Monetary and fiscal policies coordination under federalism*

Fabiana Rocha[§]
Ronald Hillbrecht[¤]

RESUMO

O propósito do trabalho é mostrar que, dadas as suas características, o federalismo brasileiro implica déficits estaduais crescentes, minando a capacidade do governo central de perseguir a estabilidade macroeconômica. Um modelo simples é desenvolvido para mostrar que, sob certas condições, a descentralização gera maior dívida agregada e inflação do que ocorreria sob a coordenação do governo federal. Um teste para avaliar o processo gerador do estoque das dívidas estaduais é implementado, buscando verificar as condições de solvência dos governos estaduais. Verificou-se que os Estados de São Paulo, Rio de Janeiro e Rio Grande do Sul apresentam trajetórias de dívida insustentáveis, o mesmo não acontecendo com Minas Gerais. Sob essas condições institucionais, o federalismo brasileiro não contribui para a estabilidade macroeconômica. A privatização dos bancos estaduais, a limitação do déficit e da dívida dos governos estaduais e o aumento da independência do Banco Central devem ser considerados conjuntamente como importantes mudanças institucionais para a melhoria da gestão macroeconômica no Brasil.

Palavras-chave: federalismo, dívida estadual, inflação

ABSTRACT

The purpose of this paper is to show that, given its characteristics, the Brazilian federalism implies increasing debts at state level, undermining the central government ability to pursue macroeconomic stability. A simple model is developed to show that under certain conditions, decentralized policy making generates higher aggregate debt and inflation than under coordination at the federal government level. It is also shown that this aggregate debt is an increasing function of the degree of expected future monetization. In order to verify the solvency condition of state governments, a test that evaluates the generating process of the stock of states' debts is implemented. It was found that for the states of São Paulo, Rio de Janeiro, and Rio Grande do Sul the time paths of the debts are unsustainable. Brazilian federalism does not enhance long run macroeconomic stability, and a major reform that promotes a wide and clear separation of monetary and fiscal policies is yet to come. Privatizing government financial institutions, limiting states' debts and deficits, and increasing the Central Bank's independence should altogether be considered important institutional changes to promote sound macroeconomic management in Brazil.

Key-words: federalism, state debt, inflation

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1 Introduction

Fiscal federalism has been imposing severe difficulties to a more permanent fiscal adjustment in Brazil. This is especially true after the 1988 Constitution. It constrained the central government by the obligation to transfer to states and local governments a substantial part of its tax revenues, but it did not impose any effective limitations on their spending programs. The consequence is that the central government fiscal austerity efforts have been partly offset by lower level governments overspending. Werneck (1995) points out that this overspending seriously affects the making of monetary policy, since part of this overspending has been financed by state-owned financial institutions - state banks - that are recurrently bailed out by the Central Bank. The mechanisms through which state governments increase current spending using their banks are well described in Werlang and Fraga (1995), Novaes and Werlang (1995), and Hillbrecht (1995), and are: i) the states issue low rating bonds, and the Central Bank swaps them for higher rating federal paper, reducing the states' costs to finance their outstanding debts, ii) state banks get discount loans and do not honor subsequent obligations, and iii) state banks do not hold the minimum amount of required reserves. Since the Central Bank enjoys low independence, it is politically pressured by state governments to rescue their financial institutions. The existence of state-owned financial institutions together with a low degree of Central Bank independence narrow the separation of fiscal and monetary policies, and imposes difficulties to sound macroeconomic management in Brazil. The aggregate debt of Brazilian states not only increased through the 1980's and 1990's, but it has become an important part of the fiscal management problem in Brazil, being roughly one third of total government debt since 1993. Recurrent bail-outs of state banks are a source of inflationary bias in the Brazilian economy.

The purpose of this article is twofold. First, we develop a simple model where states in a federation determine without coordination their spending patterns following an institutional rule that allows them to monetize partially their debts. Second, we verify if the time path of states' expenditure, revenue, and debt is consistent with the assumption of intertemporal budget balance. More precisely, we test the solvency condition of state governments, and the difficulties imposed by it on fiscal adjustment in Brazil.

