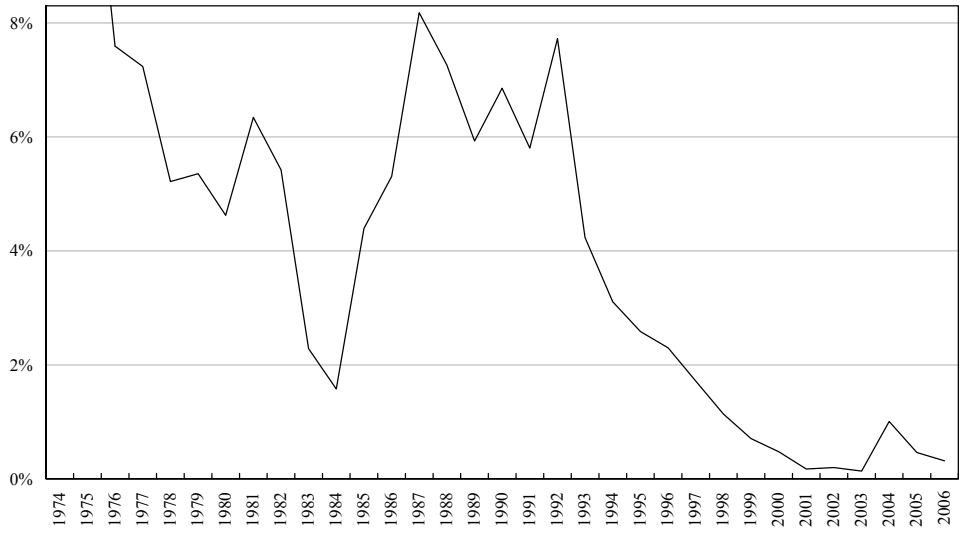


Figure 4

Inflation Tax
(percent of GDP)



Source: Central Bank of Uruguay.

cannot exceed 10 per cent of the Primary Expenditure of the previous year's National Budget.[23] Given this, the collection of the inflation tax in the final years of the stabilization process (1998-2002) averaged only 0.3 per cent of GDP.

Putting both pieces together, the returns of money printing through inflation have been considerably reduced. For instance, the inflation acceleration of 1983 collected through inflation tax 3.8 per cent of GDP, while in 2002-2003 it accounted for just 0.6 per cent of GDP per annum.

Nonetheless, current remonetization (2005-06) could be indicating the beginning of a new structural change to make it possible for inflationary finance to achieve a "low equilibrium". In order to consolidate this tendency, target inflation should necessarily be kept in low levels, avoiding incentives for a short-term inflationary funding.

3.3 Effects on the General Government's primary balance

3.3.1 Structural and legal framework of Primary Revenue and Expenses[24]

Public finances in Uruguay over the period 1970-2006 are characterized by an average General Government's primary deficit of 0.8 per cent of GDP, which shows high volatility: its standard deviation is 2.3 per cent of GDP, achieving its historical maximum after the crisis of 1982, and in the other end presenting surplus in specific years, at the beginning of the 1980s and of the 1990s, reaching its maximum in 2006. This development has taken place within the framework of an increase in the share of primary revenues and expenses in GDP: revenues went from 13 to 20 points of GDP in the period, while expenses increased from 16 to 22 points at the beginning of this decade. It should be noted that both categories exhibit high and similar standard deviation, around 2.3 per cent of GDP.

The Government has discretionary power in its tax policy, in order to create and modify taxes, fix rates, tax bases and exemptions, by means of laws and decrees. Taxes are mainly linked to expenditure, wages and pensions, and foreign trade, with a declining participation, and present a weighted average lag in collection of approximately 22 days. The bulk of Central Government's collection (75 per cent of the total over the period) is collected by the Taxation Office (DGI), whose main taxes (VAT and IMESI) represent 2/3 of total collection and fall on expenditure.[25] This tax structure was consolidated in the first half of the Seventies and, in spite of structural changes in regulation, has not substantially changed as regards its structure, although it certainly has increased its levels.

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[23] Law No. 16.696, dated 30th March 1995, articles 47 and 49.

[24] Annex 3 presents a more detailed analysis of the legislation over the period, which in turn updates the Borchardt, Pereira and Vicente (2001) compilation, as well as its effects on collection lags per taxes.

[25] VAT accounts for almost half of the DGI's collection, while the IMESI, a bunch of different taxes on selected goods and services, has a participation of 16 per cent.

Figure 5

General Government Primary Balance: Actual and CAPB
(percent of GDP)

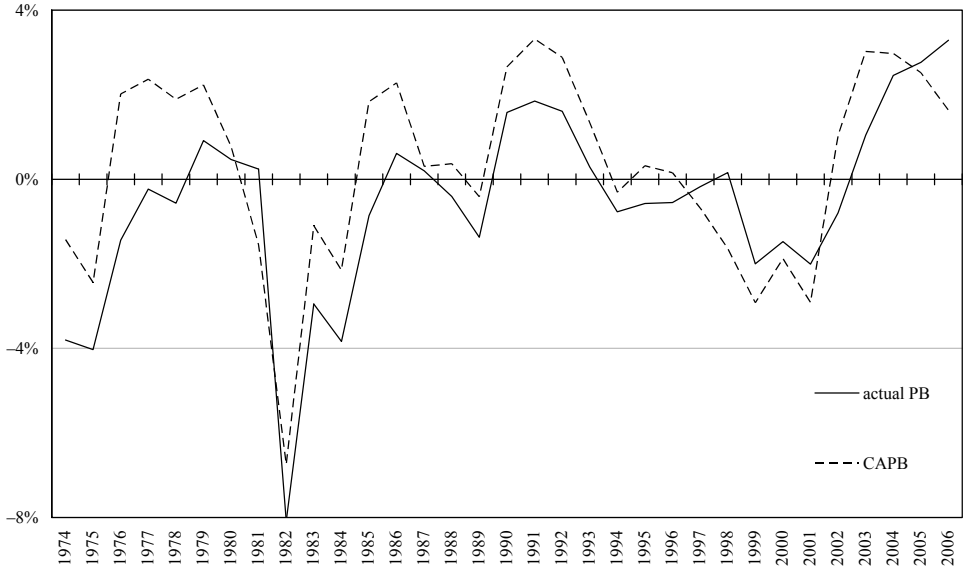
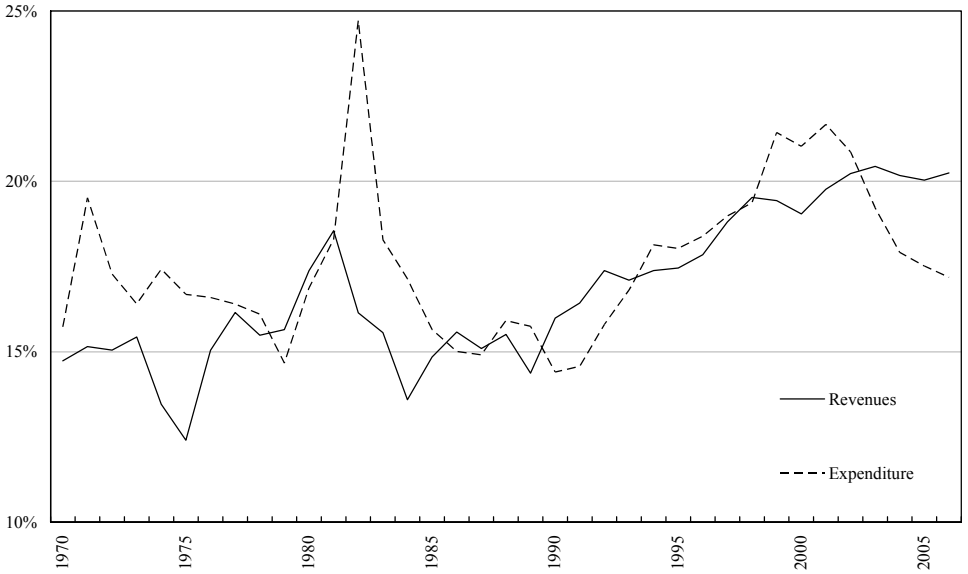


Figure 6

General Government Primary Revenues and Expenditure
(percent of GDP)



Source: Central Bank of Uruguay.

