The Fiscal and Monetary History of Uruguay 1960-2014

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Working Paper

Abstract

Following Sargent (1992) this paper analyzes the budget constrain of Uruguay's public sector in the period 1960-2014. This approach allows concluding that the high inflation of the 1960s was associated with sustained fiscal deficits. The opening of the economy, the financial liberalization and the use of stablizations plans limited the discretionary management of the economic policy, which resulted in less inflationary financing of fiscal deficits. Although the inflation level significantly declined during the whole period, the inflation tax was still important to finance fiscal deficits. During the second half of 20th century, financial vulnerability of the public sector grew because of public-debt dollarization. In contrast, in the last decade primary fiscal surpluses and the lower share of foreign-currency public debt in the financing of the public sector, reduced such vulnerability. Between 1960 and 2014 Uruguay reduced its budget constraint and improved its fiscal balance. Evidence suggests that in the last three decades governments have slowly understood the importance of fiscal constraints.

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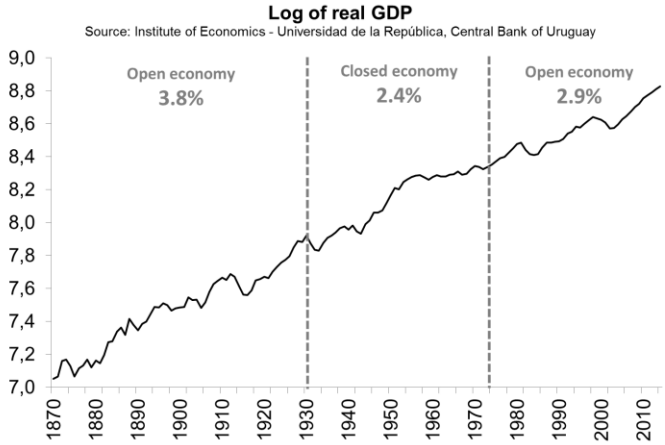
1. Introduction

Schematically, the economic history of Uruguay can be characterized by the overlapping of two different growth strategies. Until 1930 and since 1974 policy guidelines laid down growth in international integration (*open economy*). In contrast and with nuances, between 1931 and 1973 the domestic market (*closed economy*)[2] was the support of economic growth.

Changes in economic policy that altered these growth strategies were due to two large international price shocks that affected the terms of trade. The first occurred between 1929 and 1931 and was the result of the Great Depression. The second took place in 1973 and was associated with the first oil shock of the decade.

Figure 1



Throughout the 20th century, Uruguay experienced a long economic *decline*. Growth was comparatively low during the period of closed economy (Figure 1). In the periods of open economy, although the growth rate was a little bit greater, GDP's volatility was higher, which prevented boom phases from consolidating (Figure 2). As a result, Uruguay's GDP per capita fell from a level similar to the United States in the end of the 19th century to almost one third of it in the first decade of the 21st century (Figure 3).

Uruguay's *decline* is associated with a fragile external integration and inappropriate policies. The fragility of the external integration derives from a specialization in undifferentiated products intensive in natural resources that have volatile prices and often face restrictions to access different markets. In addition, the opening of the economy since the last quarter of the 20th century integrated Uruguay with two unstable economies: Argentina and Brazil.

In parallel, since WWII, institutions and policies were not able to create a favorable climate for robust growth. This occurred in spite of the fact that policy orientations were different. Until the 1970s the economy was under the *interventionism* that characterized the period of closed economy, because business profitability depended critically on non-economic factors, encouraging the deviation of resources and talent to rent-seeking activities. Then, after the opening of the economy and under a more *pro-market* policy

[2] Since 1959 changes were implemented to alter the overall direction of policies in force since the 1930s. However, only since 1973 were there changes that had consequences on the growth strategy.

orientation, some weak institutions, characterized by inefficient macroeconomic regimes and incomplete markets, were unable to manage the effects of external shocks. This, together with a volatile external environment, resulted in steep macroeconomic fluctuations and uncertainty. In short, the institutional environment created an unfavorable environment for saving, investing and innovating.

Figure 2

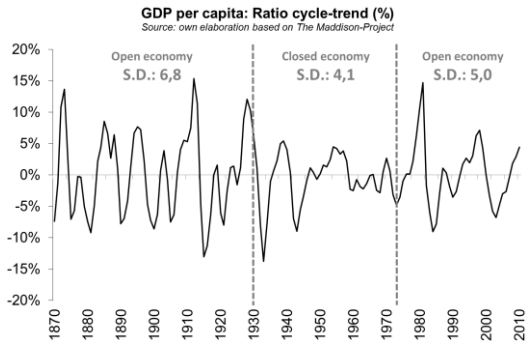
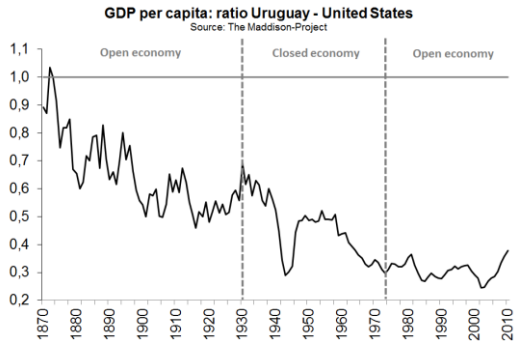


Figure 3



The monetary and fiscal history of Uruguay in the last half century has the *decline* as a backdrop. At the same time, monetary and fiscal policies are essential to explain this. For example, low growth and rising inflation in the late 1950s explain the changes in the monetary and fiscal policies of the early 1960s. Additionally, the way fiscal deficits were financed in the late 1950s explains the origin of the sustained inflation that lasted until the end of the 20th century (Figure 4). This chronic-inflation period caused the demonetization of the economy, eroding the stabilizing effectiveness of the monetary policy (Figure 5). As a result, macroeconomic instability consolidated, promoting *impatient* agents that demanded expected returns on their investments, which eventually affected growth (Oddone, 2008 & Oddone, 2010).

Figure 4

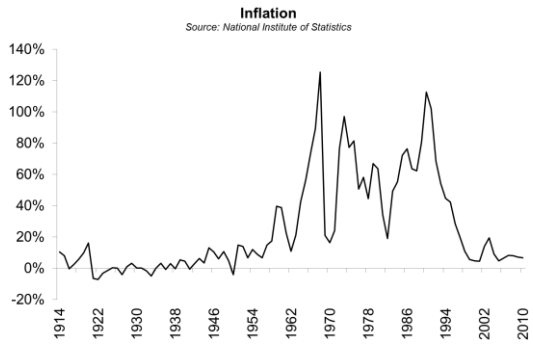
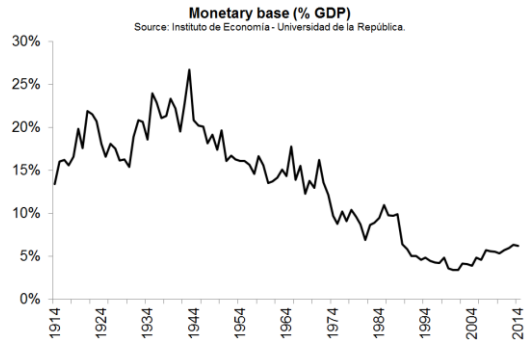


Figure 5



This article first describes some stylized facts that characterize the monetary and fiscal history of Uruguay between 1960 and 2014. After that, it presents the conceptual framework proposed in Kehoe, Nicolini & Sargent (2013) used to assess the fiscal constraints in Latin America. Then, data for Uruguay from 1960 to 2014 are used to estimate an adapted budget-constraint model of Sargent (1992). Next, some conclusions and some lessons are summarized. And finally, a research agenda for the next stage of the project is proposed.

2. Stylized Facts

The 1960-2014 period includes, first, a brief stage (1960-1973) where *interventionism* and import-substitution policies predominated, and then a longer one, starting in 1974, where several reforms were implemented to promote the opening of the economy, trade integration with Argentina and Brazil and financial liberalization. Both of them have similarities such as sustained fiscal deficits and a relatively high inflation rate.

The opening of Uruguay to international markets after the 1970s gave governments progressive access to alternative financing sources. As a result, public debt began to increase in the 1980s, drawing attention away from inflationary financing. However, the combination of nominal rigidities and high market concentration maintained the inflation inertia, which consolidated the dollarization of public debt, increasing the financial vulnerability of the public sector. The latter became an additional source of macroeconomic instability since the 1980s.

Meanwhile, regional integration contributed to coordinate business cycles in Uruguay more closely with sharp fluctuations in prices and activity in the region, especially with Argentina. The demonetization of the economy associated with persistently high inflation started restricting the stabilizing effectiveness of the monetary policy. In response, in the 1970s and 1990s anti-inflationary plans were carried out based on exchange-rate anchors. In both cases, fiscal policies that were not contractionary enough in the expansive phases of the cycle led to pronounced mismatches of the real exchange rate. In 1982 and 2002, currency devaluations contributed to causing two banking crises.