The article is organized as follows. In section 2 we develop the theoretical model. It is shown that the higher the degree of fiscal dominance, the higher are the equilibrium inflation and the aggregate debt. Furthermore, the bigger the number of states in a federation that have access to inflationary revenues, the bigger are the equilibrium inflation and aggregate debt when compared to the equilibrium where coordination is performed by the center. In section 3 we perform the empirical tests. In order to check if the intertemporal states borrowing constraints

hold in present value terms we evaluate the generating processes of the stock of states' debts. The states of São Paulo, Minas Gerais, Rio de Janeiro, and Rio Grande do Sul were chosen to compose our sample because their debts add up to more than 90% of total state debt. The conclusions are presented in section 4. Some institutional reforms to provide long-term macroeconomic stability in Brazil are also suggested.

2 Monetary and fiscal policies coordination under federalism: a theoretical model

We develop a model that uses the basic structure given in Tabellini (1988), but generalizes the results incorporating the insights in Werlang and Novaes (1995) and Hillbrecht (1995), where there are several states in the federation with access to inflation revenues, characterizing decentralized policy making. Tabellini (1988) shows that government debt is an increasing function of the degree of monetization, which characterizes fiscal dominance in his model. Novaes and Werlang (1995) model a federation where member states incur in excessive deficits because of the recurrent bail-out of their financial institutions, which allow them to transfer their deficits to the federal government. As states can transfer their deficits to the center, they also borrow too much, leading to an inefficient equilibrium characterized by excessive deficits, debts and inflation. Their model assumes full monetization of deficits, though. Hillbrecht (1995) shows that in the presence of decentralized monetary policy making, that is, when states can compete for seigniorage and pressure politically the central bank to collect their shares, an equilibrium inflation on the wrong side of the Laffer curve (a higher than optimal inflation rate for a given level of inflationary revenue) is possible without reliance on time inconsistency. However, his model does not focus on fiscal issues, as endogenous deficits and debts.

The economy can be characterized as a small, open economy, with perfectly flexible exchange rates, and a price taker in international capital markets. Purchasing power parity is assumed as well. The time horizon is two periods. At the end of the second period all debt has to be repaid. The economy consists of a representative agent in the private sector, several states or fiscal authorities, and a central bank that accommodates the demand for inflationary revenues according to an institutional rule that gives the degree of fiscal dominance' We first describe the maximization problem faced by the private sector, then we derive the macroeconomic

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1   Tabellini (1988) shows that if the central bank and the private sector have the same welfare function, this function is decreasing in the degree of fiscal dominance. We hold the institutional rule as given only to show that decentralized policy making leads to inefficient outcomes to the private sector.

equilibrium where coordination is held at the federal level. We call this equilibrium the Pareto efficient allocation for a given institutional rule[1] Finally, we introduce the argument of decentralized policy making, and compare the outcomes.

The private sector objective function is:

$$V = \ln C_1 + \beta \ln C_2 + \ln m_1 + \beta \ln m_2 \tag{1}$$

where C_i is consumption in i, i = 1,2; m_i is the real balance held at the end of period i (it enters the utility function because of the liquidity services it provides), and $0 < \beta < 1$ represents the intertemporal preferences and is equal to $1/(1 + r)$, where r is the real interest rate prevailing in international capital markets.

The representative consumer faces the following wealth constraint:

$$W = E(1 - \tau_1) + \beta E(1 - \tau_2) + B_0 + M_0 / P_1$$
$$= C_1 + m_1(1 - \beta \Pi_2^e) + \beta C_2 + \beta m_2 \tag{2}$$

where W is his lifetime real wealth, E is the real output he is endowed with each period, which is taxed away at rates τ_1 and τ_2; B_0 and M_0 are the government debt and nominal balances he holds at the beginning of t=1, where government debt is indexed to the price level; and $\Pi_2^e = P_1 / P_2^e$ is the inverse of the expected inflation for t=2.

