TEXTO PARA DISCUSSÃO N° 135

THE FEDERAL DOMESTIC DEBT AND STATE GOVERNMENTS: THE IMPACT OF THE STATE DEBTS ON THE FEDERAL GOVERNMENT FINANCES

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Junho de 2000

Ficha catalográfica

336.1/.5 L965f 2000	Luporini, Viviane The Federal domestic debt and state governments : the impact of the state debts on the federal governemnt finances / por Viviane Luporini. - Belo Horizonte: UFMG/Cedeplar, 2000. 18 p. (Texto para discussão; 135) 1. Divida pública – Brasil. 2. Finanças públicas – Brasil. Universidade Federal de Minas Gerais. Centro de Desenvolvimento e Planejamento Regional. II. Título. III. Série.

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FACULDADE DE CIÊNCIAS ECONÔMICAS
CENTRO DE DESENVOLVIMENTO E PLANEJAMENTO REGIONAL

THE FEDERAL DOMESTIC DEBT AND STATE GOVERNMENTS: THE IMPACT OF THE STATE DEBTS ON THE FEDERAL GOVERNMENT FINANCES

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CEDEPLAR/FACE/UFMG
BELO HORIZONTE
2000

SUMÁRIO

Abstract: This paper investigates how the finances of the Brazilian federal government responded to innovations in the debts of the most indebted states, São Paulo, Minas Gerais, Rio de Janeiro and Rio Grande do Sul. Using monthly data from 1981 to 1998, a vector autoregression system (VAR) is estimated to investigate the relationship between the federal government finances and the state debts. Results have indicated that state debts are relatively important to the forecast of the federal domestic debt when compared to the impact of a shock to government expenditures or tax revenues, but the effect of the state debts on the federal debt is very small when compared to the effects of a shock to the real interest rate.

Keywords: Federal debt; state debts; fiscal consolidation; Brazil
JEL: H63

Resumo: Este artigo investiga de que forma as finanças do governo federal brasileiro tem respondido a inovações nas dívidas dos estados mais endividados da federação, quais sejam, São Paulo, Minas Gerais, Rio de Janeiro e Rio Grande do Sul. Utilizando dados mensais do período 1981: 1998, um sistema de vetores autoregressivos (VAR) é estimado a fim de se investigar a relação entre as finanças do governo federal e o endividamento desses estados. Os resultados obtidos indicam que as dívidas estaduais são relativamente importantes para a previsão da evolução da dívida mobiliária federal quando comparadas ao impacto de um choque nos gastos governamentais ou na receita tributária, mas os efeitos das dívidas estaduais sobre a federal são bastante pequenos quando comparados a uma variação na taxa de juros real.

Palavras-chave: Dívida federal; dívidas estaduais; consolidação fiscal; Brasil
JEL: H63

1. INTRODUCTION

The financial situation of the local Brazilian governments and of the most indebted states (São Paulo, Minas Gerais, Rio de Janeiro and Rio Grande do Sul) has been an important source of pressure on the federal government's debt, particularly after the price stabilization plan of 1994.

The Brazilian federal domestic debt as a ratio do GDP increased steadily until 1980 and assumed unprecedented levels after 1981 when the international loans became more difficult and expensive. The borrowing requirements of the federal government (Treasury and Central Bank) increased from 4.8 percent of the GDP in 1983 to 26.6 percent in 1988. Although the Brazilian federal domestic debt (averaged 24.1 percent of GDP between 1981 and 1996) is not particularly large when compared to other countries, the conditions for rolling it over are reasons for concern. The government has been paying high real rates of interest on its securities and the public has been reluctant in accepting securities of maturity period longer than 6 months.