Following is the description of the main stylized facts that characterize the fiscal and monetary history of Uruguay between 1960 and 2014. To do so, the period 1960-2014 is divided into four subperiods: i) *stagflation* (1960-1973); ii) *opening and liberalization* (1974-1985); iii) *boost and halt*[3] (1986-2003); iv) *the golden years* (2004-2014).

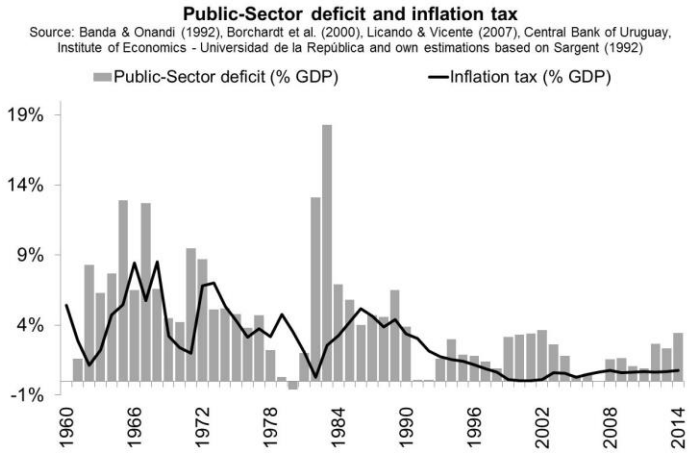
2.1. Stagflation (1960-1973)

For most people in Uruguay the 1960s are synonymous of the end of a period of growth and prosperity. This perception is based on the prolonged stagnation and the consolidation of chronic inflation that started at the end of the 1950s. The magnitude of the economic failure led to a social and political crisis that ended the long democratic stability of Uruguay in 1973.

Between 1960 and 1973 the average annual growth of GDP per capita was 0.2% and the average annual inflation was 51% (it was 5.1% in the 1940s and 11% between 1950 and 1958) (Figure 4).

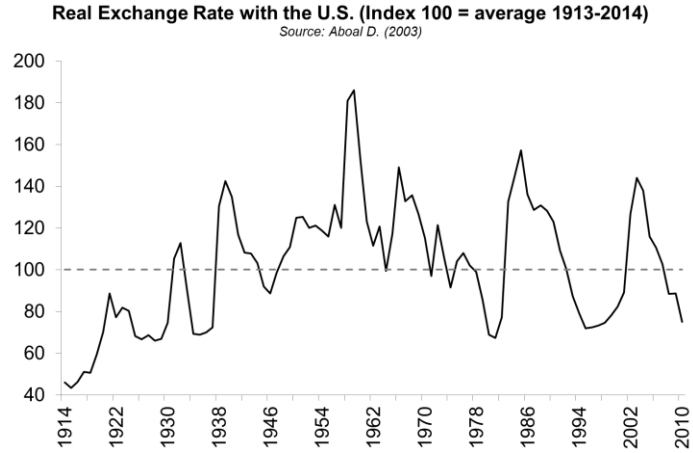
[3] *Boost and halt* is a translation from Spanish of "*El Impulso y su freno*", a book written by Carlos Real De Azua which referred to the period of import substitution between the 1930s and 1950s.

Figure 6



The rise in inflation in the 1960s had essentially three main causes. First, the increasing public deficit financed with the collection of inflation tax (Figure 6). The fiscal deficit started to grow because government expenses increased more rapidly than the revenues for two reasons: i) the growth in expenses had some inertia and were rigid since lobbyists were fighting to avoid the losses caused by high inflation; ii) revenues started to grow less because of the economic stagnation.

Figure 7



Second, protectionist policies in accordance with the period of closed economy kept an undervalued real exchange rate during all the decade (Figure 7). At the same time, the progressive reduction of Central Bank reserves, especially during the first half of the decade, reinforced the need to resort to periodic devaluations (Figure 10). The intense rhythm of devaluations imposed by both put pressure on the prices of imported goods, which were relevant in industrial costs (especially supplies and capital goods). The predominance of barely competitive markets made it easy to pass periodic devaluations on to prices (Oddone, 2010).

Third, ever since the end of the 1950s, interest rates consolidated at very low levels, even negative in real terms at times, which encouraged an artificial expansion of the aggregate demand.[4]

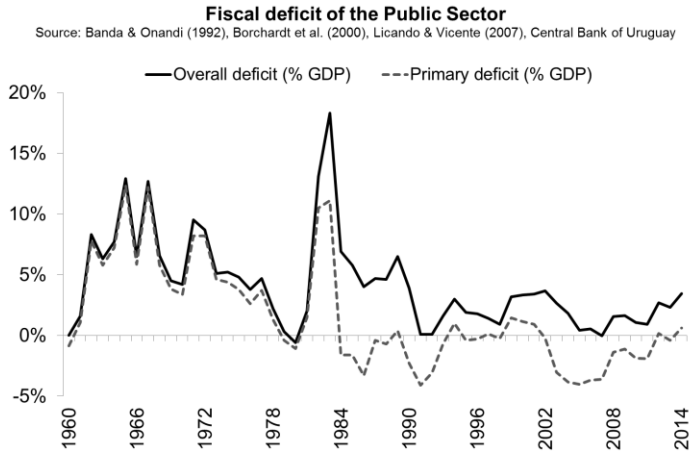
Inflationary tax in this period was the main source of financing of fiscal deficits (Figure 6). This was due to the low level of domestic savings, in part caused by the price instability itself and the limited access to external financing for a closed economy with a marked *interventionist* economic policy.

2.*2 Opening and liberalization (1974-1985)*

In 1973 amid growing political and social tensions that had persisted for almost a decade, the constitutional government fell and a *facto* government was instituted, which remained in power until 1985.

The economic policy of the non-democratic period has three stages. The first until 1978 was focused on stabilizing the external sector and promoting a series of reforms to end the model of closed economy. Among the reforms are the opening of the economy through trade integration with Argentina and Brazil, the promotion of exports and the financial liberalization.

Figure 8



During the second period between 1978 and 1982, the government focused on the implementation of an anti-inflationary plan based on an exchange-rate anchor. At the beginning the plan managed to reduce the rate of inflation (Figure 4) within a context of real-exchange-rate appreciation (Figure 7) and GDP growth (Figure 1). An insufficient fiscal contraction (Figure 8) to moderate the effects of disinflation and the appreciation of the real exchange rate on aggregate demand caused a significant deterioration of the current account of the balance of payments (Figure 9).

[4] Act No.9756 of 1938 to regulate the banking system established that interest rates were fixed by the Executive Branch. This regime worked until 1968. With the consolidation of two-digit inflation since 1957, real interest rates were negative for a long period. This led to the development of a side banking system known as *parabanking*, which increasingly started to operate in dollars.

The expansion of the aggregate demand was boosted by an increase in private spending, especially real-estate investment and consumption of durable goods. They were both stimulated by a significant growth in the debt of the private sector that was mainly denominated in US dollars.[5]

Figure 9

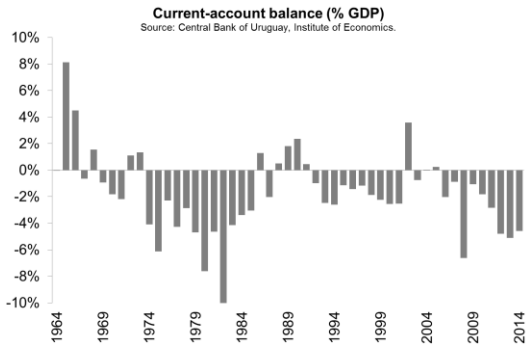
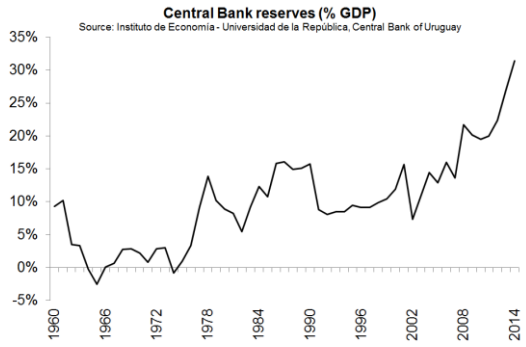