The consumer's problem is to maximize equation (1) subject to equation (2). The first order conditions yield the following solutions:

$$C_1 = C_2 = m_2 = \frac{W}{2(1 + \beta)}$$

$$m_1 = \frac{W}{2(1 + \beta)(1 - \beta \Pi_2^e)} \tag{3}$$

There are n states in a federation, and we will assume that the only role of the federal government is to provide coordination of fiscal policies. The fiscal authorities are modeled as Leviathans, in the sense that they care only about public spending. Their objective functions,

therefore, are:

$$U^i = \ln G_1^i + \beta \ln G_2^i \qquad (4)$$

where U_i is the objective function of the ith state and G^i is its aggregate spending.

Coordination at the center results in the joint maximization of states' objective functions. The federal government, therefore, establishes consolidated levels of public spending and debt, and splits them up equally among the states. Its objective function is:

$$\sum_{i=1}^{n} \lambda^i (\ln G_1^i + \beta \ln G_2^i) \qquad (4')$$

It is assumed that the federal government poses the same weights to each state's objective function, that is, $\lambda^i = 1/n$, $i = 1,2,...,n$.

The government intertemporal budget constraint is:

$$G_1 + B_0 = \tau_1 E + \beta B_1 + M_1/P_1 - M_0/P_1$$
$$G_2 + B_1 = \tau_2 E + M_2/P_2 - M_1/P_2 \qquad (5)$$

where $B_{0,1}$ is the aggregate debt.

In order to maximize its objective function, the federal government will choose $\tau_{1,2}$ equal to 1 and tax away all physical wealth of the private sector. To simplify matters, the fiscal deficit net of interest payments will be $g_i = G_i - E$, which from now on enters the government utility function.

The institutional rule to be followed is:

$$g_2 = -(1-\theta)B_1$$
$$M_2/P_2 - M_1/P_2 = \theta B_1 \qquad (6)$$

The institutional rule defines the degree of fiscal dominance, that is, it tells the central bank to monetize a positive fraction of government debt. The central bank thus accommodates the government demand for monetization according to this rule. The closer θ is to 1, the higher is the degree of fiscal dominance, meaning that a higher proportion of government debt is going to be monetized. By the end of period two, all debt must be repaid.

Now the macroeconomic equilibrium can be found. The demand for real balances and the price level in period 1 depend on the expected rate of inflation and on the money supply rule given by (6). From equations (3) and (6), we have

$$m_2 = \theta B_1 + m_1 \Pi_2 = \theta B_1 + \frac{m_2 \Pi_2}{1 - \beta \Pi_2^e} \tag{7}$$

Imposing rational expectations, we have

$$\Pi_2^e = \Pi = \frac{W - 2\theta(1 + \beta)B_1}{W(1 + \beta) - 2\beta\theta(1 + \beta)B_1} \tag{8}$$

Note that $\partial(\Pi)/\partial(W) > 0$, $\partial(\Pi)/\partial(\theta) < 0$, and $\partial(\Pi)/\partial(B_1) < 0$ for $\theta > 0$. The inverse of the inflation rate is positively related to the private sector's wealth, and negatively related to the stock of public debt and the degree of fiscal dominance.

The price level in period 1 is determined by the equilibrium condition in the money market:

$$\frac{1}{P_1} = \frac{m_1}{M_1} = \frac{W}{2(1 + \beta)(1 - \beta \Pi_2^e)M_1} \tag{9}$$

Defining the rate of monetary expansion as $\mu = M_1/M_0$, recalling that the private sector's endowment is entirely taxed away, and using equation (7), the price level in period 1 can be written as:

$$\frac{1}{P_1} = \frac{B_0 - 2\beta\theta B_1}{(2\mu - 1)M_0} \tag{10}$$

The price level is, therefore, increasing in θ, μ, and in B_1 if $\theta > 0$.

The government budget constraint is

$$B_1 = \frac{1}{\beta}(g_1 + B_0 - \frac{M_0}{P_1}(\mu - 1)) \tag{11}$$

or, using (10),

$$B_1 = \Phi(\mu,\theta)g_1 + \Omega(\mu,\theta)B_0$$

$$\Phi(\mu,\theta) = \frac{(2\mu - 1)}{\beta[(2\mu - 1) - 2\theta(\mu - 1)]} \tag{12}$$

$$\Omega(\mu,\theta) = \frac{\mu}{\beta[(2\mu - 1) - 2\theta(\mu - 1)]}$$

The federal government problem is to maximize (4') with respect to g_1 and g_2, subject to (6) and (12). The first order conditions imply

$$\frac{1}{g_1} = \frac{\beta(1-\theta)\Phi(\mu,\theta)}{g_2} \tag{13}$$

and the optimal aggregate debt in period 1 is

$$B_1 = \frac{\mu}{(1+\beta)[(2\mu - 1) - 2\theta(\mu - 1)]}B_0 \tag{14}$$

Thus, the optimal debt in period 1 is increasing in θ, the degree of debt monetization.