Figure 7

Indexed Primary Expenditure
(share of total expenditure)

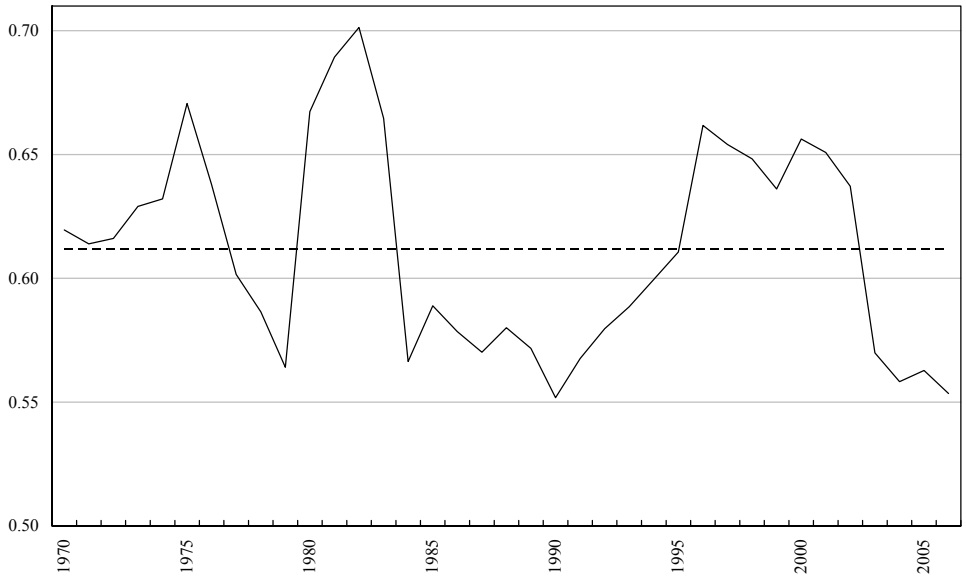


Figure 8

Wages and Salaries
(percent of GDP)

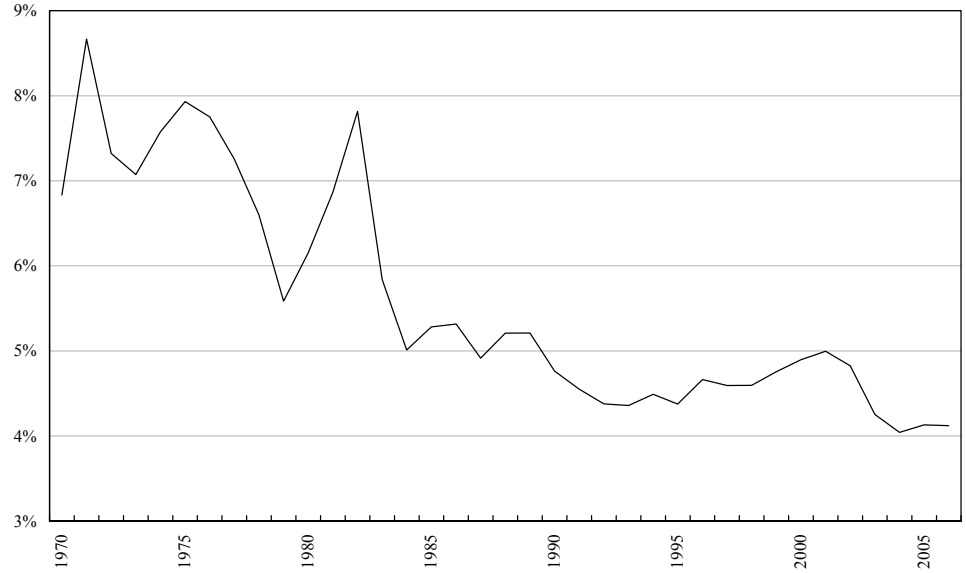
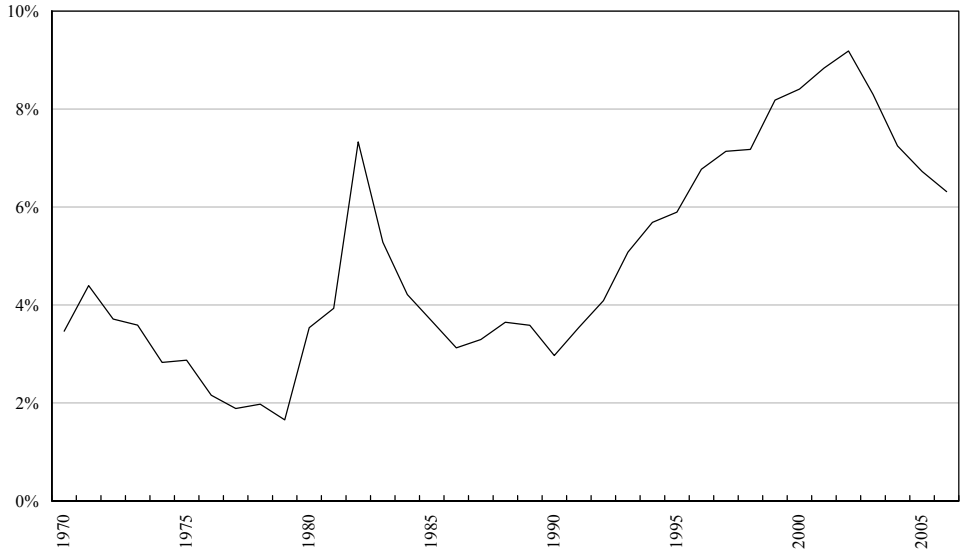


Figure 9

Transfers to Social Security (BPS)
(percent of GDP)



Source: Central Bank of Uruguay.

Current Primary Expenditure, composed of the Government's consumption and transfers to other public or private agents, mostly transfers to the Social Security System (BPS and the Military and Police Funds), accounts for 82 per cent of total expenditure. In particular, public salaries and transfers to Social Security, which are subject to indexation rules and present a procyclical behavior, weight together 60 per cent of total expenditure. We shall call them Indexed Primary Expenditure.

Salaries adjustment period has varied between quarterly, four-monthly and annual, while, after the Constitutional Reform of 1989, the Government has lost its discretionary power as regards the amount, the time and then the lags of pension adjustments. Since then, both BPS revenue and expenses, and consequently their financial balance, shall be endogenously determined by inflation. The rest of the Primary Expenditure (purchases and investments) is managed on a discretionary basis without an explicit adjustment to inflation, while interest payments are endogenously determined by financial variables that cannot be controlled by the spending policy.

3.3.2 Reaction of primary balance to changes in inflation

A first approach to quantify the effects of inflation on the primary balance of the Public Sector in Uruguay is through the correlation matrix between the different

Table 2

Correlation Matrix: Fiscal Variables, GDP and Inflation, 1970-2005

Fiscal Variables	GDP	Inflation
Total Receipts	0.96	–0.58
Net Taxes DGI	0.95	–0.54
VAT	0.95	–0.55
IMESI	0.70	–0.18
IRIC	0.93	–0.72
Primary Expenditure	0.95	–0.71
Indexed Primary Expenditure	0.93	–0.78
Transfer to Social Security	0.91	–0.74
Salaries	0.57	–0.42
Interest	0.64	–0.47
GDP	1.00	–0.69
Inflation	–0.69	1.00

items of primary revenue and expenses, GDP growth and inflation, which is summarized in the table above.

On the one hand, there is a positive and strong correlation between almost all the selected items and GDP. This feature appears on receipts as well as Primary Expenditure, the latter being determined by Social Security. On the other hand, there is a negative correlation between GDP and inflation. These facts determine the usefulness of including GDP as a control variable.

Correlations with respect to inflation are generally negative for all items, being higher for Primary Expenditure than for receipts. The inverse relationship between receipts and inflation, mostly explained by tax receipts, would be showing the effect of lags in collection, which is, however, lower than those of expenditure, especially IPE, confirming the favorable net effect of inflation on primary balance presented in Section 2.

A similar correlation can be seen between inflation and tax collection and VAT, while taxes with longer lags, like IRIC, present a higher correlation. The variable with the higher negative correlation with inflation is IPE, explained firstly by transfers to Social Security, while salaries present a lower correlation. Given this important relationship and that it accounts for 60 per cent of total spending, it is confirmed that this is the central variable to be analyzed in detail. Finally, the relationship between interest and inflation, relatively weak, has to be complemented

with the inclusion of the exchange rate, since almost the whole interest bill has been denominated in foreign currency.[26]

A more structural analysis of revenue, expenses and inflation, where GDP is included as a control variable, makes it possible for reactions of the different items to changes in inflation rate. Due to lack of higher frequency data for the whole period 1970-2005, annual data are used; estimations are made by OLS; all variables are expressed in logarithms; the different revenue and expenses items are deflated by CPI; real GDP is deflated by its implicit deflator, and inflation is measured as a CPI variation.

The results in general show: expected signs and high significance level for GDP, this being consequently a good control variable; a good general adjustment of regressions; and, in the case of receipts, a first degree autocorrelation is detected (low values of statistical DW, subsequently confirmed by the Breusch-Godfrey test). Autocorrelation of residuals implies that OLS results become inefficient, but they keep the properties of being unbiased and consistent. Since the purpose here is a historical analysis, not to make forecasts, this is a second order limitation.

Here we present the results obtained for consolidated revenue and IPE; other results omitted in this section are presented in Annex 4.

Total tax revenues, composed of DGI collection, foreign trade, and Wage and Pension Tax (IRP) present a statistically non-significant relation with inflation. This is due to: the low relationship of inflation with foreign trade receipts, as the nominal exchange rate is not included in the analysis, the small sample, and the continuous changes in regulations, both on tariffs and IRP.[27] Consequently, the analysis for receipts has to focus on the net tax collection of *DGI* (*NT_DGI* variable). The following equation is then estimated:

$$NT\_DGI_t = C + \alpha.GDP_t + \beta.INFLA_t$$

The results obtained are shown below (*t*-statistics in brackets):

$$NT\_DGI_t = \underset{(-9.9)}{-5.33} + \underset{(17.2)}{1.79}.GDP_t + \underset{(1.7)}{0.04}.INFLA_t$$

$$R_C^2 = 0.93 \qquad F = 214.7 \qquad DW = 0.38$$

The α coefficient, associated to GDP, shows the expected sign and a high significance level. Nonetheless, it can be noticed that inflation has only 10 per cent

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[26] See Rial and Vicente (2003).