Figure 10

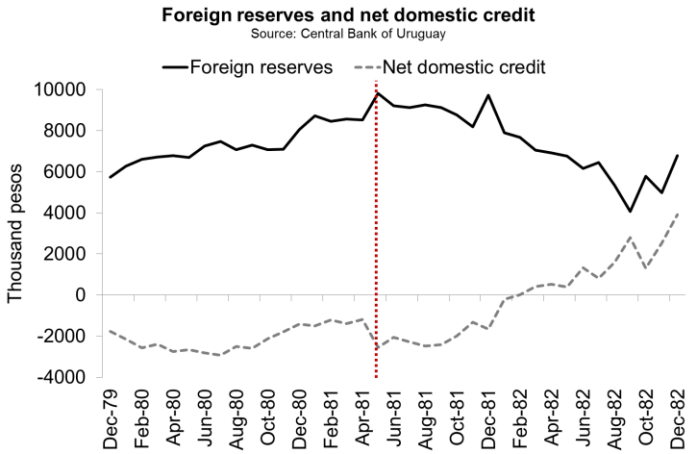


The simple version of Krugman's model (1979) included in Kehoe, Nicolini & Sargent (2013)[6] allows for a more precise approximation of this period. Krugman's argument (1979) is that sustained fiscal deficits within a context of restrictions to external financing force the Central Bank to increase domestic credit. Under a fixed exchange rate, the increase of domestic credit leads to a loss of international reserves, which may cause a balance-of-payment crisis, currency devaluation and an increase in the inflation rate. In Uruguay, between 1980 and 1982, the overall fiscal deficit of the public sector increased by 13 percentage points of GDP within a context of progressive restriction to external financing[7] while the monetary regime in place was based on an exchange-rate anchor[8]. Aligned with the predictions of the model, since mid 1981 domestic credit started increasing and international reserves began to fall (Figure 11), which contributed to the rise of a balance-of-payment crisis[9].

In November 1982 upon leaving the stabilization plan, the third stage of the period begins and lasts until 1985. When external financing no longer covered the hefty current-account deficit, the government devalued the local currency 153% in one single day. The large stock of dollar-denominated debt of the private sector quickly caused serious solvency problems of debtors, which triggered a banking crisis.

[5] At the end of 1981, half of the total debt in foreign currency was from the private sector, something unprecedented in the history of Uruguay (Antía, 1986).
[6] See Annex 4.
[7] Since August 1982, when the debt crisis started in Mexico, the restriction on external financing increased considerably.
[8] To be precise, the regime pre-announced the value of the exchange rate and can be classified as *crawling peg* (Edwards & Savastano 1999).
[9] Between November and December 1982 the peso weakened by 100% against the US dollar. Average inflation rate climbed up from 19% in 1982 to 49% in 1983 (Figure 4).

Figure 11



The significant increase in the public debt-to-GDP ratio during the third stage is associated with three factors (Figure 12). First, the specific conditions of the restructuring of public debt after the crisis.[10] Second, the need of the Central Bank to recompose its stock of international reserves due to both the BOP crisis and the banking crisis (Figure 10). And third, the effect of currency devaluation on the dollar-denominated debt (Figure 13[11]). The three factors help to understand how the BOP crisis, that originated in an expansion of domestic credit and an excess of private debt, ended up becoming a public-debt crisis.

Figure 12

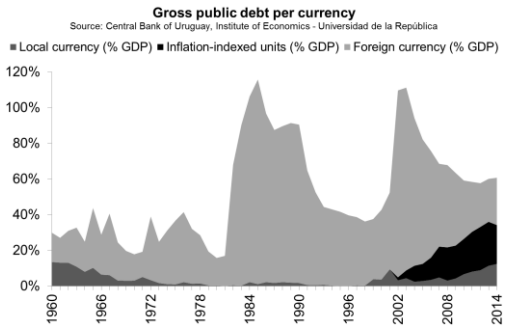
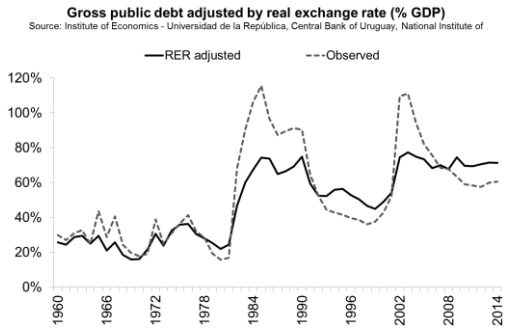


Figure 13



2.3 Boost and Halt (1986 – 2003)

The recovery that began in 1986, and especially in the first half of the 1990s, is explained by a sequence of positive external shocks and the decrease of both the public debt-to-GDP ratio (Figure 12) and private debt as a result of the real currency appreciation.

A new stabilization plan was put into practice in December 1990 based on an exchange-rate anchor. The plan was complemented with a fiscal adjustment of more than four points of GDP, with a unilateral tariff-reduction program and the integration of Uruguay to the MERCOSUR. The coordinated application of these actions was supposed to help reduce

[10] The negotiations with banking creditors resulted in the signing of four payment agreements and the *purchase of banking portfolios*. This caused an increase of the parafiscal deficit that reached 6.2% of GDP in 1983 (half of the deficit of the non-financial public sector).

[11] Annex 1 describes the procedure followed to estimate public debt adjusted by real exchange rate.

inflation every time the fiscal deficit required less financing, openness promoted more competition and the downturn trend of the exchange rate set a ceiling to the increase in prices of tradable goods.

The plan reduced the 12-month inflation to a one-digit figure for the first time in thirty years (Figure 4). Although the stabilization plan was abandoned during the 2002 crisis, once the crisis was overcome, the inflation rate remained below 10%.

The real exchange rate had a significant appreciation during the plan (Figure 7). This is because the convergence of prices of non-tradable and *regionally* tradable goods to the variation in the exchange rate was slow, especially in the first half of the decade[12]. An insufficiently tight fiscal policy in the expansive phase of the cycle (Figure 8), the presence of wage-indexation mechanisms based on past inflation within a context of disinflation and *inflation imported* from Argentina and Brazil, all caused the distortion of relative prices.

The real appreciation of the currency led to a progressive deterioration of the current-account balance (Figure 9), which was financed by positive capital inflows into the region before the crises exploded in Southeast Asia in 1997 and Russia in 1998.

In turn, the distortion of relative prices reflected in the appreciation of the real exchange rate, especially during the second half of the 1990s, prevented the authorities of the time from adequately estimating how vulnerable Uruguay's public finances were to the devaluation of the peso (Figure 13).

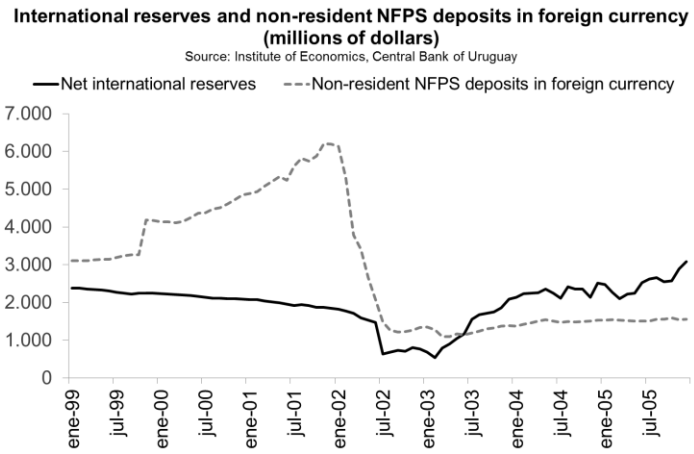
The rupture of the stabilization plan in Argentina (Convertibility) in December 2001 led to a worsening of Uruguay's fiscal deficit as the recession deepened and caused a series of events that ended with a run on bank deposits. The continued withdrawal of deposits (especially those of non-residents) from the system resulted in an important loss Central Bank reserves (Figure 14). This led to abandoning the exchange-rate commitments in June 2002. As opposed to 1982, the 2002 crisis was not a BOP crisis but a banking crisis.

The free-floating exchange rate caused a major depreciation of the peso. This slowly favored the recovery of the external sector and helped to explain the significant increase of exports since the end of 2002. However, given the high share of public debt denominated in foreign currency, the devaluation severely weakened public finances and placed public debt on an unsustainable path (Rial & Vicente, 2003). As a result, Uruguay conducted a debt restructuring which resulted in a voluntary[13] reprogramming of maturities for a value equivalent to half of the total public debt. The swap reached such support that it obtained 90% of the proposed amount. The 10% that did not adhere received the payments under the conditions originally agreed on. (De Brun and Della Mea, 2003).

[12] *Regionally tradable* goods, as opposed to tradable and non-tradable goods whose prices are formed in the international and domestic markets respectively, are formed in regional markets. The integration of Uruguay with Argentina and Brazil and the intense appreciation of the real exchange rate in those markets associated with stabilization plans implemented there, delayed the convergence of the variation in prices of regionally tradable goods with the evolution of the exchange rate. (Bergara, Dominoni & Licandro, 1994).

[13] The rating agencies considered it a default. S&P downgrading the public debt of Uruguay to Selective Default and Fitch downgrading to DDD in 2003. Uruguay inserted a Collective Action Clause (CAC) in the new bonds as well, which many believe would trigger a Credit Default Swaps (CDS) event because it changes the underlying structure of the debt.