Now, instead of considering coordination at the center, we introduce the problem of decentralized policy making. The n states in the federation decide without coordination on their

spending and debt. For simplicity, we assume that each state taxes a fixed proportion of the representative consumer's wealth, $0 < \tau^i < 1$, and that $\Sigma\tau^i = 1$. The problem of the ith state is

$$\max U^i = \ln g_1^i + \ln g_2^i$$

Each state's intertemporal budget constraint is given by:

$$g_1^i + B_0^i = \beta B_1^i + \alpha^i \frac{M_1 - M_0}{P_1}$$

$$g_2^i + B_1^i = \alpha^i \frac{M_2 - M_1}{P_2} \tag{5'}$$

The institutional rule now tells the states that the central bank will monetize a fraction of their debts. It implies that

$$g_2^i = -(1-\theta)B_1^i$$

$$\alpha^i \frac{M_2 - M_1}{P_2} = \theta B_1^i \tag{6'}$$

Furthermore, to make the symmetric case we consider $B_0^i = B_0^j, \alpha^i = \alpha^j = 1/n, \forall i, j$.

The ith state budget constraint in period 1, therefore, is given by

$$B_1^i = \frac{1}{\beta}\left[g_1^i + B_0^i - \frac{M_0}{P_1}(\mu - 1)\frac{1}{n} \right] \tag{15}$$

Equations (7)-(10) define the macroeconomic equilibrium, where the price level at $t = 1$ and the expected inflation rate depends on the aggregate debt and on the degree of monetization. We can rewrite equation (10) as

$$\frac{1}{P_1} = \frac{\sum\limits_i^n B_0^i - 2\beta\theta\sum\limits_i^n B_1^i}{(2\mu - 1)M_0}$$

Substituting the equation above into (15), we find each state's budget constraint:

$$B_1^i = \Phi(\mu,\theta,n)g_1^i + \Omega(\mu,\theta,n)B_0^i + \Theta(\mu,\theta,n)\sum_{i \neq j}^n B_1^j \tag{16}$$

where

$$\Phi(\mu,\theta,n) = \frac{n(2\mu-1)}{\xi(\mu,\theta,n)}$$

$$\Omega(\mu,\theta,n) = \frac{n\mu}{\xi(\mu,\theta,n)}$$

$$\Theta(\mu,\theta,n) = \frac{2\beta\theta(\mu-1)}{\xi(\mu,\theta,n)}$$

$$\xi(\mu,\theta,n) = n\beta(2\mu-1) - 2\beta\theta(\mu-1)$$

The problem each state faces is to maximize U^i, subject to the institutional rule and the budget constraint given by (16). It is assumed that the states play Nash-Cournot and that the Central Bank accommodates and monetizes a fraction θ of each state's debt. The first order conditions for the ith state imply

$$\frac{1}{g_1^i} = \frac{\beta(1-\theta)\Phi(\mu,\theta,n)}{g_2^i} \tag{17}$$

Each state's debt in period 1 and the aggregate debt are, respectively·

$$B_1^i = \frac{\mu}{(1+\beta)(2\mu-1) - 2\theta(1+\beta n)(\mu-1)}B_0 \tag{18}$$

$$B_1 = \frac{n\mu}{(1+\beta)(2\mu-1) - 2\theta(1+\beta n)(\mu-1)}B_0 \tag{19}$$

Consider equation (19) that gives the aggregate level of debt in period 1. For n equal to 1, the model collapses to Tabellini (1988), and the aggregate debt will be equal to the solution of the coordination problem as it appears in equation (14). Moreover, it can be shown that

$\partial B_1^i / \partial n \prec 0$ and $\partial B_1^i / \partial \theta, \partial B_1 / \partial n, \partial B_1 / \partial \theta \succ 0$ for $\mu > 1$ and θ not too large. These results suggest that the larger the degree of fiscal dominance - the degree of monetization - the larger the states' debts and the aggregate debt as well. Besides, the bigger the number of states in a federation that can partially monetize their debts, the bigger is each state's debt and the larger is the aggregate debt. Finally, according to (8), inflation is positively related to n, since the partial derivatives of the inverse of the inflation rate with respect to θ and B_1 are negative for $\theta > 0$.