The analysis of the dynamic of the government's debt seems indeed to indicate that the federal domestic debt responds strongly to the financial components of the public deficit, namely inflation and the real interest rate. [Luporini (1998a)]. A substantial reduction in the real rate of interest has been limited mainly for two reasons. Under a fixed exchange rate regime until the end of 1998, there was a growing need for foreign capital inflows to support an overvalued Brazilian currency, which kept real interest rates at high levels. The exchange rate liberalization eased the way to the implementation of monetary policy in January of 1999, but the upward pressures on domestic prices and the adoption of an inflation target system has rendered the Central Bank caution on the rhythm of nominal interest rate reductions. As a result, the fall of the real rate of interest has not been fast enough to alleviate the financial component of the public deficit. The government has tried to control its debt/GDP ratio through fiscal adjustments.

Despite the government efforts, three factors have contributed to the pressure on the government's debt: the change in the vertical distribution of revenues implemented by the 1988 Constitution, the rigidity of expenditures (mainly payroll and social levies), and the fiscal imbalances of local governments, especially the states of São Paulo, Minas Gerais, Rio de Janeiro and Rio Grande do Sul. The outstanding debt of these states represented, together, 88.5 percent of the securities issued by local governments (states and municipalities) in November of 1997 [Boletim do Banco Central do Brasil, January 1999].

The delicate fiscal situation of the local governments increases the probability of a federal authorities' bail of their debts. But what is the relative importance of the states' debt to the finances of the federal government? The purpose of this paper is to investigate the impact of the four most indebted states on the federal government finances and, most importantly, on the dynamic of its domestic debt.

2. THE STATE GOVERNMENT FINANCES AND THE FEDERAL DOMESTIC DEBT

The recent expansion of the federal government domestic debt can be mainly explained by fiscal imbalances and the costs of its finance, but the borrowing necessities of the local governments have been an important source of concern to the government in its overall effort for fiscal consolidation. In 1997, for example, the borrowing necessities of the public sector as a whole registered an increase of 0.2 per cent of GDP relative to 1996, resulting in a total deficit of 6.1 percent, and although the federal government managed to keep its borrowing requirements constant at 2.6 percent of GDP, the relative participation of the local governments in the deficit increased from 46 percent in 1996 to 50 percent in 1997 (rising from 2.7 to 3.0 percent of GDP)[Banco Central, 1997].

The total local government's indebtedness is the combination of domestic debt (securities or bonds issued to the public), loans from state-owned commercial banks, contractual debt with foreign creditors and federal financial institutions and, finally, fluctuating debt (arrears on payments to suppliers, salary payments due to state employees, borrowings from commercial banks backed by future tax revenues, and other loans).

According to their relative sizes, the state government's domestic debt is the authorities' main source of concern. This debt nearly doubled between 1992 and 1995, increasing from R$ 21307 millions to R$ 39512 millions (values at prices of December 1995). In 1995, it represented over 50 percent of local government's total indebtedness, having increased 10.2 percent between 1992 and 1993, 17.3 percent during 1993-94, and 27.4 percent in the period 1994-95 [Relatório do Banco Central, 1995]. The main reasons for this sharp increase are the difficulties to balance the local government's budget and the high levels of the domestic real rate of interest. Moreover, an erroneous interpretation of the Constitutional Amendment 3/93 led to further increases in the stock of state debt. The Amendment limited the issuance of new securities for rolling over the already existing debt. The Senate interpreted that new securities could be issued to roll over the nominal value of the existing debt. Given that the state's securities are mostly indexed and floating, as the value of the existing debt increased as a result of higher interest rate, new issues of securities were authorized by the Senate, not only to roll over the existing debt, but also due interest payments.

Fifteen Brazilian states and two municipalities (Rio de Janeiro and São Paulo) issue securities but the debts by the states of São Paulo, Minas Gerais, Rio de Janeiro and Rio Grande do Sul dominate the market for local government securities. In November 1997, the securities of these four states represented 88.5 percent of the total state debt.

3. THE IMPACT OF THE STATE DEBTS ON THE FEDERAL GOVERNMENT BUDGET CONSTRAINT

The local government debts affects the finances of the federal government through the absorption of part of the states contractual debt, the bailing out of state-owned financial institutions and the exchange of state for federal securities. How has the federal government finances responded to these effects and how important they have been? This section analysis the dynamic responses of the federal government budget constraint, particularly, its debt, to innovations in the state governments' debt.