Figure 14



As in the 1970s, the *boost* of the 1990s ended with a sudden *halt*. Notwithstanding the severity of the 2002 crisis that had significant economic, social and political consequences, a number of changes were made during the 1990s that laid the foundation of a stronger economy. That partly explains the robust recovery since 2003.

2.4. The golden years (2004-2014).

From the second half of 2003 Uruguay left the crisis behind. A period of growth and prosperity started, and its duration and intensity had not been seen since the 1940s. Between 2003 and 2014 the average annual GDP growth rate was 5.9%, three times the one recorded in the second half of the 20th century.

The growth originated in the super cycle of *commodity* prices and in the strength of foreign (regional and extra-regional) demand, and it was accompanied by structural policies and reforms that helped to install a favorable business climate.

The economic policy implemented since 2005 attempted in the first place to create a framework capable of reducing those macroeconomic fragilities that had amplified the effects of external shocks in 1982 and 2002. The pillars of the strategy were: to consolidate exchange-rate flexibility, to reduce financial vulnerability of the public sector and to strengthen the prudential regulation of the financial system. For this, the macroeconomic-policy scheme adopted was based on inflation targets, the consolidation of a primary fiscal surplus until 2011 (Figure 8) and the strengthening of the management of assets and liabilities of the public sector (in particular public debt) (Table 1).

In parallel, the Central Bank strengthened the banking regulation aimed at managing the risks of currency mismatch and liquidity, improving capital requirements and reducing exposure to non-resident operations. The combination of a favorable external environment with a macroeconomic policy framework oriented to managing risks returned the investment grade to Uruguay's public debt in 2012.

The sustained growth of aggregate demand in the entire period, but especially after 2007, stressed prices in two ways. On the one hand, inflation remained almost always higher than the official target. On the other hand, intense appreciation of the real exchange rate

took place, which eventually affected competitiveness, especially with Argentina and Brazil since 2014 (Figure 7).

Another contribution to this was an increasingly inconsistent management of policy instruments since 2012. Given the weakness of the monetary channel to influence aggregate demand, the fiscal policy was not contractionary during the expansive phase of the cycle, while the wage policy attempted higher nominal rigidity in a context of full employment. Consequently, on the one hand the primary fiscal result began to deteriorate as a result of the sustained expansion of central government spending and, especially, of a lower contribution of public companies to the consolidated fiscal result of the public sector (Figure 8). On the other hand, collective bargaining among employers, workers and the government fixed indexed schemes that favored inflationary inertia[14]. All this contributed to the end of the *golden years* with the consolidation of three imbalances: the external sector, public finances and the price system (inflation and real exchange rate).

Table 1

	% of gross public debt	
	2001	**2014**
Debt with maturity < 1 year	13,1%	12,2%
Foreign-currency debt	82,2%	43,7%
Local-currency debt	17,8%	56,3%
Fixed-rate debt	43,2%	78,9%
Floating-rate debt	38,2%	15,1%

Source: Central Bank of Uruguay

In brief, between 2005 and 2014 the government managed to reduce those vulnerabilities that in the past have amplified external shocks. Among them are the lack of commitment on the variation of the exchange rate, the improvement of the public-debt profile (maturities, currency denominations and interest rates), the strengthening of banking supervision and regulation mechanisms and the consolidation of a high stock of Central Bank reserves (Table 1, Figure 10 and Figure 12). However, the appreciation of the real exchange rate between 2008 and 2013 may be underestimating, as it occurred in 1982 and 2002, the vulnerability of the public debt to a depreciation of the real exchange rate (Figure 13).

3. Conceptual Framework

Following we present the analytical framework used to describe fiscal constraints in Uruguay between 1960 and 2014. The same follows the guidelines proposed in Kehoe, Nicolini & Sargent (2013) for the study of the fiscal and monetary history of Latin America.

Sargent (1992) uses a simple model of government budget constraint to explain episodes of nominal instability (or inflationary episodes). Equation **(1)** is part of the model

[14] Collective bargaining has been active in Uruguay since 2005. Wage agreements in force since 2012 and 2013 established clauses of period adjustments based on past inflation. This, together with an inflation of 10% that triggers automatic wage increases in several sectors of the economy, resulted in a rigid nominal environment that favored inflationary inertia.

proposed in Kehoe, Nicolini and Sargent (2013). The model extends the one from Sargent (1992) including debt denominated in foreign currency and in inflation-indexed account units. B_t, b_t y b_t^* are defined as the stock of debt in nominal pesos, inflation-indexed account units and foreign currency respectively, and D_t as the primary deficit of the public sector consolidated in real terms. The M_t variable represents the stock of money, P_t the price level, E_t the nominal exchange rate and, finally, the terms R_t, r_t y r_t^* are interest rates in nominal pesos, inflation-indexed account units and foreign currency, respectively.

$$B_t + M_t + b_t P_t + b_t^* E_t = (D_t + T_T)P_t + B_{t-1}R_{t-1} + M_{t-1} + b_{t-1}r_{t-1}P_t + b_{t-1}^* r_{t-1}^* E_t \quad \textbf{(1)}$$

The left side of equation **(1)** represents the sources of financing of the consolidated public sector in period t, while the right side consists in the obligations that this sector has to face in the same period. The sources include the stock of debt in t (denominated in different currencies) plus the monetary base also in t. The obligations include the primary deficit of the public sector in t, the monetary base in $t-1$ and the public debt service calculated as the principal plus interest in $t-1$.

The term T_t, included next to the deficit, aims at gathering extraordinary transfers that occur during periods of crisis or severe fiscal constraints. This variable is calculated as the residual of the model and is the one that enables to balance sources with obligations.

Following the model of Kehoe, Nicolini & Sargent (2013), equation **(1)** can be expressed in terms of real GDP as follows[15]:

$$(\theta_t^N - \theta_{t-1}^N) + (\theta_t^r - \theta_{t-1}^r) + \xi_t(\theta_t^* - \theta_{t-1}^*) + (m_t - m_{t-1}) + m_{t-1}\left(1 - \frac{1}{g_t \pi_t}\right) =$$
$$\theta_{t-1}^N \left(\frac{R_{t-1}}{\pi_t g_t} - 1\right) + \theta_{t-1}^r \left(\frac{r_{t-1}}{g_t} - 1\right) + \theta_{t-1}^* \left[\xi_t \left(\frac{r_{t-1}^*}{g_t \pi_t^W} - 1\right)\right] + d_t + t_t \quad \textbf{(2)}$$

The first three terms on the left side of equation **(2)** (public sector sources) represent increases in the public debt-to-GDP ratio in nominal pesos, inflation-indexed account units and foreign currency, respectively. The fourth term comprises the variation of the monetary base, while the latter measures the inflation tax. The obligations of the public sector appear on the right side. The first three terms represent the real return of the debt in their respective denominations, while the last two measure the primary fiscal deficit of the public sector and the transfers estimated as a residual.

4. The budget constraint for Uruguay[16]

The *consolidated budget constraint* (CBC) for Uruguay corresponds to the entire public sector. This includes: General Government, State-Owned Enterprises and Financial Public Sector[17].

Between 1960 and 2014 the composition and the size of the CBC *of the public sector* changed (Table 2, Figure 15, Figure 16). First, the primary fiscal deficit shrinks

[15] See Annex 2 for a complete derivation.
[16] Annex 1 describes the assumptions made in the budget-constraint exercise.
[17] See Annex 1 for a complete description of the composition of the public sector.

throughout the whole period. Second, although the inflation tax drops, only between 1974 and 1985 public debt in all currencies was more relevant as a financing source. Third, chronic inflation determined that public debt was mostly denominated in foreign currency, especially from the second half of the 1970s with the integration of Uruguay in the international economy and greater access to financial markets (Figure 12). As a result, the financial vulnerability of the public sector increased, which became relevant during the debt crises of 1982 and 2002. Fourth, the high interest payments in 1974-2003 were associated with these two crises. Lastly, since 2004 the budget constraint decreased significantly due to the consolidation of a primary surplus and a declining public debt-to-GDP ratio.