The intuition for the results above is straightforward. If states in a federation can monetize their debts, the aggregate government debt will be bigger than under a single fiscal authority because of an externality: each state does not bear the whole cost of its marginal debt, which is revealed by higher inflation. The bigger the number of states that can monetize their debts, the larger the externality because of the relatively smaller impact of each state's marginal debt on the inflation rate. This externality should be related to the problem of moral hazard of fiscal policies, as was pointed out by McKinnon (1995) in the context of the European Monetary Union: a high indebted state, knowing ex-ante that a bail-out - either by monetization or direct government to government lending - might be forced to avoid financial distress provoked by a government's threat to default on its debt, will not take corrective fiscal measures.

3 Testing states' fiscal policies

3.1 Econometric methodology

The results of the theoretical model indicate that when states in a federation can monetize their debts, the bigger the degree of fiscal dominance, the bigger are the states' debts, and the aggregate debt as well. Pastore (1995) and Rocha (1995) offer evidence that the federal debt is actually too high in the sense that the path of fiscal deficits requires increases in base money in order to guarantee solvency. In other terms, seigniorage adjusts exactly to fulfill the government's budget constraint. The question that remains to be answered concerns, therefore, the behavior of states fiscal policies or, more precisely, involves the sustainability of states deficit processes and the requirement that they balance their budgets in present value terms.

The solvency condition for states borrowing can be derived in the usual way. The dynamic equation, which describes the evolution of the debt of a particular state, is given by:

$$B_t = (1+r_t)B_{t-1} - S_t \tag{20}$$

where B_t is the real state internal debt, r_t is the *ex post* real interest rate, and S_t is the real non interest surplus. The surplus is defined as $R_t - G_t$, where R_t is the real revenue, and G_t constitutes real purchases of goods and services excluding interest payments on debt. Since each state in the federation has access to central bank inflation revenues, a fraction of states revenues comes from monetization of part of their debts.

Assuming the real interest rate to be constant, step-by-step forward substitution results in the intertemporal budged constraint:

$$B_t = \lim_{s \to \infty}(1+r)^{-s}B_{t+s} + \sum_{s=1}^{\infty}(1+r)^{-s}(R_{t+s} - G_{t+s}) \tag{21}$$

Taking expectations of (21) conditional on information available at time t, under the hypothesis of present value budget balance, the debt outstanding in the current period must be equal to the present value of all future surpluses:

$$B_t = \sum_{s=1}^{\infty}(1+r)^{-s}E_t(R_{t+s} - G_{t+s}) \tag{22}$$

From (21), this is mathematically equivalent to the restriction that the discounted value of the expected future stock of debt converges to zero as time goes to infinite:

$$E_t \lim_{s \to \infty}(1+r)^{-s}B_{t+s} = 0 \tag{23}$$

This condition is the so-called no-Ponzi game condition in macroeconomics literature. It rules out that the states government finance their spending by perpetual deficits. If the left hand side of (23) is greater than zero and the debt stock is greater than the future surpluses, then the state has a debt overhang problem and it is bubble financing its expenditures, with the old maturing debt being financed by new debt issues.

In recent years unit root and cointegration tests have provided useful tools in testing the long-run federal government's solvency condition.[2] We apply the methodology developed by Trehan and Walsh (1991) to evaluate the sustainability of Brazilian states'debts. We use their proposition 2 that is rewritten below:

Proposition: If $1 + r_t$ is a stochastic process strictly bounded below by $1 + \delta$ ($\delta > 0$) in expected value and $(1 - L)B_t$ is a stationary process, then the solvency condition given by equation 23 is satisfied.[3]

Therefore, only the deficit inclusive of interest is required to test if the intertemporal budget balance holds when the expected real rate of interest is allowed to vary.