A vector autoregression representation (VAR) allows the description of a system of equations with interdependent variables and is, therefore, appropriate for the analysis of the government budget constraint. The representation will also allows an analysis of how the tight monetary policy implemented by the federal government has impacted dynamic of the state debts.

3.1. Data Set

The data set consists of monthly observations from 1981:1 to 1998:11 and was collected from the Boletins do Banco Central do Brasil published by the Brazilian Central Bank and Conjuntura Econômica published by the Getúlio Vargas Foundation.

The inflation rate is the percentage variation of the General Price Index- Internal Supply and the interest rate is the *Overnight* market rate. Federal government debt, revenue and expenditure are the series "Federal Domestic Debt held by the Public", "Total Treasury Revenue" and "Total Treasury Expenditures", respectively.

Finally, state debt consists of securities issued by the states of São Paulo, Minas Gerais, Rio de Janeiro and Rio Grande do Sul, all published by the Brazilian Central Bank. All series were converted into Millions of Reais and divided by the General Price Index (IGP).

3.2. Preliminary Unit Root Tests

The vector autoregression representation (VAR) requires that the variables involved in the system be covariance-stationary (or weakly stationary) so that the parameters can be consistently estimated. Unit root tests must therefore be performed in each of the series. Because the actual data processes generating the series are not known a priori, the unit root tests are performed in three models, starting with the least restrictive one, which includes a trend and a drift terms. When we fail to reject the null hypothesis of non-stationarity (presence of a unit root), the statistical significance of the trend term is tested, under the null, against the critical values provided by Dickey and Fuller (1979). If the trend term is not statistically different from zero, then the unit root should be carried out simply with an intercept or drift. The same procedure is applied to the intercept and depending on its statistical significance, the unit root test should be preformed on a regression equation without a trend or intercept term. The results are reported in TABLE 1.

The Augmented Dickey-Fuller tests have indicated the inflation rate, the state debts taken as a whole and the federal debt are first order integrated processes and must enter in the VAR in first differences. The real rate of interest, government revenue and expenditure are covariance stationary and will be used in levels.

3.3. Impacts on the federal government debt

The preliminary unit root tests have indicated that the inflation rate, the federal government debt and the state debts are first order integrated processes, while the real interest rate, tax revenue and government expenditures are stationary processes. The VAR was estimated with the following variables: inflation, federal debt and state debts in first differences; real interest rate, revenue and expenditure in levels.

A log-likelihood ratio test was performed to determine the appropriate lag length for the vector autoregressive system.

The statistic is for the test is: $(T-c)(\ln|\theta_{Ho}| - \ln|\theta_{Ha}|)$, where,

c stands for the number of parameters estimated in each equation of the unrestricted system;

T is the number of usable observations;

$\ln|\theta_H|$ is the natural logarithm of the determinant of the residual variance under the null and the alternative hypothesis, both calculated over the same sample period.

Starting with a lag length of 6 periods, the null hypothesis that a two-lag VAR can adequately capture the dynamics of the system can not be rejected at the 5 percent confidence interval.

The vector autoregression estimated coefficients are difficult to interpret and the results are usually summarized by impulse response functions and variance decomposition of the error-covariance matrix. The impulse functions show the responses of an endogenous variable to a one standard deviation in an innovations in the variables in the system. For the interpretation of the impulse response functions, the covariance matrix of the resulting innovations must be diagonal. The Cholesky decomposition was then used to orthogonalize the error terms. The ordering of the variables can, however, substantially alter the response functions and should be decided with care.