[27] The IRP is created in 1982, with a rate of 1 per cent on salaries and pensions (law 15.294, 15th June 1982). As from the fiscal adjustment of 1990 there have been many modifications thereof, generally increasing its rates and diversifying brackets of taxpayers. Later, in 2004, rates and brackets are reduced to their 1990s' levels. Changes in tariffs were much more frequent.

significance, in addition to be positively, and not negatively correlated with real tax collection; anyway, this relation is very weak. On the other hand, residuals show first order serial autocorrelation. When solving the problem including the lagged dependent variable, the coefficient of inflation almost does not change, becoming significant (see Annex 4).

This result can be explained due to several factors. Firstly, as indicated, the average lag between generation and collection of taxes is small, especially in main taxes, as VAT and IMESI; moreover, when working with annual data, this effect is diluted, whereby not very significant collection losses via Olivera-Tanzi should be expected. Analyzing per tax, it is noticed that the β coefficient is positive for VAT and IMESI, while is negative for IRIC, a tax with a longer lag, supporting this hypothesis.[28] On the other hand, as stated above, in the whole period there were innumerable changes in regulations with a marked bias to increase tax pressure; this factor, in addition to going in the opposite direction to inflation, also explains why the relation with GDP is fairly higher than one. In this same respect, several taxes have been created in the course of the period, with the consequent increase in net collection beyond GDP or inflation effects.[29] Another factor to be taken into account is that elasticities are different according to the business cycle; *i.e.*, evasion is countercyclical. Finally, the positive sign could also be explained by a favorable effect of relative prices, combined to the evolution of the implicit prices of collection with reference to general CPI.[30]

Consequently, the effect on receipts requires a study in depth, which we leave for another work, as the focus here is the real reduction of expenditure.

In the case of real Primary Expenditure, *IPE* as well as the components thereof present an inverse and significant relation with inflation, both current and lagged one period. On the other hand, they show a positive and significant relation with *GDP*, thus presenting a procyclical feature.

Several regressions were made as follows:

$$IPE_t = C + \alpha.GDP_t + \beta.INFLA_t + \theta.D_t$$

where D_t designates dummy variables.

Variants refer, on the right hand side, to the inclusion of current or lagged inflation. On the left hand side variables used were: salaries, transfers to BPS, to the

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[28] Arbeleche and Bension (1996), using a different methodology to analyze years 1994-95 come to a similar conclusion; in this case, the loss for lags in collection averages 0.4 per cent of GDP in each year, versus 0.7 per cent on average for expenses, in a context of annual inflation slightly higher than 40 per cent.

[29] In this respect, in 1980 the IMAGRO and the ITP were created; in 1984, the IRA, the IMEBA and the IVEME-ICOME; in 1986 the IMABA; in 2001, Tax on sportsmen, ICOSIFI, Revenue Tax on Insurance Companies, IMESSA, ICOSA and COFIS, while many tax rates and bases for existing taxes were increased.

[30] Part of the effect, VAT on imports, is determined by real devaluation (appreciation); in the case of the IMESI, since this deal with some goods with managed prices, relative prices change on a more discretionary basis. This is an interesting issue of study for the future.

Military and Police Funds, to the total Social Security System, and total IPE. In all cases the parameters were significant and had the expected signs; the global adjustment was very good; and on several occasions residual correlation was ruled out through the Breusch-Godfrey test. Here we present the regression of better adjustment for IPE.

$$IPE_t = 2.74 + 1.26.GDP_t - 0.10.INFLA_{t-1} - 0.33.D\_BPS79_t - 0.22.D\_BPS05_t + 0.25.D\_1982_t$$

(–7.6) (17.8) (–5.5) (–4.0) (–2.6) (3.1)

$$R_C^2 = 0.95 \qquad F = 119.4 \qquad DW = 1.37$$

Its goodness-of-fit is high and the signs of GDP and lagged inflation coefficients are the expected ones, confirming the procyclical nature of IPE and its inverse relationship with the inflation rate. Three dummy variables are included: one for the Social Security Reform of 1979, which determined an abnormal increase in the number of retired persons; another one for the year 1982, where there was a combination of a strong increase in transfers along with an important update of cash flow between the Government and BPS, resulting in an abnormally high expenditure, not related to the business cycle; and the other for the recent labor formalization process of 2005, that implied an important once-and-for-all increase in the number of taxpayers.[31] [32]

It can be seen that an increase (reduction) of current inflation in 1 per cent causes a reduction (increase) of 0.1 per cent in real IPE on the following period, the behavior being very similar when working without lags in inflation. Consequently, inflation acceleration does reduce real expenditure, more than offsetting the real erosion of receipts. On the other hand, the dependent variable varies in the same direction and is more volatile than GDP.

Both behaviors are stronger in transfers to Social Security than in salaries. In such transfers, that finance the public social security imbalance, inflation is highly significant and presents a value of $\beta = -0.157$, being this relationship weaker after 1989. On the other hand, as in this latter period there was an important economic growth, its correlation with GDP is also very strong. Salaries depend in a smaller degree on the cycle, while their more discretionary nature partly blurs the effects of inflation. Finally, the nominal adjustments of these items are made in short terms (quarterly, four-monthly) during most part of the period, whereby, on considering annual average data, the statistical effect of inflation is diluted.

These results of real dilution and procyclical Primary Expenditure are similar to the ones obtained by Guerson (2004), using impulse response functions, with data until 2003. The author finds that the probability of fall of the real Primary

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[31] These phenomena are detailed in Section 3.3.3 below.

[32] Similar results are obtained if the 1982 dummy is omitted. However, it is important when working with more disaggregated data (Annex 4).

Expenditure given the acceleration of inflation is 0.92, and a positive and lasting impulse – response on the Primary Expenditure of GDP innovations (both in real terms).

Finally, we investigate the reaction of the Primary Balance (PB) to changes in inflation, finding the following results:

$$PB_t = \underset{(58.1)}{0.66}.GDP_t + \underset{(4.22)}{0.20}.INFLA_t - \underset{(-25.6)}{5.97}.D\_1982_t + \underset{(3.0)}{0.75}.D\_BPS05_t$$

F = 115.1 DW = 1.39

The regression is highly significant, being the signs of GDP and inflation the expected ones. A 1-point increase in inflation determines an improvement in real Primary Balance of 0.2 percentage points. These results are similar if we include lagged inflation instead of the current one, and if a constant in the equation is included, being then a robust estimation.[33]

This type of relation seems to be the prevailing configuration in Latin America. In such sense, using a similar approach to this one, Aguilar and Gamboa (2000) analyze the case of Mexico, finding that the real dilution of Primary Expenditure is greater than the one on Revenues; as a result, inflation acceleration improves the Primary Balance. Cardoso (1998) makes a simulation based on a simple model of inflationary finances for the Brazilian economy, finding that, under certain rates of inflation, the effect of the inflation on the Primary Expenditure dominates the effect on Revenues, and then improving the Primary Balance.

The relationship found between inflation, receipts and IPE constitute the traditional case of improvement of the fiscal balance through inflationary surprise. Inflation acceleration reduces the primary deficit, through the real reduction of indexed expenses, which are stronger than the Olivera-Tanzi effect on receipts. In the opposite direction, a fall of inflation combined with a lack of credibility on its persistence endogenously deteriorates primary deficit, reflecting one of the costs of disinflation. This is particularly relevant for transfers to Social Security after the Constitutional Reform of 1989, whereby adjustments were deprived of their discretionary power.

The evolution of IPE is analyzed in more detail below, taking into account the macroeconomic and regulatory environment indicated above.

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[33] The Primary Balance presents negative values in several years, so that logarithms cannot be computed. To solve this problem, a constant was added. As a result, the coefficients of the involved variables do not change, except for the one of the constant, which becomes non-significant.

3.3.3 Stabilization plans, financial crises and primary expenditure

General Government's Primary Expenditure during the last 35 years presented some stylized facts, such as its procyclical nature, an increase during the favorable stages of price stabilizations, a sharp fall at the end of these plans, and a subsequent increase some 3 years later.

The procyclical nature of Primary Expenditure is explained partly by the co-movement of primary revenue and expenses of the Central Government (ρ=0.94). This means a *pari passu* increase at the time of economic growth, and an adjustment of expenses simultaneously with the endogenous fall of receipts, said adjustment partly falling on IPE. Part of the explanation is given by the traditional business cycle during an ERBSP, with an initial expansion and a final recession. On the other hand, the structure of Primary Expenditure is biased to non-tradable goods, such as salaries, social security benefits, hiring of services and expenses in non-tradable. This structure, together with the typical real appreciation of these plans, provokes a relative increase of non-tradable goods prices, determining an endogenous increase of spending.