Figure 15

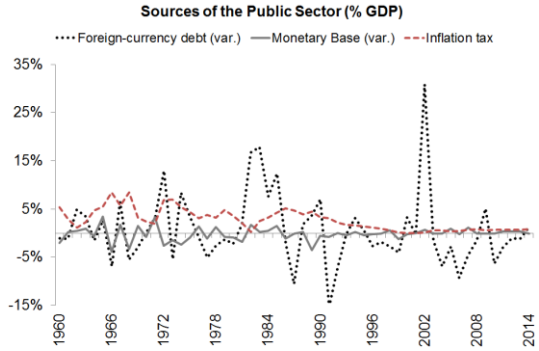
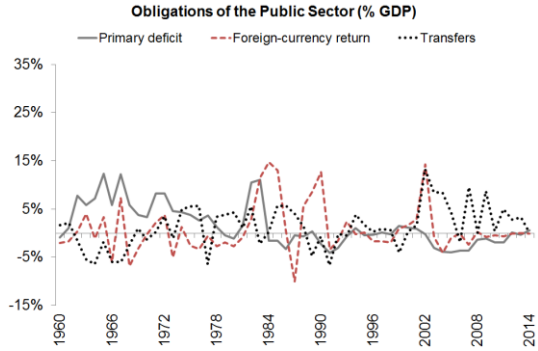


Figure 16



4.1 Sources

The monetization and the inflationary financing of fiscal deficits (***monetary issuance plus inflation tax***) fell throughout the whole period. Between 1960 and 1973 the economy was closed, so the main source to finance fiscal deficits was the inflation tax. The reasons for this were an insufficient domestic savings as a result (also) of the inflation and the limited access to international financial markets. After the mid 1980s, the greater access to alternative sources and the lower propensity of governments to finance fiscal deficits with inflation (Figure 6) limited the use of inflation tax.

Table 2

Consolidated Budget Constraint of the Public Sector: 1960-2014 (% GDP)

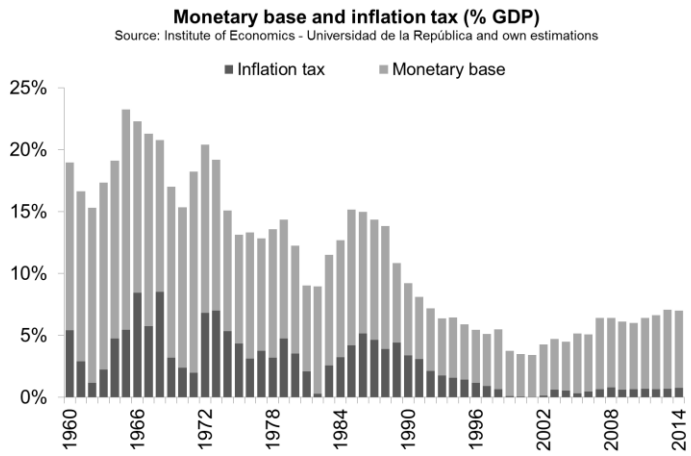
	1960-1973	1974-1985	1986-2003	2004-2014
Sources				
Local-currency public debt (Δ)	-1,1%	0,0%	0,2%	0,7%
Foreign-currency public debt (Δ)	0,7%	4,7%	0,1%	-2,8%
Inflation-indexed public debt (Δ)	-	-	0,2%	1,6%
Monetary base (Δ)	-0,2%	-0,1%	-0,4%	0,2%
Inflation tax	4,7%	3,4%	1,9%	0,6%
Total	**4,0%**	**7,9%**	**2,1%**	**0,3%**
Obligations				
Public-sector primary deficit	6,1%	2,9%	-0,8%	-1,9%
Local-currency return	-	-	-	-0,1%
Foreign-currency return	-0,4%	2,4%	1,6%	-0,9%
Inflation-indexed return	-	-	-0,1%	-0,5%
Transfers*	-1,7%	2,6%	1,4%	3,7%
Total	**4,0%**	**7,9%**	**2,1%**	**0,3%**

**Estimated as a residual*

Source: based on Kehoe, Nicolini & Sargent (2013)

In the last decade, the consolidation of a lower inflation rate resulted in a substantial decrease of the inflation tax as a source of deficit financing. This has favored a moderate remonetization of the economy (Figure 17).

Figure 17



It was not until between 2004 and 2014 that the share of ***public debt denominated in foreign currency*** shrinks due to the progressive replacement with ***public debt denominated in local currency*** (Table 2, Figure 12) [18]. The policies to maintain the annual inflation rate below 10%, the appreciation of the real exchange rate until April 2013 and the debt dedollarization, stimulated portfolio changes towards instruments in pesos. As a result, the financial vulnerability of the public sector was reduced, which is essential to defend macroeconomic stability. However, public debt corrected by the real

[18] If we exclude 1991 and 1992, public debt denominated in foreign currency increased 1.5 points of GDP on average between 1986 and 2003 (instead of remaining stable as shown in Table 2). In those two years, public debt denominated in foreign currency shrunk due to the Brady Plan.

exchange rate shows that the public debt/GDP ratio is greater than the uncorrected one (Figure 13).

4.2 Obligations

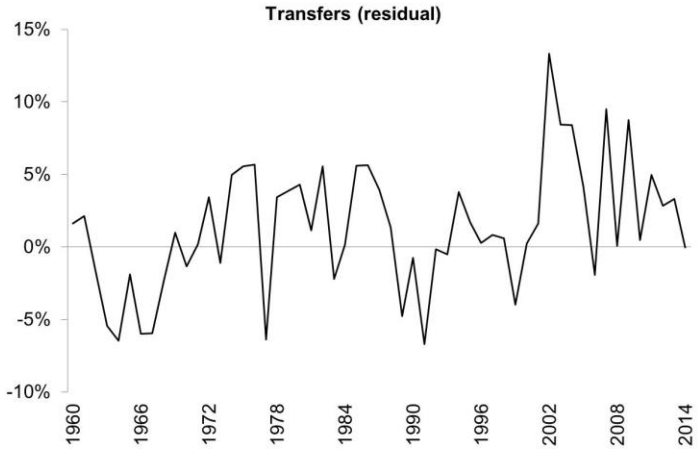
The ***primary fiscal deficit*** of the public sector shows a decreasing trend since the second half of the 1970s. With the exception of the record of the 1982 crisis, since the 1990s primary deficits became substantially lower in relation to the closed-economy period. However, only after 2003 primary surpluses seem to consolidate (Figure 8).

Given the high share of dollar-denominated public debt, currency devaluations in 1982 and 2002 severely weakened public finances. This is the reason why the returns of public debt in foreign currency were one of the components that contributed the most to the budget constrain during 1974-1985 and 1986 – 2003 (Table 2).

In contrast, ***transfers*** (t_t) exhibit an erratic trajectory, although the sign that prevails since 1974 is positive (Figure 18). By definition, this variable includes all transfers that occur during periods of severe fiscal constraints (Kehoe, Nicolini & Sargent, 2013). When there is a negative sign, *sources* are insufficient to finance *obligations*. Conversely, when the sign is positive, *sources* exceed *obligations*.

Some assumptions are proposed to help explain the magnitude and the sign of the *transfers* in some years. In any case, it should not be forgotten that, by construction, the variable *transfers* includes all the estimation errors contained in the rest of the variables[19]. That is, their trend may also reflect measurement problems.

Figure 18



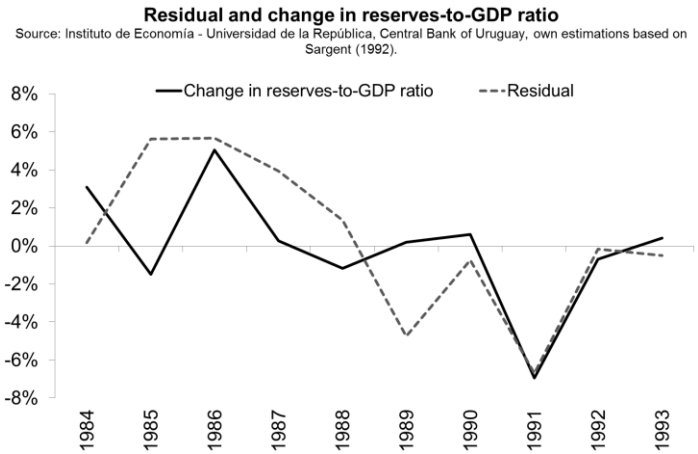
The negative sign of *transfers* during 1960 is mainly explained by the period 1963-1968, when a series of quasi-fiscal operations occurred. Some of them provided financial assistance to the non-financial public sector. For example, the Banco República[20] granted loans without cost (zero interest rate) to the Treasury up to 1/6 of the national budget. At the same time, given the restrictions on liquid international reserves, the Central Bank had

[19] As mentioned before, the variable is estimated as a residual.
[20] Before 1967 Banco República was the state-owned commercial bank as well as the monetary authority.

to make financial swaps that negatively affected the parafiscal result[21] [22]. Because none of the two examples can be counted as a *source*, both are included in the *transfers* with a negative sign[23].

As we mentioned, significant *transfers* with a positive sign reflected increases in public debt whose destination was none of the *obligations* included. For example, an increase in the stock of international reserves held by the Central Bank or an increase in reserve requirements of the banking system[24]. To solve this issue in this version of the paper we proceed as follows. First, we compare the trends of the trasnfers and the change in the Central Bank reserves over GDP between 1984 and 1993. As it can be seen, the behavior of the two variables was very similar. This means that, at least for these years, the transfers were mainly explained by the increase of Central Bank reserves (Figure 19).