First, some evidence it is necessary that the expected rate of real interest is not constant. The ex post real interest rate series seems to follow an ARMA (1,1) process:[4]

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2   Hamilton and Flavin (1986) argue that if deficits and government debt follow a stationary process then intertemporal budged balance is satisfied. Trehan and Walsh (1988; 1991), Haug (1991), and Smith and Zin (1991), on the other hand, show that intertemporal budget constraint still holds if deficits and debt are nonstationary but are cointegrated. All these tests have as assumption that the real interest rates are constant or have constant one-ahead step forecasts. Trehan and Walsh (1988; 1991) also show that when the expected real interest rate is variable, the cointegration test is no longer valid. In this case, intertemporal budget balance is satisfied if the first difference of the government debt is a stationary process, given a strictly positive expected real rate of interest. Hakkio and Rush (1992) establish as a necessary condition for the government to obey its present value budget constraint cointegration between government spending inclusive of interest payments and government revenue. Cointegration guarantees that spending and revenue do not drift far apart because their difference is stationary. Another hypothesis that is part of their empirical procedure is that the cointegrating factor of the equilibrium equation equals one. Although a value smaller than one is consistent with a strict interpretation of intertemporal budget constraint, it implies increasing difficulties in marketing the debt. When the variables are measured relative to GNP, if the cointegrating factor is smaller than one, the real value of the debt relative to GNP tends to infinity. This increases the incentive to default, and may eventually imply increasing problems for the government to market its debt. A constant expected value of the interest rate is not required as long as the real interest rate is stationary. Finally, Wilcox (1989) argues that the present value borrowing constraint holds, and so fiscal policy is sustainable, if the forecast trajectory for the discounted debt converges to zero. His test consists of two steps. First, it is necessary to check if the stock of the discounted debt is stationary. If nonstationarity is rejected, a test for a zero mean in the representation of the debt process must then be performed. Intertemporal budget balance holds if and only if the discounted debt series is stationary with zero mean. Since the test is performed using the discounted debt, no assumptions about the interest rates are necessary.

3   Stationarity of the deficit inclusive of interest ensures that the outstanding stock of debt grows at most according to a linear trend. However, given a strictly positive expected real rate of interest, the discount rate series grows exponentially. This guarantees that (23) holds.

4   We use the interest rates on federal securities (Over-Selic) deflated by the central IGP-DI at the end of the month, i.e., the geometric average of the month under consideration and the following month. The Dickey-Fuller test rejects the null hypothesis of a unit root for this series.

$$(1 - 0.944L)r_t = (1 + 0.813)e_t$$
$$(0.078) \qquad (0.130)$$

$$Q(20) = 23.18$$

The equation above implies that past values of the real interest rates have important information about its current behavior. Therefore, the hypothesis of a constant ex post real interest rate can not be considered adequate.