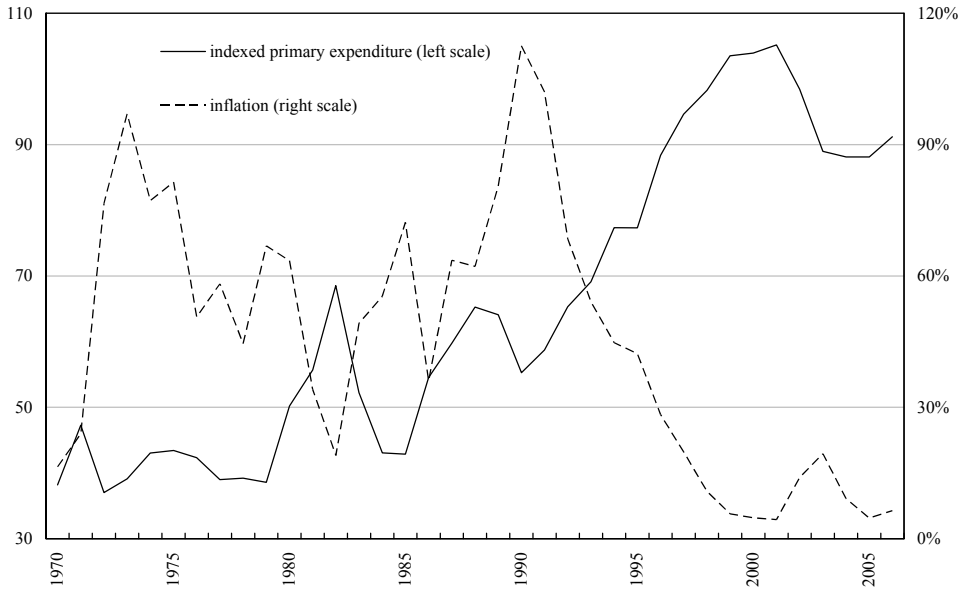
Then, together with the sudden end of these plans, a strong fall of Primary Expenditure can be observed, and a subsequent recovery some 3 years later. This adjustment appears in all the items, both in the discretionary and in the indexed ones. In the latter, the real reduction appears in spite of the existence of nominal increases, via inflation acceleration, constituting the traditional case of dynamic inconsistency. This pattern can be observed both at the end of the 1982 and 2002 stabilization plans. Taken into consideration, among other things, that the average and the variance of inflation were much higher in the first case, the real adjustment of IPE was much harder, its recovery having also been greater afterwards.

In the period 1978-82 there was an increase of all the items of Primary Expenditure, accompanying the evolution of receipts. This feature was stronger in IPE over the last 2 years, as a result of a more pronounced fall of inflation, together with a backward looking indexation criterion with annual adjustment. Thus, in 1982, real Primary Expenditure increased 20 per cent.[34] After the end of the ERBSP in November 1982, together with a jump in the exchange rate, a sharp recession and inflation acceleration, real Primary Expenditure shrank for 3 consecutive years, its fall being on impact the biggest of the 35 years under study, while IPE shrank a real 23.8 per cent, or 4.9 per cent of GDP, both for salaries (–21.7 per cent) and transfers to Social Security (–25.5 per cent). The inflation acceleration of 1984 and 1985 reduced again IPE in real term by 17.5 and 8 per cent, respectively, the latter considering only social security benefits, since in 1985-86, with the return of democracy and the Wages Councils, public salaries were discretionarily increased

[34] There were also some discretionary changes in Social Security: in 1979 a grace period was opened, allowing for an increase in the number of beneficiaries and a reduction of the waiting stock, partly explaining the aforementioned increase. Roldós (1990) states that 0.8 points of the 3.5 per cent of GDP increase of expenses of the BPS between 1979 and 1981 were due to an increase of the number of beneficiaries.

Figure 10

Central Government IPE Constant Prices, Inflation



Source: own preparation based on Central Bank of Uruguay data.

on a quarterly or on a four-monthly basis according to past inflation.[35] The real reduction of IPE proved to be a very effective tool to reduce the fiscal deficit *via* inflationary surprise, in the same way as in period 2 of Section 2 model.

Nonetheless, the inflation reduction of 1986 determined a strong growth in IPE in real terms, which continued in the two following years. This is explained to a great extent by two advances on account of the wage annual adjustment (law 15.900) that were fixed in 1987, thus reducing the period of real dilution of IPE.[36] This evolution shows the cost of disinflation, vanishing the initial favorable effect of real dilution. This happens in some "period 3", not contemplated in the model of Section 2.

The above described pattern appears again during the 1990s. In 1990, as a consequence of inflation dynamics, a new stabilizing experience starts; once again, it is an ERBSP, complemented by the fiscal adjustments of 1990 and 1995. The results for the period 1990-99 mark a continuous decrease of inflation from 112.5 to 5.7 per cent, and a strong real appreciation, within a framework of economic growth.

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[35] This practice is explained in article 6 of law 15.809, dated 21st. April 1986.

[36] This law provides annual adjustments on April 1, while the two advances on account were made in September and January of each year.

Figure 11

Indexed Primary Expenditure – Real Change – 1st Plan
(percent)

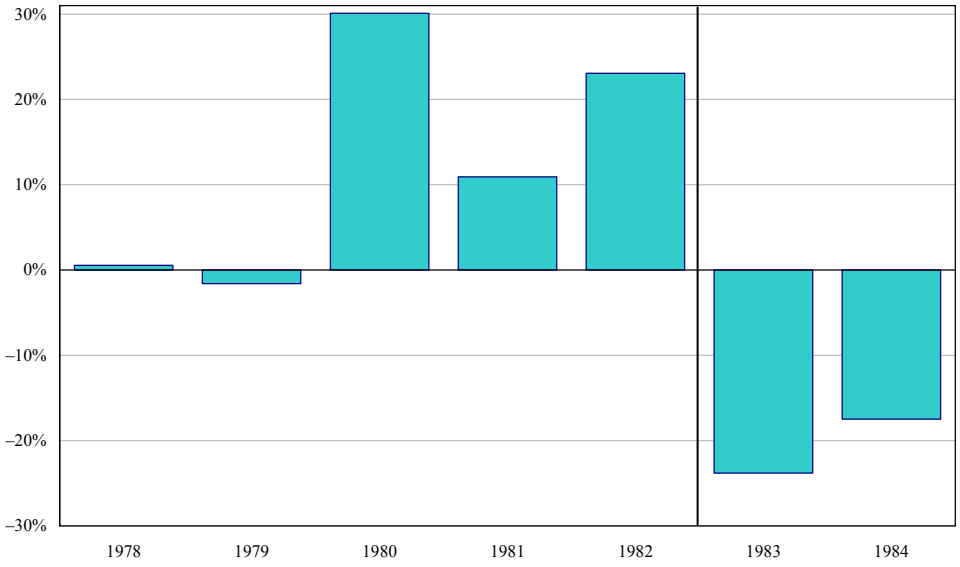
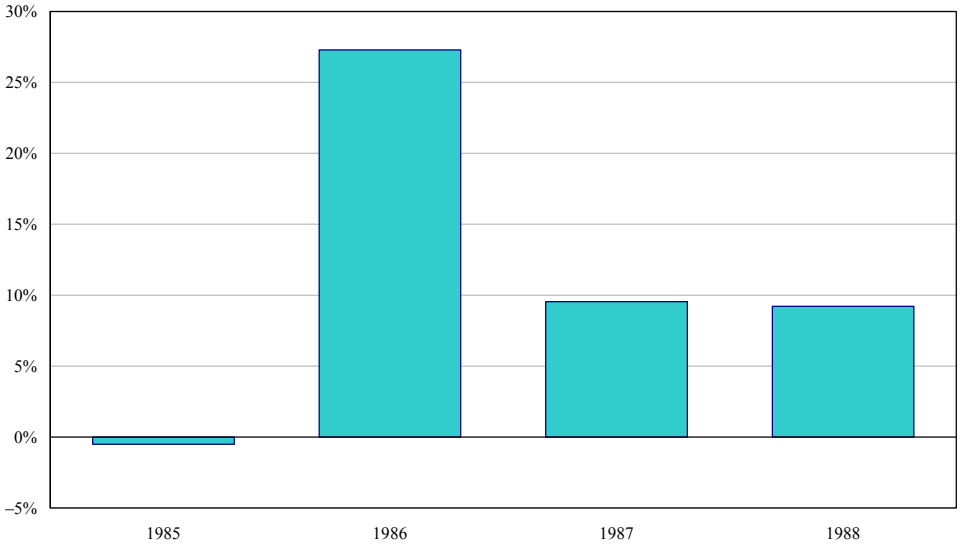


Figure 12

Indexed Primary Expenditure – Real Change – "Period 3"
(percent)



Source: own preparation based on Central Bank of Uruguay data.