The ordering of the variables used implies that:

1. Current values of real interest rate, revenue, state debts, expenditures and federal debt do not influence the current change in the rate of inflation;
2. Current values of a change in the rate of inflation, but not of revenue, state debts, expenditures or federal debt influence the real interest rate;

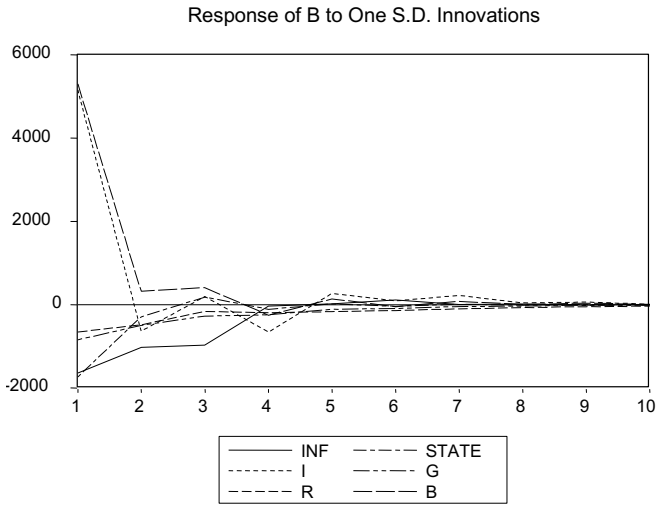
3. Current values of inflation and real interest rate, but not of state debts, expenditures or debt influence revenue;

4. Current values of inflation, real interest rate and revenue, but not of expenditures or federal debt influence state debt;

5. Finally, current values of inflation, real interest rate, revenue, state debts and expenditures influence the federal debt.

Assumption 2 implies that current values for the change of the federal debt will not influence current values of the real interest rate. This may not seem plausible when the market is able to dictate the selling price of government securities. That is a limiting situation, however, and does not preclude the Central Bank from determining the interest rate through open market operations. Moreover, one can think of the change in the level of federal debt as influencing the real interest rate only with a lag, given that the inflation rate for the period in hand is not yet available. In any case, other orderings resulted in stronger assumptions.

The Graph of the impulse response functions for the federal debt indicates that its response to a one-standard deviation innovation in the rate of inflation, real interest rate, government revenue, state debts and government expenditures tend to be totally absorbed within 10 months.



The federal debt immediate response to an inflation shock is negative and its effect is completed after 6 months. The immediate response to a shock to the real rate of interest is positive, being as powerful as the response to a shock to debt itself. The debt response to a shock to itself follows the same pattern of the response to the real interest rate, although with a temporal lag. This indicates the relative importance of the financial component of the debt to its dynamic with the federal debt feeding into itself through the real interest rate.

The initial response of the federal debt to an innovation in the state debts is negative. This is probably a sign of the limiting availability of resources in the public's hand to invest in government securities, being them issued by the Treasury or by the state governments. But after two and a half months, the federal debt response a shock to state debts is totally absorbed with the federal debt returning to its previous level and during the third month following the shock, the state debt has a positive effect on the federal debt.

The federal debt responses to a revenue and expenditure shock are both initially negative, but relatively small. Both shocks are absorbed within 18 months.

The variance decomposition of a vector autoregression gives the relative contribution of an innovation to the mean-squared error of the forecasted variables *h* periods, with *h* ranging from 1 to 24 months.

The results indicate that after 24 months, 7.12% of the forecast error variance of debt is accounted for by innovations in the change of the inflation rate, 41.94% by innovations in the real rate of interest, 1.23% and 1.71% by innovation in government revenue and expenditure respectively, and 43.22% by innovations in the federal debt itself.

The debts of the sates of São Paulo, Minas Gerais, Rio de Janeiro and Rio Grande do Sul, taken together account for 4.78% of the forecast error variance of the federal debt and is very stable throughout the 24 months analyzed (5% in period 1 and 4.79% in period 24). The effect of an innovation in the state debts to the forecast variance of the federal debt is small if compared to the effect of the real rate of interest (41.94%), but large if compared to the effects of an innovation in government expenditures (1.71%) and revenues (1.23%). The debts of the most indebted states are not unimportant from the point of view of a plan for fiscal consolidation of the public sector as a whole, but with no doubts, the high real rates of interest remain the unconditional villain of the debt/GDP growth.

4. CONCLUDING REMARKS

This paper investigated how the finances of the Brazilian federal government responded to innovations in the debts of the most indebted states, São Paulo, Minas Gerais, Rio de Janeiro and Rio Grande do Sul, using monthly data from 1981 to 1998.