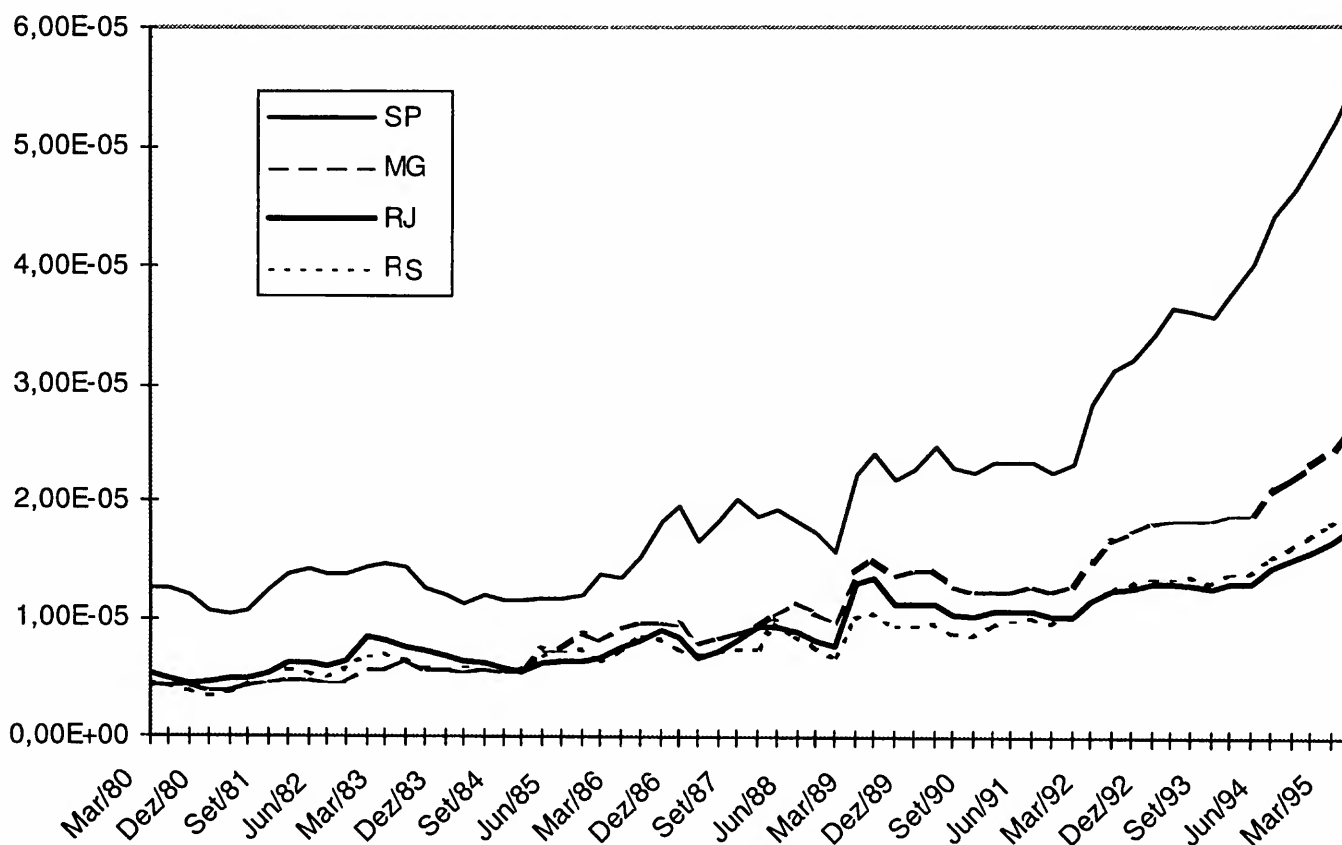Second, we use the augmented Dickey-Fuller tests to check the stationarity of the time series $(1-L)B_t$:[5]

$$(1-L)^K B_t = const + \alpha t + \beta_0 (1-L)^{K-1} B_{t-1} + \sum_{t=1}^{p} \beta_t (1-L)^K B_{t-i} + u_t \qquad (24)$$

where $K = 2$, and $H_0: \beta_0 = 0$, $H_1: \beta_0 < 0$.

If the null hypothesis is rejected, the first difference of the state debt process is stationary, and we can conclude that the solvency condition is satisfied. If not, that is, if $(1 - L)B_t$ is an $I(1)$ process, then the results indicate the existence of debt overhang. Figure 1 plots the levels of states' debts.

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5   We use quarterly value of states debt published by the Brazilian Central Bank (*Boletim do Banco Central do Brasil*, several issues). From 1980.I to 1995.II in constant prices of 1980. The tests are performed for São Paulo, Minas Gerais, Rio de Janeiro and Rio Grande do Sul because the debts of these states correspond to more than 90% of the total states debt.

Figure 1
State's Debts: São Paulo (SP), Rio de Janeiro (RJ),
Minas Gerais (MG), and Rio Grande do Sul (RS)
1980:I -1995:II

3.2 Empirical evidence

The results of the augmented Dickey-Fuller (ADF) tests are presented in Table 1. The number of lagged terms is chosen to ensure that the errors are uncorrelated. First, the ADF test is applied to the levels of the states' debts in order to check if it is appropriate to proceed to differentiation. The results indicate that the unit root hypothesis can not be rejected for any of the four states. Since all the debts are non-stationary in levels, it makes sense to verify the stationarity of the first difference of the debts series. The tests results imply that the solvency condition is not satisfied, except for Minas Gerais. For São Paulo, Rio de Janeiro and Rio Grande do Sul, the null hypothesis of non-stationarity of the first difference of the debt series can not be rejected, and therefore these states' budgets are not balanced in present value terms.