Figure 19



Second, we use detailed official data on the financing of the public sector for the period 1994 – 2014 as this data is only avaible for these years. Such data are divided into *monetary liabilities*, *public debt* (loans and government securities), *net deposits, financial assets and other extraordinary transfers*[25]. Strictly speaking, only the first two are included as sources of financing in the CBC exercise. This implies that the CBC exercise registers concepts on the *sources* side that have no offsetting entry on the *obligations* side. A first example is that of *net deposits* that include reserve requirements of commercial banks deposited at the Central Bank. These are a liability to the public sector (an increase in public debt) but have no offsetting entry on the *obligations*. A second example is that of *financial assets*. By construction, in the CBC, the financing for the purchase of reserve assets of the Central Bank and the Treasury is recorded under *sources*, but its offsetting

[21]Agreements to purchase foreign currency at a rate lower than the market with 6-month resale agreements under equal terms. The repurchase resulted in an exchange difference that was the hedge to delay the devaluation of the revenue-expenditure mismatch (Banda & Onandi, 1992).

[22] The stock of international reserves held by the monetary authority was negative in 1964 and 1965 and close to zero in 1966 and 1967 (Figure 10).

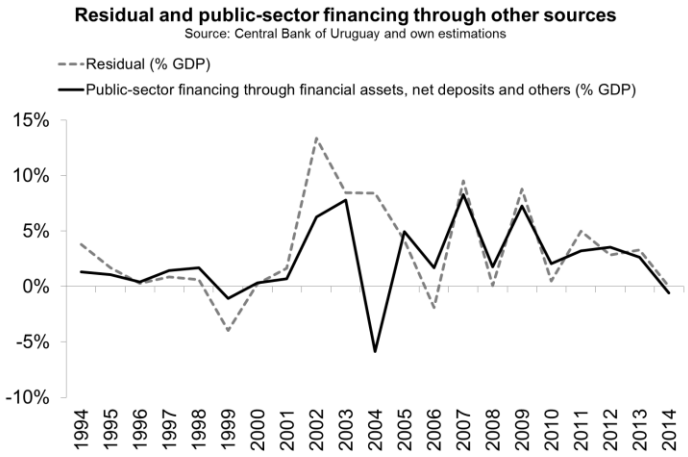
[23] The negative value of the *transfers* in 1977, 1983, 1989 and 1991, will be explored in following versions of this paper using Central Bank reserves and reserve requirements of commercial banks.

[24] To avoid this limitation, as Felipe Meza suggested during the Workshop at the Univeristy of Chicago in January 8, the change in Central Bank reserves could also be included in the *obligations* side of the equation of CBC. In the same direction, we propose to include another term in the *obligations* side for the reserve requirements of commercial banks. We will try to introduce these changes in following versions of this paper.

[25] See Annex 1 for a detailed description of these terms.

entry is not recorded under any of the items comprising the *obligations*. Therefore, in both cases, the CBC exercise could be overestimating (underestimating) the *sources* with respect to the *obligations*. If that is the case, the level of *transfers* of the CBC exercise might be overestimated (underestimated). As Figure 20 shows, the *transfers* were almost completely explain by public financial assets, net deposits and others extroradinary transfers[26].

Figure 20



5. Conclusions

High inflation in the 1960s was associated with sustained fiscal deficits. Since the second half of the 1970s, the opening of the economy, the financial liberalization and the use of the stabilization plans, were limiting the discretionary management of the economic policy, which resulted in less inflationary financing of fiscal deficits. Although the inflation level significantly declined during the whole period, the inflation tax was still important to finance fiscal deficits.

During the second half of 20th century, financial vulnerability of the public sector grew because of public-debt dollarization. In contrast, in the last decade primary fiscal surpluses and the lower share of foreign-currency public debt in the financing of the public sector, reduced such vulnerability.

Between 1985 and 2014 Uruguay reduced its budget constraint and improved its fiscal balance. Evidence suggests that in the last three decades governments have slowly understood the importance of fiscal constraints.

A lesson learned of the recent fiscal and monetary history of Uruguay is that the weak transmission mechanisms of monetary policy and the need for exchange-rate flexibility to manage frequent external shocks, turn fiscal balance into the anchor of macroeconomic stability.

[26] Operations associated with the consequences of the 2002 crisis erode the explanatory power of these three categories with respect to the evolution of transfers between 2002 and 2005.

6. Agenda

Improving the quality of the data used to estimate the CBC model is the first priority in the immediate line of work. This requires, first, collecting new information on the stock of debt denominated in foreign currency for 1960 and for the 1963-1969 period and, second, extending the price index of tradable goods of Cancelo et al. (1994) which is included in Aboal (2003) and was used to estimate the real exchange rate series in this paper[27]. In addition, it will be necessary to have a better understanding of the composition of the estimations for fiscal deficits, especially for those periods where these estimations were joined with official data[28].

Secondly, the agenda is intended to move forward to estimate the other models proposed in the conceptual framework of Kehoe, Nicolini & Sargent (2013).

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[27] A linear evolution of the stock was used in this version of the paper for the years where data is missing and the US CPI was used as an approximation to the price index of tradable goods in dollars (P_t^W).
[28] See Annex 1.

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Annex 1 Description of data and variables

Public Sector

The definition of Public Sector used in this paper comprises: i) General Government that include: Central Government and Local Governments; ii) State-Owned Enterprises that include: Fuel, Electricity, Telecommunications, Water, Insurance, Railway, Ports; iii) Financial Public Sector that include: Central Bank, Commercial Bank and Mortgage Bank.

Consumer Price Index for Uruguay

The Consumer Price Index (CPI) comes from the National Statistics Institute (INE) for the entire period. The figure corresponds to the year-end figure.

Gross Domestic Product

Two sources are considered for the Gross Domestic Product (GDP) in nominal terms: Bonino et al. (2012) for the period 1959 to 2008 based on data from the Central Bank of Uruguay, and the series of National Accounts of the Central Bank of Uruguay (BCU) for the period 2009-2014.

INE's CPI is used as a deflator to calculate real GDP. Although the Central Bank published a deflator index for GDP since 1999, and an implied deflator can be extracted from Bonino et al. (2012) for the remaining years, in this version we have chosen to use the CPI as the deflator for GDP so as to be consistent with the conceptual framework in Kehoe, Nicolini & Sargent (2013).

Nominal exchange rate

The nominal exchange rate is the value of the US dollar measured in Uruguayan pesos in December of each year. The exchange rate used for the 1968-2014 period comes from the National Institute of Statistics, while for the period 1959-1967 it comes from the Institute of Economics (IECON) of Universidad de la República based on Maubrigades, S. (2003).

US Consumer Price Index

The US Consumer Price Index comes from the Bureau of Labor Statistics of the United States and corresponds to the year-end figure. It was used as an approximation of the price index of tradable goods in dollars (P_t^W).

Bilateral real exchange rate Uruguay - United States

The series of the bilateral real exchange rate Uruguay - United States is an extension of the estimation of Aboal D. (2003).

Public debt

This series corresponds to the stock of public debt denominated in local currency, foreign currency and inflation-indexed units issued by the Central Government (CG), state-owned enterprises (SOE's), local governments and the Central Bank. The historical series of the Institute of Economics were used for the 1959-1998 period, while since 1999 data come from the Central Bank under different denominations (pesos, dollars, euros, yen, special drawing rights, inflation indexed units and others). For the year 1960 and the period from 1963 to 1966 there is no data on public debt denominated in foreign currency, so a linear evolution of this stock was assumed between 1959 and 1961 and between 1963 and 1966.

Public debt adjusted by real exchange rate

The public debt-GDP ratio is adjusted by the real exchange rate as follows. The debt is comprised by a stock in local currency and another one in foreign currency. Both domestic-currency debt and GDP are expressed in constant currency using the CPI as the deflator for Uruguay. Foreign-currency debt is first adjusted by US CPI and then expressed in pesos using the nominal exchange rate of the year 2008. This year was

chosen as in 2008 the bilateral real exchange rates of Uruguay with respect to Brazil, Argentina and the United States were all close to the long-term averages (1913-2014).

Monetary base

For the period 1959-2001 the monetary base series comes from Institute of Economics, and since 2002 the data are from the Central Bank. The figure corresponds to the year-end figure.

Overall fiscal deficit of the Public Sector

Given that there is no single estimation that covers the entire period (1960-2014), the series of fiscal deficit of the consolidated public sector was built by using different estimations. Band & Onandi (1992) was used for the 1959-1991 period, Borchardt et al (2000) for 1992-1996 and Licandro & Vicente (2007) for 1997 and 1998. Since 1999 data come from the Ministry of Economy and Finance.