Figure 13

Indexed Primary Expenditure – Real Change – 2nd Plan
(percent)

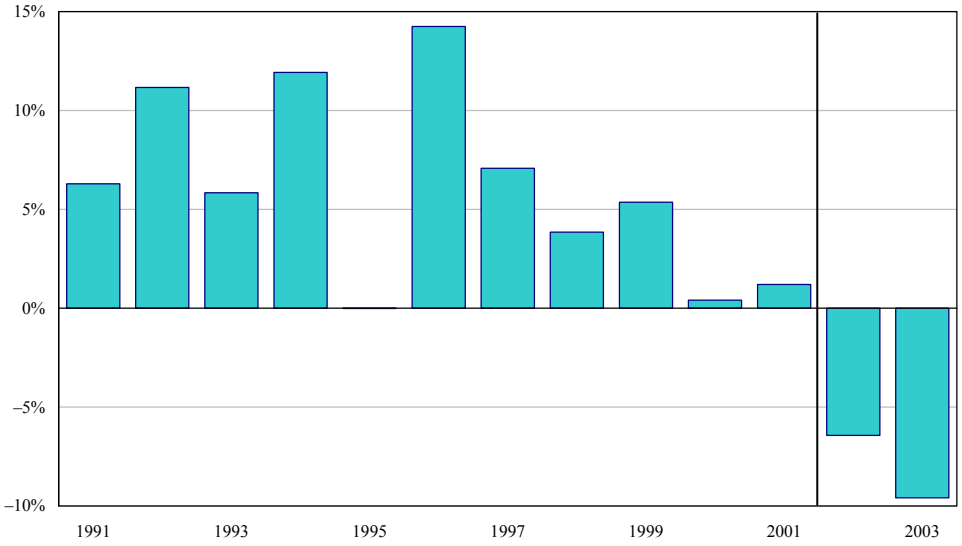
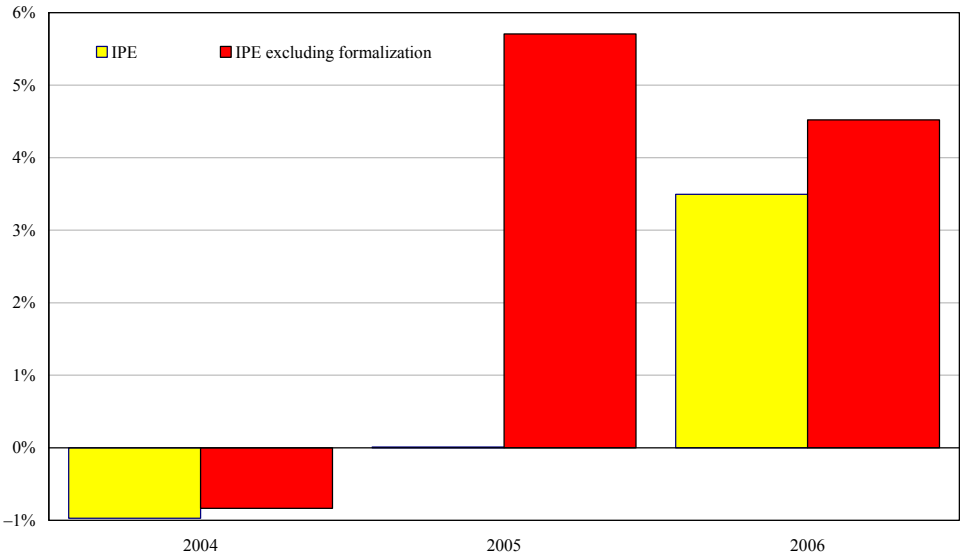


Figure 14

Indexed Primary Expenditure – Real Change – "Period 3"
(percent)



Source: own preparation based on Central Bank of Uruguay data.

Given the structure of expenses concentrated in non-tradable goods, which moreover are backward looking indexed, there is an endogenous increase of real IPE of 7.3 per cent annual average, while transfers to Social Security grow in real terms at two-digit rates in almost the whole period, driven by the constitutional reform of 1989.[37] Thus, the costs of disinflation once again offset the favorable effect of the real erosion of expenditure at the beginning of the decade.

In 2002 the strong nominal devaluation, the acceleration of inflation, and the sharp fall of GDP cause an important fiscal imbalance, which continues in the following years. IPE reproduces the same pattern as in the crisis of 1982, though in a most moderate way: a real fall of 6.4 per cent on impact, followed by a real fall of 10 per cent in 2003. In this period the real reduction of salaries is higher than transfers to Social Security, because of the smaller discretionary margin of the latter after the reform of 1989. Therefore, the effect of real dilution of expenditure has smaller returns, together with lower inflation acceleration.[38] In the final years, inflation falls to 4.7 per cent, while real Primary Expenditure has a slight increase. Salaries raise a real 5 per cent *per annum* on average, while the endogenous increase of average real pensions is compensated by the increase of receipts in the BPS resulting from labor formalization, which reduces transfers from the Central Government.[39] If the formalization effect is ruled out, the indexation effect on Social Security is isolated. In that case, the IPE would grow by a real 5.7 per cent in 2005, and a real 4.5 per cent in 2006.

Finally, comparing the two experiences it is shown that the effect of real IPE reduction through inflation was higher when inflation generated was higher and the indexation mechanism was weaker; consequently, there was a reduction of the inflation acceleration performance in the 2nd Plan. Besides, the positive effect of dilution of real expenditure and more generically of improvement in the primary balance occurs only in the short term; this mechanism brings problems, causing opposite effects in the subsequent disinflation stage.[40]

3.4 Summary

The table below summarizes the main stylized facts in Uruguayan inflationary finances in the period 1970-2006, breaking it down according to macro performance (GDP growth and inflation). The main regular features are: a permanent fall in *seignorage*, mainly because of the almost disappearance of the

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[37] This evolution appears together with a discretionary increase of purchases and investments in almost all the years, the latter showing a marked political cycle.

[38] For a global analysis of the crisis of 2002 exceeding the fiscal scenario, see De Brun and Licandro (2005).

[39] The process of labor formalization, caused by the Wages Councils and greater controls, determines an increase of taxpayers to the BPS of 6.0 per cent in 2004, and 11.6 per cent in 2005, while real social security benefits fall 1.8 per cent in 2004 and increase 6.1 per cent in 2005 (annual averages).

[40] In order to model this kind of problems it would be necessary to repeat the game outlined in Section 2. See Backus and Drifill (1991).

Table 3

Main Macro And Fiscal Variables – Selected Periods
(percent)

	1970-77	**1978-81**	**1982-84**	**1985-90**	**1991-98**	**1999-2002**	**2003-06**
Δ Real GDP	1.8	4.7	–5.7	3.3	4.4	–5.4	6.7
Inflation	64.8	54.1	40.2	69.6	43.9	7.6	9.8
General Government Deficit *(percent of GDP)*	3.0	0.2	6.1	1.6	0.9	4.4	3.0
Seignorage (percent of GDP)	2.8	2.3	2.0	3.0	1.2	–0.2	0.7
Inflation Tax *(percent of GDP)*	5.0	3.7	3.0	5.3	1.7	0.3	0.4
$\Delta\ b_n$	–0.4	0.0	0.0	0.0	0.0	0.8	6.6
Δ Real IPE	0.3	12.4	–8.2	4.2	7.5	–1.7	2.8

Source: own preparation based on Central Bank of Uruguay data. All variables are averages of the period.

inflation tax; inexistence or marginal weight of domestic currency-denominated debt; and inverse relationship between inflation acceleration and real Primary Expenditure; especially, there were strong adjustments of IPE in periods of crisis and recoveries afterwards. The first two factors seem to reverse in the last period (after 2003), creating possible problems of inflationary bias.

4 Summary, conclusions and prospects

In the preceding pages we have established, both from a theoretical and from an empirical point of view, how monetary policy prevented fiscal consolidation in the Uruguayan economy.

Using a time inconsistency model of monetary policy we show that the greater the participation of nominal debt in domestic currency, the amount of indexed expenditure and the degree of monetization, the greater the inflation outcome in a discretionary equilibrium.

The analysis of Uruguayan data suggest that those ways of financing were used and misused over the past 35 years, while there were just a few fiscal consolidation episodes. After changes in private sector's expectations and behavior, we can obtain mixed messages.

Although real erosion of nominal debt in domestic currency was one of the keys of public debt sustainability in the fifties and in the sixties, this tool disappeared with the (demand-driven) dollarization of public debt. After the 2002 crisis, nominal debt in domestic currency re-enters the scene as part of a broader strategy of reconstruction of markets in UY Pesos, although it is still issued for short terms and -at least at the beginning- at high rates.

Monetary financing of the deficit, which played a major role until the beginning of the stabilization plan of 1990, lost importance due to the simultaneous reduction of the tax base and the inflation rate. In the past few years its contribution has not even been sufficient to finance the Central Bank's deficit.

Unlike the two previous channels, there is still a strong negative link between primary balance and inflation acceleration. We have shown that this tool was the one that most contributed to the fiscal adjustment in the episodes of 1982 and 2002. We have also suggested that there is a significant and negative relationship between expenditure and inflation acceleration, particularly in the case of salaries and pensions, which roughly account for 60 per cent of total spending. Tax receipts, however, do not seem to have a significant association with inflation acceleration. As a result, the strong positive association between the primary balance and inflation generates a tension between the objectives of price stability and fiscal consolidation, the latter being the more politically painful option in the short run. Nonetheless, this association causes an endogenous increase of expenditure during inflation stabilization attempts, constituting one of the main costs of disinflation.

From an institutional point of view, in order to limit tensions between objectives of fiscal consolidation and price stability, the proposed reform of the Organic Act of the Central Bank should guarantee an independent institution committed to price stability, as is the international practice. This will leave Fiscal Policy without a tool as effective in the short run as harmful in the long run, opening the door for fiscal consolidation as the only remaining option. As a result, fiscal as well as monetary policy would gain in transparency and accountability.

Finally, this paper leaves an agenda of pending issues. On the one hand, in a small open economy such as ours, the effects of relative prices on the primary balance must be included in the discussion. Moreover, as a natural extension, the coverage should be expanded, both the institutional one, including the Consolidated Public Sector, as well as the period, including the first half of the 20th century. This bigger sample, in turn, could allow for the use of more sophisticated econometric techniques, such as VARs. Furthermore, the endogenous evolution of indexed expenditure leads to a new consideration of structural budget balances methodologies.