The relationship between the federal government finances and the state debts is analyzed through the estimation of a vector autoregression system (VAR). The results have indicated that state debts are relatively important to the forecast of the federal domestic debt when compared to the impact of a shock to government expenditures or tax revenues, but the effect of the state debts on the federal debt is very small when compared to the effects of a shock to the real interest rate. In other words, although from the point of view of a plan for fiscal consolidation of the public sector as a whole the state debts are a reason for concern, from the point of view of the dynamic of the federal domestic debt, the state debt have a limited role. Instead, high real rates of interest continue to be the great villain of the federal government finances.

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6. TABLES

TABLE 1

Unit Root Tests

$$\Delta Y_t = \alpha_1 + \gamma Y_{t-1} + \alpha_2 t + \sum_{i=2}^{4} \delta_i Y_{t-i+1} + \varepsilon_t$$

	ADF(4) Stat	Intercept	Trend
Level			
Inflation	-2.952	1.837*	-0.004*
		(1.715)	(-0.477)
Federal Debt	-0.221	-678.36*	17.77*
		(-0.550)	(1.440)
State Debt	0.081	350.84*	-3.456*
		(1.330)	(-0.694)
Interest Rate	7.316**	-	-
Revenue	5.267**	-	-
Expenditures	5.014**	-	-
First Difference			
Inflation	8.069**	-	-
Federal Debt	5.830**	-	-
State Debt	6.161**	-	-

ADF(*d*): Augmented Dickey-Fuller Test; null of unit root, truncation lag (*d*)
McKinnnon critical values 1%, 5% and 10% confidence interval for ADF
according to Augmented Dickey-Fuller critical value of –3.432
* Non-significant according to Dickey-Fuller critical value of 2.79.
** Rejects the null of unit root at 5% or 1%.

TABLE 2

Variance Decomposition of the Federal Domestic Debt: Proportion of forecast error *h* months ahead produced by each innovation (%)

Variance Decomposition of the Federal Debt ***(h)***	Contribution of on innovation in					
	Inflation	Interest	Revenue	State Debt	Expenditures	Federal Debt
1	4.355146	43.22454	0.705077	4.899183	1.156361	45.65969
2	5.857622	42.41663	1.051595	4.870136	1.509683	44.29434
3	7.197775	41.63576	1.073363	4.822529	1.598628	43.67195
4	7.132257	41.91293	1.121528	4.796938	1.674651	43.36170
5	7.118573	41.93663	1.163624	4.787688	1.691388	43.30210
6	7.131063	41.91344	1.194011	4.786390	1.704458	43.27064
7	7.123788	41.94379	1.209802	4.781606	1.705852	43.23516
8	7.123185	41.94026	1.218038	4.781275	1.707789	43.22946
9	7.122475	41.94078	1.221934	4.780720	1.708028	43.22607
10	7.122338	41.93981	1.223926	4.780655	1.708269	43.22500
11	7.122189	41.93974	1.224949	4.780553	1.708291	43.22428
12	7.122156	41.93952	1.225490	4.780530	1.708317	43.22399
13	7.122120	41.93948	1.225771	4.780506	1.708316	43.22380
14	7.122110	41.93943	1.225917	4.780499	1.708318	43.22373
15	7.122102	41.93941	1.225993	4.780494	1.708317	43.22368
16	7.122099	41.93940	1.226032	4.780492	1.708317	43.22366
17	7.122097	41.93939	1.226052	4.780490	1.708316	43.22365
18	7.122096	41.93939	1.226063	4.780490	1.708316	43.22365
19	7.122096	41.93938	1.226068	4.780490	1.708316	43.22365
20	7.122096	41.93938	1.226071	4.780489	1.708316	43.22364
21	7.122096	41.93938	1.226073	4.780489	1.708316	43.22364
22	7.122096	41.93938	1.226074	4.780489	1.708316	43.22364
23	7.122096	41.93938	1.226074	4.780489	1.708316	43.22364
24	7.122096	41.93938	1.226074	4.780489	1.708316	43.22364