Interest payments

Between 1959 and 1973, data were obtained from the Institute of Economics and correspond only to the Central Government. The estimations in Borchardt et al. (2000) were considered for the period 1974-1996 and correspond to the entire public sector. Because official data begin in 1999, interest payments from the Institute of Economics are used for 1997 and 1998.

Primary fiscal deficit of the Public Sector

The primary deficit of the consolidated public sector was calculated as the difference between the overall and the interest payments. However, considering the construction of interest payments, the primary deficit from 1959 to 1973 and from 1997 to 1998 is very likely to be overestimated (for these years only interest payments made by the Central Government can be considered, which excludes other relevant actors of the Public Sector such as the SOE's and the Central Bank).

Interest rates on public debt

Average interest rates for each currency are available only since 2004 once the Debt Management Unit was created. Therefore, in order to estimate these rates for the period 1959-2003, the following assumptions are made.

Between 1959 and 1998, although data on interest rates are not available, it was possible to estimate an *implicit interest rate* by calculating the ratio of interest payments in t over the stock of public debt in $t-1$. Since in this period 90% of the debt was denominated in foreign currency (mostly dollars), it is assumed that the entire stock of public debt was denominated in that currency and that, therefore, the implicit interest rate corresponds to the interest rate paid on the debt denominated in dollars.

Between 1999 and 2003, it is still assumed that the entire stock of public debt was denominated in foreign currency. Given that data on public debt by currency are available since 1999, an interest rate in foreign currency was built by weighting the interest rates in *special drawing rights* and *dollars* by their respective shares in the total stock of public debt. The dollar interest rate is calculated as the ratio of the residual of the amount of interest payments (the total interest payments less those in SDRs) over the dollar-denominated debt.

Between 2004 and 2014, the interest rates by currency are the ones published by the Debt Management Unit. An interest rate in foreign currency was built by weighting the rates in dollars, yen, euro and SDRs by their respective shares in the total stock of public debt.

Financing of the Public Sector

According to Central Bank data, Uruguay's Public Sector is financed, besides public debt and loans, by net deposits, financial assets and other extraordinary transfers.

Net deposits include “net deposits of the non-financial public sector at commercial banks”, “net deposits of commercial banks at the Central Bank” and “the assistance of the Central Bank to commercial banks in 2002”.
Financial assets “correspond to the financing through financial assets since January 2007” and before this date such financing is “net of reserve liabilities and assistance of the Central Government to commercial banks through its account at the Central Bank”.
Other extraordinary transfers comprise: “deposits at the Central Bank and export currencies to be claimed by the Non-Financial Public Sector”, “internal suppliers of the Non-Financial Public Sector”, “cash, foreign deposits and tenure of private securities held by the Non-Financial Public Sector, “counterpart of transfers of stand-by loans from the Central Bank to the Central Government in 2002”, “counterpart of 2,800,000,000 million pesos of an agreement between Banco Hipotecario, Banco República and the Central Government in July 2004” and “Government´s deposits at Central-Bank special accounts since May 2005 due to international issuance of public debt”.

Annex 2 Complete derivation of the consolidated budget constraint of the public sector (Sargent, 1992)

The Budget constraint is defined as follows:

$$B_t + M_t + b_t P_t + b_t^* E_t = (D_t + T_T)P_t + B_{t-1}R_{t-1} + M_{t-1} + b_{t-1}r_{t-1}P_t + b_{t-1}^* r_{t-1}^* E_t \quad (\mathbf{1})$$

The left hand side of equation **(1)** represents the sources of financing of the consolidated public sector in period t, while the right hand side includes the obligations that this sector has to face in the same period. The sources include the stock of debt in t (denominated in different currencies) plus the monetary base also in t. The obligations include the primary deficit of the public sector consolidated in t, the monetary base in $t-1$ and the public debt service calculated as the principal plus interest payments in $t-1$.

The term T_t, included next to the deficit, gathers extraordinary transfers that occur during periods of crisis or severe fiscal constraints. This variable is calculated as a residual and is the one that enables to balance sources with obligations.

By dividing equation **(1)** by nominal GDP the following is obtained:

$$\frac{B_t}{y_t P_t} - \frac{M_t}{y_t P_t} + \frac{b_t}{y_t} + \frac{b_t^* E_t}{y_t P_t} = \frac{(D_t + T_t)}{y_t} + \frac{B_{t-1}R_{t-1}}{y_t P_t} + \frac{M_{t-1}}{y_t P_t} + \frac{b_{t-1}r_{t-1}}{y_t} + \frac{b_{t-1}^* r_{t-1}^* E_t}{y_t P_t} \quad (\mathbf{3})$$

The level of domestic prices is defined as follows:

$$P_t = \left(P_t^h\right)^{\alpha} (P_t^W E_t)^{1-\alpha} \quad (\mathbf{4})$$

where P_t^h is the price level of non-tradable goods, P_t^W is the price level in dollars of tradable goods and α is the share of non-tradable goods in the domestic deflator. Therefore,

$$\frac{E_t}{P_t} = \frac{E_t}{\left(P_t^h\right)^{\alpha} (P_t^W E_t)^{1-\alpha}} = \frac{E_t}{\left(\frac{P_t^h}{P_t^W E_t}\right)^{\alpha} P_t^W E_t} = \frac{\xi_t}{P_t^W} \quad (\mathbf{5})$$

where ξ_t is the real exchange rate.

If the following variables are defined as

$$\theta_t^N = \frac{B_t}{y_t P_t}, \theta_t^r = \frac{b_t}{y_t}, \theta_t^* = \frac{\frac{b_t^*}{P_t^W}}{y_t}, m_t = \frac{M_t}{y_t P_t}, \pi_t = \frac{P_t}{P_{t-1}}, \pi_t^W = \frac{P_t^W}{P_{t-1}^W}, g_t = \frac{y_t}{y_{t-1}}, d_t = \frac{(D_t + T_t)}{y_t} \quad (\mathbf{6})$$

the budget constraint can be expressed as follows:

$$\theta_t^N + m_t + \theta_t^r + \theta_t^* \xi_t = d_t + \theta_{t-1}^N \frac{R_{t-1}}{\pi_t g_t} + \frac{m_{t-1}}{\pi_t g_t} + \theta_{t-1}^r \frac{r_{t-1}}{g_t} + \theta_{t-1}^* \frac{r_{t-1}^*}{\pi_t^W g_t} \xi_t \quad (\mathbf{7})$$

This equation can be reformulated so that:

$$\left(\theta_t^N - \theta_{t-1}^N \frac{R_{t-1}}{\pi_t g_t}\right) + \left(m_t - \frac{m_{t-1}}{\pi_t g_t}\right) + \left(\theta_t^r - \theta_{t-1}^r \frac{r_{t-1}}{g_t}\right) + \left(\theta_t^* \xi_t - \theta_{t-1}^* \frac{r_{t-1}^*}{\pi_t^W g_t} \xi_t\right) = d_t \quad (\mathbf{8})$$

By analyzing each of the terms the following result is obtained:

$$\left(\theta_t^N - \theta_{t-1}^N \frac{R_{t-1}}{\pi_t g_t}\right) = \left(\theta_t^N - \theta_{t-1}^N + \theta_{t-1}^N - \theta_{t-1}^N \frac{R_{t-1}}{\pi_t g_t}\right) = (\theta_t^N - \theta_{t-1}^N) - \theta_{t-1}^N \left(\frac{R_{t-1}}{\pi_t g_t} - 1\right) \quad (\mathbf{9})$$

$$\left(m_t - \frac{m_{t-1}}{\pi_t g_t}\right) = \left(m_t - m_{t-1} + m_{t-1} - \frac{m_{t-1}}{\pi_t g_t}\right) = (m_t - m_{t-1}) - m_{t-1}\left(\frac{1}{\pi_t g_t} - 1\right) \quad (\mathbf{10})$$

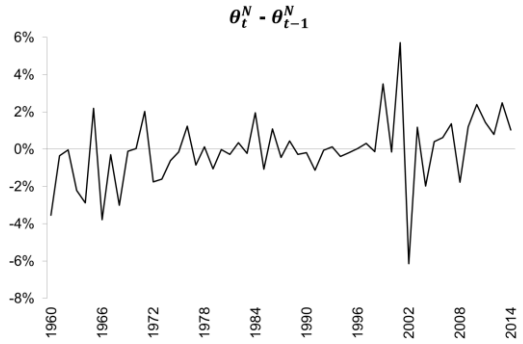
$$\left(\theta_t^r - \theta_{t-1}^r \frac{r_{t-1}}{g_t}\right) = \left(\theta_t^r - \theta_{t-1}^r + \theta_{t-1}^r - \theta_{t-1}^r \frac{r_{t-1}}{g_t}\right) = (\theta_t^r - \theta_{t-1}^r) - \theta_{t-1}^r \left(\frac{r_{t-1}}{g_t} - 1\right) \quad (\mathbf{11})$$