ANNEX 1
DERIVATION OF MAIN EQUATIONS

Equation (2)

Starting from $D + iB_n + Ei^*B^* + P.i\overline{B} = \dot{H} + \dot{B}_n + \dot{E}.\dot{B}^* + P.\dot{\overline{B}}$ (1), and recalling that $X = (\dot{P}.x) = \dot{P}.x + P.\dot{x} = P.(\pi.x + \dot{x})$, one can split nominal variables into real ones and prices, and incorporate a proxy to the interest rate parity, $i \cong r + \pi; i^* \cong r^* + \pi^*$, neglecting the terms $\pi r; \pi^* r^*$:

$D = P.d$; idem for $B_n, (EB)^*$;

$$\dot{H} = \left(\dot{P}.h\right) = \dot{P}.h + P.\dot{h} = P.\left(\frac{\dot{P}}{P}.h + \dot{h}\right) = P.\left(\pi.h + \dot{h}\right)$$

idem for $\dot{B}_n, \dot{B}^*, \dot{\overline{B}}$. Adding these terms and eliminating P equation (2) is obtained.

Equation (10) derived from (8)

Expressing (8) in discrete time:

$$\alpha_t + \frac{\overline{\omega_t}}{(1+\pi)^{s-n}} - \tau_t + b_{t-1}.\left(\theta.r + \gamma.r^* + (1-\theta-\gamma).\bar{r}\right) - \pi_t.h_t = \Delta h_t + \Delta b_t$$

assuming constant interest rates.

Working with just 2 periods (t=1,2); imposing, to simplify, that all expenditure is indexed (α=0) and allowing for GDP growth (rate g) and inflation (rate π):

$$\frac{\overline{\omega}}{(1+\pi)\cdot(1+g)} - \tau + \frac{b_1}{(1+\pi)\cdot(1+g)}.\left(\theta.r + \gamma.r^* + (1-\theta-\gamma).\bar{r}\right) - \frac{\pi.h}{1+\pi} = (h-h_1) + (b-b_1)$$

where all period 2 variables have no date, τ is expressed in terms of period 2.

Assuming: inflation-constant money demand (k constant), that expenditure adjust according to expected inflation, and breaking down real interest rates:

$$\frac{\overline{\omega_1}\cdot(1+\pi^e)}{(1+\pi)\cdot(1+g)} - \tau + \frac{b_1}{(1+g)}.\left(\theta\cdot\left\{\frac{1+i}{1+\pi}-1\right\} + \gamma\cdot\left\{\frac{(1+i^*)(1+e)}{1+\pi}-1\right\} + (1-\theta-\gamma)\cdot\left\{\frac{(1+r)(1+\pi)}{1+\pi}-1\right\}\right) - k.\pi = (h-h_1) + (b-b_1)$$

Including the transversality condition for the non-monetary debt (b=0 in period 2) and constant Monetary Base in the long run, isolating τ in the *r–h–s*, (10) follows:

$$\tau = \frac{\overline{\omega_1}\cdot(1+\pi^e)}{(1+\pi)\cdot(1+g)} + \frac{b_1}{(1+g)}\cdot\left(\theta\cdot\frac{1+i}{1+\pi} + \gamma\cdot\frac{(1+i^*)(1+e)}{1+\pi} + (1-\theta-\gamma)\cdot\frac{(1+r)(1+\pi)}{1+\pi}\right) - \frac{k.\pi}{1+\pi}$$

Equation (15)

Maximization Program:

Choose π to:

$$\text{Max (9) } V = E\left[\lambda(y-\bar{y}) - \frac{\pi^2}{2} - \rho\tau\right]$$

Subject to:

$$y = \alpha + a\cdot\left(\pi - \pi^e\right) \tag{13}$$

$$\tau = \varpi_1\left(1-\left(\pi-\pi^e\right)\right) + b_1\left[r - \theta\left(\pi-\pi^e\right) - \gamma\left(q-q^e\right)\right] - k\pi \tag{14}$$

(13) and (14) in (9):

$$V = E\left[\lambda\left(\left\{\alpha + a\cdot\left(\pi-\pi^e\right)\right\} - \bar{y}\right) - \frac{\pi^2}{2} - \rho\left\{\varpi_1\left(1-\left(\pi-\pi^e\right)\right) + b_1\left[r-\theta\left(\pi-\pi^e\right) - \gamma\left(q-q^e\right)\right] - k\pi\right\}\right]$$

$$\frac{\partial V}{\partial \pi} = 0 \Leftrightarrow \lambda.a - \pi - \rho\left\{-\varpi_1 - b_1\theta - k\right\} = 0 \Rightarrow (15)\pi^D = \lambda.a + \rho\left\{\varpi_1 + \theta\cdot b_1 + k\right\}$$

ANNEX 2
STATISTIC TABLES

Table 4

Deficit and Monetary Financing
(end-of-the-year data, percent of GDP)

	Fiscal Deficit		*Seignorage*	$\pi.h$	$\Delta(H/Y)$	Residual
	Public Sector	General Government				
1970	3.2	1.9	-	-	-	-
1971	5.7	3.4	-	-	-	-
1972	10.4	3.1	-	-	-	-
1973	5.7	0.8	5.8	12.2	–2.7	–3.7
1974	6.3	4.6	2.9	7.6	–2.8	–1.9
1975	6.4	4.8	3.4	7.2	–0.9	–2.9
1976	5.9	2.9	4.6	5.2	1.4	–2.1
1977	6.8	2.4	2.7	5.4	–1.1	–1.6
1978	4.4	0.5	4.5	4.6	1.2	–1.3
1979	1.8	–1.3	3.9	6.3	–0.9	–1.5
1980	1.1	–0.1	2.6	5.4	–1.0	–1.9
1981	3.2	1.8	0.3	2.3	–1.8	–0.2
1982	14.9	10.2	1.9	1.6	1.6	–1.3
1983	6.9	3.0	2.8	4.4	0.6	–2.2
1984	8.1	5.0	3.8	5.3	0.7	–2.2
1985	6.1	3.1	5.9	8.2	1.7	–4.0
1986	3.6	0.5	4.2	7.3	–1.1	–2.0
1987	4.0	1.2	4.9	5.9	0.1	–1.2
1988	4.2	1.8	4.1	6.9	–0.4	–2.3
1989	5.9	3.2	0.9	5.8	–3.4	–1.5
1990	2.6	–0.2	2.9	7.7	–0.5	–4.4
1991	0.1	–0.8	2.3	4.2	–0.8	–1.1
1992	–0.8	–1.0	2.3	3.1	0.1	–0.9
1993	1.3	1.1	1.4	2.6	–0.4	–0.8
1994	2.6	1.7	1.9	2.3	0.3	–0.7
1995	1.5	1.9	1.1	1.7	–0.4	–0.3
1996	1.4	1.6	1.1	1.1	–0.2	0.1
1997	1.4	1.3	0.9	0.7	0.0	0.2
1998	0.9	1.1	1.4	0.5	0.8	0.1
1999	4.0	3.9	–1.3	0.2	–1.3	–0.1
2000	4.1	3.7	–0.2	0.2	–0.3	–0.1
2001	4.3	4.7	0.0	0.1	–0.1	–0.1
2002	4.5	5.3	0.2	1.0	0.0	–0.8
2003	4.1	5.5	1.3	0.5	0.7	0.2
2004	1.5	2.2	0.4	0.3	–0.4	0.4
2005	0.4	1.6	2.2	0.3	1.9	0.0
2006	0.5	0.5	0.6	0.4	–0.2	0.4

Source: Banco Central del Uruguay.

Table 5

Deficit and Monetary Financing
(annual average data, percent of GDP)

	Fiscal Deficit		*Seignorage*	$\pi.h$	$\Delta(H/Y)$	Residual
	Public Sector	General Government				
1970	3.2	1.9	–	–	–	–
1971	5.7	3.4	–	–	–	–
1972	10.4	3.1	–	–	–	–
1973	5.7	0.8	–	–	–	–
1974	6.3	4.6	2.6	6.1	–1.8	–1.7
1975	6.4	4.8	2.2	5.4	–1.3	–1.9
1976	5.9	2.9	3.8	4.1	1.5	–1.8
1977	6.8	2.4	2.5	4.4	–0.4	–1.5
1978	4.4	0.5	3.2	3.6	0.5	–0.9
1979	1.8	–1.3	2.7	4.7	–1.0	–1.0
1980	1.1	–0.1	2.7	4.6	0.1	–1.9
1981	3.2	1.8	0.7	2.1	–1.1	–0.3
1982	14.9	10.2	0.1	1.1	–0.2	–0.8
1983	6.9	3.0	3.3	3.8	1.8	–2.2
1984	8.1	5.0	2.5	4.1	–0.2	–1.4
1985	6.1	3.1	4.2	6.1	0.9	–2.8
1986	3.6	0.5	3.4	6.1	–0.5	–2.2
1987	4.0	1.2	3.3	4.8	–0.3	–1.1
1988	4.2	1.8	3.6	4.9	0.3	–1.6
1989	5.9	3.2	2.5	5.5	–1.0	–2.1
1990	2.6	–0.2	0.9	4.7	–2.7	–1.2
1991	0.1	–0.8	1.6	3.7	–0.6	–1.5
1992	–0.8	–1.0	1.6	2.5	0.1	–1.0
1993	1.3	1.1	1.4	2.1	0.2	–0.8
1994	2.6	1.7	1.1	1.6	–0.2	–0.4
1995	1.5	1.9	1.5	1.7	0.4	–0.7
1996	1.4	1.6	0.7	1.1	–0.3	0.0
1997	1.4	1.3	0.8	0.8	0.1	0.0
1998	0.9	1.1	0.9	0.5	0.4	0.0
1999	4.0	3.9	0.1	0.2	0.0	–0.2
2000	4.1	3.7	–0.7	0.2	–0.8	–0.1
2001	4.3	4.7	0.0	0.1	–0.1	–0.1
2002	4.5	5.3	0.1	0.5	–0.1	–0.3
2003	4.1	5.5	1.2	0.8	0.7	–0.2
2004	1.5	2.2	0.1	0.3	–0.6	0.4
2005	0.4	1.6	1.4	0.2	1.2	0.0
2006	0.5	0.5	1.1	0.3	0.5	0.2

Source: Banco Central del Uruguay.