Table 1
Tests for a Unit Root

	São Paulo	Minas Gerais	Rio de Janeiro	Rio Grande do Sul
$B_t^{(a)}$				
τ statistics	0.956	-0.944	-1.928	-0.131
lags	3	0	2	2
n. observations	58	61	59	59
$(1-L)B_t^{(b)}$				
τ statistics	-2.785	-4.027[*]	-3.174	-2.061
lags	5	2	5	6
n. observations	55	58	55	54

Notes: (a) corresponds to testing equation (24) when K=1; (b) corresponds to testing equation (24) when K=2. The asymptotic critical values of * at the 5% and 1% levels are -3.41 and -3.96, respectively.

We also apply a Chow (1960) test for parameter instability in order to detect whether there has been a regime change in deficits policies. Some argue that the democratization process and the new Constitution moved the states deficits onto an unsustainable path. The test produces statistic values that are too low to reject the null hypothesis of parameter stability, except for Minas Gerais. For Minas Gerais the statistics are greater than the critical value of 2.41 at the 5% level of significance for the observations 21, 33 and 36 (2.45, 2.46, and 2.50). These observations correspond respectively to the first quarter of 1985, the first quarter of 1988 and the fourth quarter of 1988. To summarize, the results suggest that São Paulo, Rio de Janeiro, and Rio Grande do Sul fiscal policies are not consistent with intertemporal budget balance, and it seems that no significant change in their deficit policies is present over the 80s and half of the 90s. Minas Gerais, however, seems to balance its budget in present value terms. The problem is that a change in its fiscal regime was detected in 1985 and 1988. It seems that these periods were characterized by events that moved the fiscal regime into a regime that possibly violate intertemporal budged balance, or, in other words, the deficits may have become too large.

4 Conclusions

We developed a model where states in a federation can monetize their debts. The results suggest that the bigger the degree of fiscal dominance - the degree of monetization - the bigger are the state's debts and the aggregate debt as well. Since there are studies analyzing the federal fiscal policy (Pastore, 1995; Rocha, 1995), we decided to evaluate the states' fiscal policies. More precisely, we assess the consistency of the time path of states debts with the assumption of intertemporal balance budget in order to get some indication about the states borrowing conditions. The results indicate that for São Paulo, Rio de Janeiro and Rio Grande do Sul the budgets are not balanced in present value terms. For Minas Gerais, the results indicate a sustainable fiscal policy, but with a possible change in regime during 1985 and 1988.

This lack of sustainability of fiscal policies at the state level imposes severe limits on the power of monetary policy in Brazil. The possibility of a bail-out by monetization does not force a highly indebted state to take corrective fiscal measures, and the central government can at most rearrange the timing of seigniorage. We have a kind of generalization of Sargent and Wallace's monetarist arithmetic (1981), where the degree of fiscal dominance is enlarged by the fact that states transfer part of their deficits to the federal government.

Important policy implications can be derived from our results. In order to promote sound macroeconomic management in Brazil, all possible solutions should be related to a change in the institutional framework of the economy. Since the existence of state-owned financial institutions is one important mechanism that allows the monetization of states' debts, one way to reduce the degree of fiscal dominance is the privatization of such institutions. However, a highly dependent central bank can always be called for by the federal government or other important organized political forces to bail out lower governments in financial crisis. Increasing the central bank independence should be considered, therefore, another necessary institutional reform to achieve monetary discipline in Brazil. Also some *ad hoc* fiscal rules limiting deficits and debts - like those present in the EMU - can increase welfare and should also be considered as part of an institutional reform to provide macroeconomic stability.[6]

References

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6   To enter the EMU, countries should comply fiscal rules that impose the following limits: i) debt no biggerthan 60% of GNP, and ii) deficits no bigger than 3\% of GNP per annum.

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