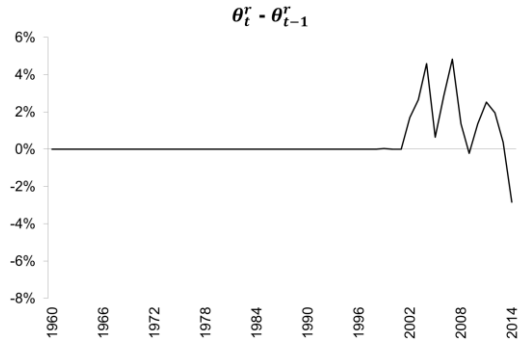
$$\left(\theta_t^* \xi_t - \theta_{t-1}^* \frac{r_{t-1}^*}{\pi_t^W g_t} \xi_t\right) = \xi_t \left(\theta_t^* - \theta_{t-1}^* + \theta_{t-1}^* - \theta_{t-1}^* \frac{r_{t-1}^*}{\pi_t^W g_t}\right) = \xi_t(\theta_t^* - \theta_{t-1}^*) - \xi_t \theta_{t-1}^* \left(\frac{r_{t-1}^*}{\pi_t^W g_t} - 1\right) \quad (\mathbf{12})$$

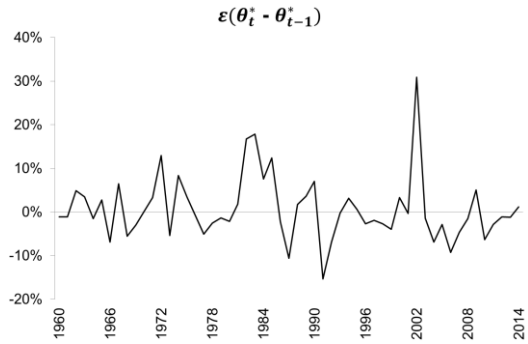
Therefore, the budget constraint can be expressed as:

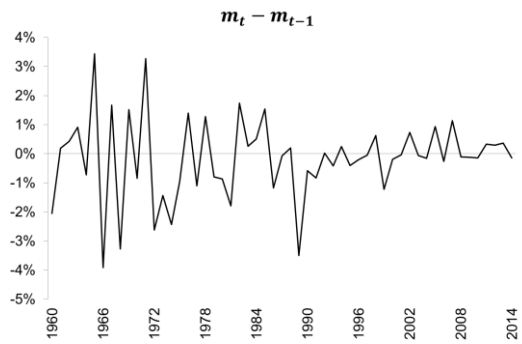
$$(\theta_t^N - \theta_{t-1}^N) + (\theta_t^r - \theta_{t-1}^r) + \xi_t(\theta_t^* - \theta_{t-1}^*) + (m_t - m_{t-1}) + m_{t-1}\left(1 - \frac{1}{\pi_t g_t}\right) = \theta_{t-1}^N \left(\frac{R_{t-1}}{\pi_t g_t} - 1\right) + \theta_{t-1}^r \left(\frac{r_{t-1}}{g_t} - 1\right) + \theta_{t-1}^* \left[\xi_t \left(\frac{r_{t-1}^*}{\pi_t^W g_t} - 1\right)\right] + d_t \quad (\mathbf{2})$$

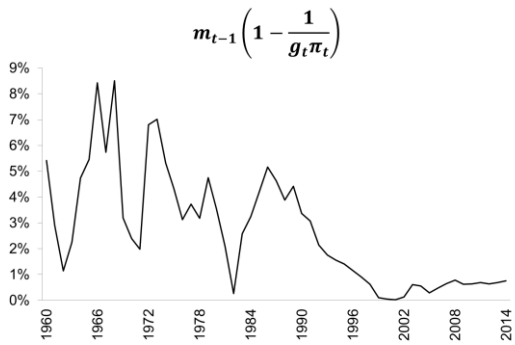
Annex 3 Results of the consolidated budget-constraint model for the public sector (Sargent, 1992)

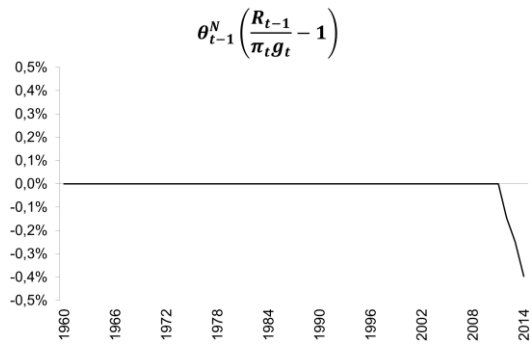


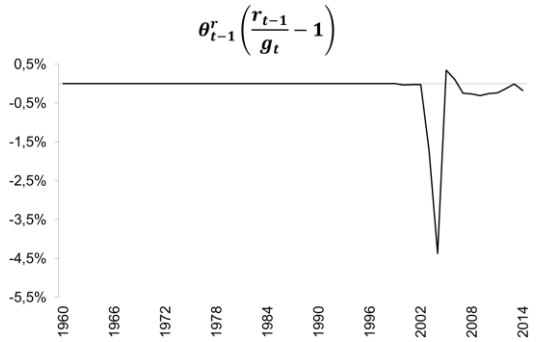











$\theta^r_{t-1}\left(\frac{r_{t-1}}{g_t}-1\right)$
0,5%
-0,5%
-1,5%
-2,5%
-3,5%
-4,5%
-5,5%
1960
1966
1972
1978
1984
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2002
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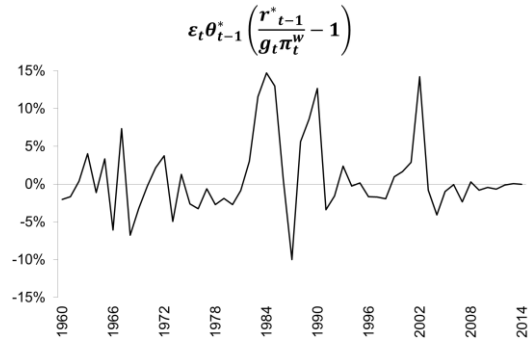
$\varepsilon_t\theta^*_{t-1}\left(\frac{r^*_{t-1}}{g_t\pi^w_t}-1\right)$
15%
10%
5%
0%
-5%
-10%
-15%
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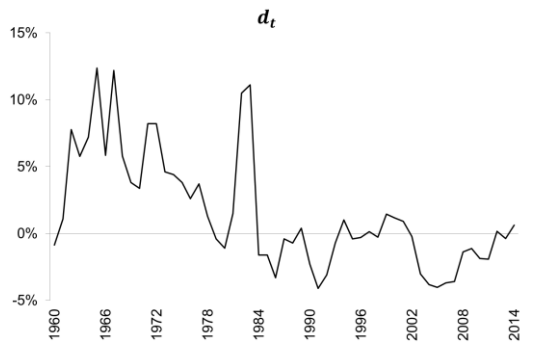
1966
1972
1978
1984
1990
1996
2002
2008
2014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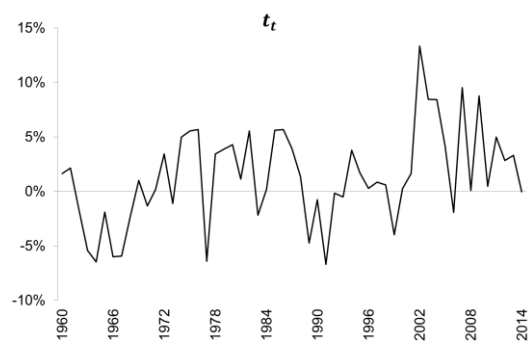
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2014

Annex 4 Model of balance-of-payments crisis (Krugman, 1979)

Assuming α=0 (share of non-tradable goods in the basket), the purchasing power parity can be represented as:

$$P_t = P_t^w . e_t \qquad \textbf{(13)}$$

where P_t is the domestic price level in period t, P_t^w is the price level of tradable goods in t and e_t is the nominal exchange rate in t. Equation **(13)** indicates that, in a context of a fixed exchange rate, the price level is determined by the prices of tradable goods expressed in dollars.

Assuming that the demand for money can be represented by:

$$M_t . v = P_t y_t \qquad \textbf{(14)}$$

where v is the velocity of money assumed constant and y_t is the real GDP determined as an exogenous variable. Therefore, the monetary base is the relevant monetary aggregate, which from the sheet of the Central Bank is defined as:

$$M_t = F_t + DC_t \qquad \textbf{(15)}$$

where F_t is the stock of international reserves held by the Central Bank and DC_t is the stock of domestic credit.

Krugman's argument (1979) is that sustained fiscal deficits within a context of restrictions to external financing force the Central Bank to increase domestic credit. Under a fixed exchange rate, the increase of domestic credit leads to a loss of international reserves, which may cause a balance-of-payment crisis, currency devaluation and rising inflation.