ANNEX 3
LEGISLATION AND COLLECTION LAGS

Important structural changes occurred in regulation during this period, such as the simplification of the taxation system that had begun in 1974 and that culminates with the Tax Reform of 1979 (Law 14.948, "Tax Reform", 30th October 1979); the Social Security reforms of 1981, 1989 and 1996; and the gradual dismantling of foreign trade taxes within the framework of bilateral agreements subsequently intensified after creation of the Mercosur since 1990.[41]

Moreover, some fiscal consolidation attempts took place, such as the fiscal adjustments of the 70s, 1990, 1995 and 2002, which as it was mentioned in the paper, were short-lived and do not ended in a successful consolidation process. These landmarks appear in the following laws: law 16.107, "Fiscal Adjustment", dated 3/3/90; law 16.697, "New tax system and improvement of competitiveness of the productive sector", dated 4/25/95; law 17.502 "Financial Stability Law", (Official Gazette 05/31/2002) and law 17.453, "Fiscal Adjustment" (Official Gazette 03/01/2003).

The different fiscal adjustments in general have increased tax rates and broadened tax bases, resulting in an increase of tax pressure without changing its structure, neither its concentration, nor its expenditure-bias taxation. However, the reforms do reduced the average lag in tax collection, consequently reducing the Olivera-Tanzi effect. For instance, the average lag in tax collection for the VAT, the main tax, during 1987-88 is progressively reduced from 75 to 30 days. According to Roldós (1990) 9,7 per cent out of the 18,3 per cent real increase of the VAT collection in 1988 was due to the reduction of the collection lag. As for expenses, these adjustments have promoted a reduction of discretionary spending, without affecting the way of adjusting expenses endogenously determined by inflation.

The main modifications in the Social Security System during the period, broadly speaking, have involved increasing contribution rates, rising the retirement age, increasing requirements for the beneficiaries, and reducing average social security benefits. Nonetheless, the indexation system linked to the average wage rate (AWR) has had very few modifications since it was created in 1979 (Institutional Act 9, October 1979). Previously, pension adjustments were made according to the average between AWR variation and inflation; consequently, this change does not particularly affect the spirit of indexation.

The most important changes have been: the reduction of the period between adjustments, reducing the effect of real dilution, and the elimination of the discretionary power of the time thereof, by Law 15.900 dated October 1987, and the constitutional reform of 1989. The former establishes that pensions will be adjusted every year on April 1, fixing two advances on account within the two months following the AWR of employees of the Central Administration. Strengthening this

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[41] Mercosur is a regional integration process initially composed by Argentina, Brazil, Paraguay and Uruguay.

change, the reform of 1989 established adjustments according to the last AWR every time there is an adjustment of civil servants' salaries, eliminating any and all discretionary power in this respect. This point is written in the Constitution, whose Article 67 states that "(...) Any adjustments to pension assignments shall not be lower than the average wage rate variation, and shall be made on the same occasions when adjustments or increases in salaries of civil servants of the Central Administration are established". As a result, since then both BPS revenue and expenses, and consequently their financial balance, shall be endogenously determined by inflation.[42] It should be mentioned that the Social Security reform implemented in 1996 (Law 16.173, 9/3/1995) created a mixed system, partially pay-as-you-go and partially of capitalization. Although this is a structural change in the system, it does not affect the indexation mechanisms.

Finally, the creation of Mercosur in 1990, which causes a gradual reduction of tariffs together with an increase of the intra-zone trade, determines a gradual reduction of collection for foreign trade, without modifying the source of inflationary distortion, linked to relative prices.

This legal structure determines an average lag in collection of 22 days for the whole period; breakdown of this figure is presented in Table 6.

[42] Moreover, actuarial and evasion factors influence thereon, but they are not the focus of this work.

Table 6

Average Lag in Collection, 1970-2006

	Lag (Days)				Average Lag	Weight on Total Revenue[1]	Weighted Average Lag
	Accrued	Cash	Indexation	Total			
Total Revenues						**89%**	**21.6**
I. DGI						**76%**	**16.2**
1. VAT						**39%**	**9.8**
local	0-30	25	0	25-55	40	25%	9.8
import	0	0	0	0	0	15%	0.0
2. Other tax goods & services (IMESI)						**18%**	**3.3**
gasoline	0	0	0	0	0	9%	0.0
others	0-30	25	0	25-55	40	8%	3.3
3. Corpotate taxes (IRIC)						**8%**	**7.3**
in advance	monthly-variable	25	0	monthly-variable	40	7%	2.7
annual payment	monthly-variable	115	0	monthly-variable	295	2%	4.6
4. Taxes on capital						**4%**	**–4.2**
in advance	monthly-variable	0	0	monthly-variable	–140	4%	–5.0
annual payment	monthly-variable	115	0	monthly-variable	115	1%	0.7
II. Foreign Trade		**0**	**0**	**0**	**0**	**10%**	**0.0**
III. Taxes on Personal Income (IRP)	**0-30**	**5**	**120**	**5-35**	**140**	**4%**	**5.4**

[1] Period average; breakdown by category of every tax average 1992-2006.

ANNEX 4
ECONOMETRIC RESULTS

Dependent Variable: RP
Method: Least Squares
Sample: 1970 2005
Included observations: 36

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
GDP	0.748854	0.2 25610	3.319249	0.0024
INFLA	0.209908	0.056817	3.694432	0.0009
D_1982	–5.949987	0.240645	–24.72520	0.0000
D_BPS04	0.605190	0.244269	2.477556	0.0191
D_BPS05	0.745952	0.253859	2.938447	0.0063
C	–0.441255	1.174627	–0.375655	0.7098

R-squared	0 .960422	Mean dependent var	3.213964
Adjusted R-squared	0.953826	S.D. dependent var	1.074199
S.E. of regression	0.230825	Akaike info criterion	0.056702
Sum squared resid	1.598411	Schwarz criterion	0.320622
Log likelihood	4.979368	F -s tatistics	145.6004
Durbin-Watson stat	1.394882	Prob(F- statistics)	0.000000

Breusch-Godfrey Serial Correlation LM Test:

Obs*R -squared	0.000000	Prob. Chi -Square(2)	1.000000

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/08/07 Time: 11:56
Sample: 1970 2005
Included observations: 36
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
GDP	0.0 08570	0.235480	0.036392	0.9712
INFLA	0.010987	0.059734	0.183935	0.8554
D_1982	−0.021500	0.256012	–0.083981	0.9337
D_BPS04	−0.073904	0.266464	–0.277351	0.7835
D_BPS05	0.143109	0.279616	0.511804	0.6128
C	−0.035279	1.225948	–0.028777	0.9772
RESID(-1)	0.349436	0.207006	1.688050	0.1025
RESID(-2)	−0.348936	0.207747	–1.679616	0.1042

R-squared	–0.016315	Mean dependent var	3.79E-17
Adjusted R-squared	–0.270394	S.D. dependent var	0.213703
S.E. of regression	0.240868	Akaike info criterion	0.183996
Sum squared resid	1.624489	Schwarz criterion	0.535889
Log likelihood	4.688069	Durbin - Watson stat	1.367700

Dependent Variable: NT_DGI
Method: Least Squares
Sample: 1970 2005
Included observations: 36

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
GDP	1.785298	0.103641	17.22572	0.0000
INFLA	0.042733	0.024871	1.718182	0.0951
C	–5.33573	0.539032	–9.898731	0.0000

R-squared	0.928622	Mean dependent var	4.180775
Adjusted *R*-squared	0.924296	S.D. dependent var	0.394597
S.E. of regression	0.108571	Akaike info criterion	–1.523166
Sum squared resid	0.388994	Schwarz criterion	–1.391206
Log likelihood	30.41698	F-statistics	214.6624
Durbin-Watson stat	0.381768	Prob(F-statistics)	0.000000

Dependent Variable: NT_DGI
Method: Least Squares
Sample (adjusted): 1972 2005
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
GDP	0.970498	0.241043	4.026241	0.0004
INFLA	0.050626	0.021446	2.360608	0.0252
NT_DGI(–1)	0.850710	0.183304	4.640966	0.0001
NT_DGI(–2)	–0.333604	0.137742	–2.421955	0.0219
C	–3.124263	0.835423	–3.739737	0.0008

R-squared	0.964214	Mean dependent var	4.209222
Adjusted *R*-squared	0.959278	S.D. dependent var	0.387384
S.E. of regression	0.078173	Akaike info criterion	–2.124740
Sum squared resid	0.177218	Schwarz criterion	–1.900275
Log likelihood	41.12057	F-statistics	195.3445
Durbin-Watson stat	1.322043	Prob(F-statistics)	0.000000

Dependent Variable: IPE
Method: Least Squares
Sample (adjusted): 1971 2005
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
GDP	1.287164	0.072171	17.83489	0.0000
INFLA(–1)	–0.097917	0.017849	–5.485900	0.0000
D_BPS79	–0.325337	0.081774	–3.978504	0.0004
D_BPS05	–0.218965	0.085617	–2.557505	0.0160
D_1982	0.250519	0.082063	3.052750	0.0048
C	–2.877899	0.379735	–7.578699	0.0000

R - squared	0.953688	Mean dependent var	4.121553
Adjusted *R*-squared	0.945703	S.D. dependent var	0.344550
S.E. of regression	0.080286	Akaike info criterion	–2.051641
Sum squared resid	0.186929	Schwarz criterion	–1.785010
Log likelihood	41.90372	F - statistics	119.4374
Durbin-Watson stat	1.374423	Prob(F-statistics)	0.000000

Breusch-Godfrey Serial Correlation LM Test:

Obs**R*-squared	0.000000	Prob. Chi-Square(2)	1.000000

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/08/07 Time: 11:54
Sample: 1971 2005
Included observations: 35
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
PIB	0.000362	0.076281	0.004746	0.9962
INFLA(–1)	–0.000343	0.019106	–0.017939	0.9858
D_BPS79	0.082052	0.104484	0.785303	0.4391
D_BPS05	0.028542	0.093469	0.305364	0.7624
D_1982	0.011234	0.089906	0.124948	0.9015
C	–0.005754	0.401247	–0.014339	0.9887
RESID(–1)	0.390690	0.231265	1.689360	0.1027
RESID(–2)	–0.012790	0.230042	–0.055597	0.9561

R - squared	–0.038881	Mean dependent var	–4.29E-16
Adjusted *R*-squared	–0.308220	S.D. dependent var	0.074148
S.E. of regression	0.084808	Akaike info criterion	–1.899212
Sum squared resid	0.194197	Schwarz criterion	–1.543703
Log likelihood	41.23620	Durbin-Watson stat	1.121369

Dependent Variable: SSS
Method: Least Squares
Sample (adjusted): 1971 2005
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	*t*-Statistics	Prob.
PIB	2.307968	0.139527	16.54139	0.0000
INFLA(–1)	–0.150501	0.034507	–4.361484	0.0001
D_BPS79	–0.553111	0.158091	–3.498684	0.0015
D_BPS05	–0.348744	0.165521	–2.106950	0.0439
D_1982	0.489983	0.158651	3.088425	0.0044
C	–9.104417	0.734133	–12.40158	0.0000

R-squared	0.944191	Mean dependent var	3.423476
Adjusted *R*-squared	0.934569	S.D. dependent var	0.606796
S.E. of regression	0.155215	Akaike info criterion	–0.733208
Sum squared resid	0.698658	Schwarz criterion	–0.466577
Log likelihood	18.83114	F-statistics	98.12682
Durbin-Watson stat	1.210091	Prob(F-statistics)	0.000000

REFERENCES

Aguilar, A.M. and R. Gamboa (2000), "Coordinación de políticas fiscal y monetaria", Instituto Tecnológico Autónomo de México, *Gaceta de Economía*, Year 5, No. 9, Suplemento.

Arbeleche, A. y M. Bensión (1996), "Efectos de una inflación cero sobre el resultado fiscal", FCEA, degree monograph, December.

Backus, D. and J. Driffill (1985), "Inflation and Reputation", *American Economic Review*, Vol. 75, No. 3, pp. 530-38.

Banda, A. (1994), "El fin de cuatro programas de estabilización", IX Annual Symposium on Economy, Central Bank of Uruguay.

Banda, A. and M. Santo (1984), "Finanzas inflacionarias en Uruguay", Economic Policy Division, Working Paper, No. 8.

Barro, R.J. (1997), "Optimal Management of Indexed and Nominal Debt", mimeo presented at the conference *Indexation, Inflation and Monetary Policy*, organized by the Central Bank of Chile, August.

Bertoni, R. and C. Sanguinetti (2004), "Sostenibilidad fiscal en Uruguay (1930-1959): el financiamiento del déficit", Central Bank of Uruguay, *Revista de Economía*, Vol. 11, No. 1, Second Period, May.

Blejer, M. and A. Cheasty (1991), "The Measurement of Fiscal Deficits: Analytical and Methodological Issues", *Journal of Economic Literature*, Vol. XXIX, December.

Borchardt, M., J. Pereira and L. Vicente (2001), "Análisis de las principales medidas de política que han afectado el resultado del sector público no financiero en los últimos 25 años", Working Paper, Monetary Policy and Macroeconomic Planning Area, mimeo.

Borchardt, M., I. Rial and A. Sarmiento (2000), "La evolución de la política fiscal en Uruguay", in E. Talvi and C. Vegh (eds.), *How to Do the Fiscal Puzzle?*, IDB.

Bucacos, E. (2003), "El financiamiento inflacionario del déficit fiscal", Financial Research Area, Working Paper, No. 02/03.

Buiter, W. (1990), *Principles of Budgetary and Financial Policy*, 1st edition; Cambridge (MA), The MIT Press.

Calvo, G. and P. Guidotti (1990), "Indexation and Maturity of Government Bonds: An Exploratory Model", in R. Dornbusch and M. Draghi (eds.), "Capital Markets and Debt Management", New York University Press.

Cardoso, E. (1998), "Virtual Deficits and the Patinkin Effect", International Monetary Fund, Working Paper, No. 98/141.

Céspedes, L., R. Chang and A. Velasco (2000), "Balance Sheets and Exchange Rate Policy", NBER, Working Paper, No. 7840.

De Brun, J. and G. Licandro (2005), "To Hell and Back: Crisis Management in a Dollarized Economy. The Case of Uruguay 2002", in A. Armas, A. Ize and E. Levy-Yeyati (eds.), *Financial Dollarization: The Policy Agenda*, Elsevier.

De Haedo, J. and C. Sapelli (1988), "Simplificación y modernización del sistema tributario en Uruguay, 1973-1987", III Annual Symposium on Economy, Central Bank of Uruguay.

Eichengreen, B. and R. Hausmann (1999), "Exchange Rates and Financial Fragility", NBER, Working Paper, No. 7418.

Eichengreen, B., R. Hausmann and U. Panizza (2003), "Original Sin: The Pain, the Mystery, and the Road to Redemption", paper presented at the SCSE-ASDEQ conference, Montreal, 15 May.

Goldfajn, I. (1997), "Public Debt Indexation and Denomination: The Case of Brazil", mimeo presented at the conference *Indexation, Inflation and Monetary Policy*, organized by the Central Bank of Chile, August.

Guerson, A. (2004), "Fiscal Policy for Good: Reducing Macroeconomic Volatility in Uruguay", World Bank, reference document for "Uruguay Sources of Growth Report", Economic Policy Group.

Kydland, F.E. and E.C. Prescott (1977), "Rules Rather than Discretion: The Inconsistency of Optimal Plans", *Journal of Political Economy*, No. 85, June.

Licandro Ferrando, G.M. and A. Masoller (1999), "Composición óptima por monedas de la deuda pública uruguaya", paper presented at the XIV Symposium on Economy of the Central Bank of Uruguay.

Marfán, M. (1988), "La política fiscal macroeconómica", in R. Cortazar (publisher) *Políticas macroeconómicas: una perspectiva latinoamericana,* 2nd edition, Santiago de Chile, CIEPLAN, 1988.

Masoller, A. and I. Rial (1997), "Impacto de la reforma previsional sobre el déficit del BPS: proyecciones de mediano y largo plazo", Economic Research Area, Working Paper, No. 2/97.

Olivera, J. (1967), "Money, Prices and Fiscal Lags: A Note on the Dynamics of Inflation", Banca Nazionale del Lavoro, *Quarterly Review*, Vol. 20.

Patinkin, D. (1993), "Israel's Stabilization Program of 1985, or Some Simple Truths of Monetary Theory", *Journal of Economic Perspectives*, Vol. 7, No. 2.

Quinet, A. and C. Bouthevillain (1999), "The Relevance of Cyclically-adjusted Public Balance Indicators – The French Case", in Banca d'Italia (ed.), *Indicators of Structural Budget Balances*, Public Finance Workshop.

Rial, I. (1995), "La política fiscal en el Uruguay: indicadores de orientación discrecional, 1983-1993", Central Bank of Uruguay, *Revista de Economía*, Vol. 2., No. 1, Second Period, May.

Rial, I. and L. Vicente (2003), "Sostenibilidad y vulnerabilidad de la deuda pública uruguaya: 1988-2015", Central Bank of Uruguay, *Revista de Economía*, Vol. 10, No. 2, Second Period, November.

Roldós, J. (1990), "El déficit del sector público y la política fiscal en Uruguay; período 1978-1987", CEPAL, Fiscal Policy 8 Series.

Sapelli, C. and H. Vieitez (1988), "Los efectos económicos de largo plazo del sistema de seguridad social vigente", CBU prize.

Tanzi, V. (1977), "Inflation, Lags in Collection, and the Real Value of Tax Revenue", International Monetary Fund, Staff Papers, Vol. 24, March.

Tanzi, V., M. Blejer and M. Teijeiro (1990), "La incidencia de la inflación en la medición de los déficit fiscales", Central Bank of Uruguay, *Revista de Economía*, Vol. IV, No. 3, April.