

Texto para Discussão

Série Economia

TD-E 06 / 2010

FISCAL RESPONSIBILITY AND THE SUPPLY OF PUBLIC GOODS

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Preliminary manuscript

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Fiscal Responsibility and the Supply of Public Goods

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Abstract

In this paper we show a model where fiscal responsibility laws, by reducing the ability of politicians to use public resources for personal gains, can lead to an increase in the supply of public goods. We test this conjecture using data from Brazilian municipalities. As a nationwide institutional innovation, Brazil's fiscal responsibility law (FRL) was exogenous to all municipalities; therefore, there was no self-selection bias in its implementation. We found a higher supply of public goods in education after the FRL (teachers, classrooms, and enrollments). The education is the most important social expenditure at the municipal level in Brazil. Our result is robust for small municipalities, municipalities with greater or lower dependency of intergovernmental transfers, and municipalities where the second-round is permitted.

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1 Introduction

Starting in the nineties several countries have adopted rules to constrain the fiscal behavior (current budget laws or fiscal responsibility laws). United States (Budget Enforcement Act, 1990), New Zealand (Fiscal Responsibility Act, 1994) United Kingdom (Code for Fiscal Stability, 1997) are origins of idea which was followed by a number of developing and developed countries, such as Australia (1997), Latvia (1998), Argentina (1999), Peru (1999), Brazil (2000), Ukraine (2001), Ecuador (2002), Colombia (2003), India (2003), and Spain (2003). In some cases, the set of rules is also important for control sub-national governments because the autonomy has a temptation to behave opportunistically with respect to central governments - the threat by a central administration to not bail out a local government with unsustainable fiscal policy is often not credible. The adoption of rules restricting the fiscal behavior of sub-national governments can solve this problem.

A number of papers have investigated whether the adoption of fiscal rules has a positive impact on fiscal performance.⁴ In this paper we show that a not thought of consequence of fiscal responsibility laws can be an increase on the provision of public goods by local governments. The reason for this is that fiscal rules reduce the ability of politicians to use public resources for personal gains. If politicians care about their future careers, then they can (partially) offset this loss by increasing the supply of public goods, making it more likely that they survive electorally.

We use Brazilian data to test the impact of the introduction of fiscal rules on the supply of public goods by local governments.⁵ Brazil's fiscal responsibility law (FRL) was enacted in the year 2000. An important feature of this law is that it applied to all municipalities (and state governments) in Brazil. In other words, the FRL was an exogenous imposition to the local governments. As such, our analysis is free of a potential endogeneity problem that shows up in empirical studies of the impact of fiscal institutions: that a particular outcome is not explained by the fiscal institutions per se, but by the electorate's preferences. Our sample includes all Brazilian municipalities in two consecutive administrations: from 1997 to 2000, the last administration before the introduction of the FRL, and from 2001 to 2004. We use a fixed effect panel to test the hypothesis that the adoption of the FRL increased the supply of public goods by municipalities.....

2 Related Literature

TO BE ADDED.

3 Career Concerns and the Supply of Public Goods

In this section we use a simple model of career concerns for politicians to show how a shock that reduces their ability to extract personal gains from public resources can lead to a greater supply of public goods. The model we consider is based on Holmstrom (1999).

⁴ We can cite von Hagen (1992), Alesina and Perotti (1996), Alesina, Hausmann, Homes, and Stein (1999), and Hallerberg and Von Hagen (1997), Gleich (2003), Fabrizio and Mody (2006), and Hallerberg, Strauch and Von Hagen (2007).

⁵ Following the 1988 Constitution, local governments have status of federation member with Executive and Legislative.

A politician in office decides how to allocate a given budget b between expenditures on public goods and “private” expenditures. Private expenditures encompass rents and the use of public resources for political purposes. The politician's payoff from allocating an amount x to private expenditures is $u(x)$, where $u: R_+ \rightarrow R$ is differentiable, strictly increasing, and strictly concave. The politician does not derive any direct benefit from his expenditure on public goods.⁶ However, he cares about his future career (in the form of future personal gains), which depends on his expenditure on public goods.⁷ We obtain the politician's indirect payoff from spending z on the provision of public goods as follows. Politicians differ in their ability to supply public goods. A politician of type $\theta \in R$ who spends z on the provision of public goods supplies a level of public goods equal to

$$g = \theta + z + \varepsilon \quad (1)$$

where ε is normally distributed with mean zero and variance σ_ε^2 . The noise term ε represents the factors in the provision of public goods beyond the politician's control. We adopt the normalization that the level of public goods is zero when its supply is zero. Note that the supply of public goods is positive even when $z = 0$. We can accommodate this by interpreting b as the amount in the budget that is allocated to discretionary spending; the rest is allocated to non-discretionary expenditures, including mandatory expenditures on public goods.

The politician's type θ is unknown to both him and the electorate. We assume that there is a common prior belief about θ that is normally distributed with mean m_0 and variance σ_0^2 . In particular, the politician has no private information about his ability. We refer to the electorate's belief about θ as the politician's reputation and denote it by θ . Standard arguments, see DeGroot (1970), show that if the electorate expects the politician to spend z^* on the provision of public goods, then his reputation after he supplies a level g of public goods is normally distributed with

$$\text{mean } m_1 \text{ and variance } \sigma_1^2 = \frac{\sigma_0^2 \sigma_\varepsilon^2}{\sigma_0^2 + \sigma_\varepsilon^2}$$

$$m_1 = m_1(g, z^*) = \frac{\sigma_\varepsilon^2 m_0 + \sigma_0^2 [g - z^*]}{\sigma_0^2 + \sigma_\varepsilon^2} \quad (2)$$

We assume that the politician's payoff from his future career is a function of $E[\pi]$, the mean of his reputation. For simplicity, we take this payoff to be just $E[\pi]$.⁸ We do not model the reasons for this dependence, but they are quite plausible given that the population cares about the provision of public goods, and so it cares about the politician's perceived ability (as the provision of public goods depends on this quantity). In the Appendix n we discuss a simple way of making endogenous the politician's payoff from his reputation.

Thus, when the electorate expects the politician to spend z^* on the provision of public goods, his payoff from spending z on public goods is

$$v(z, z^*) = E \left[\frac{m_1(g, z^*)}{z} \right] = \frac{\sigma_\varepsilon^2 m_0}{\sigma_0^2 + \sigma_\varepsilon^2} + \frac{\sigma_0^2}{\sigma_0^2 + \sigma_\varepsilon^2} \left\{ E \left[\frac{g}{z} \right] - z^* \right\} \quad (3)$$

⁶ The result that a reduction in the politician's ability to obtain private gains from public resources implies a greater supply of public goods would be immediate if he derived direct utility from public goods.

⁷ We seek some empirical evidence that expenditure on public goods is associated with the worried of politicians about its future career. In our opinion, an important thing for the career of politicians is its maintenance on power (reelection). Thus, we verify in appendix 1 whether the variables used on main results (social expenditure and public goods) to help politicians on its reelection. Our evidences show that this correlation exists.

⁸ We obtain the same results if the politician's payoff from a reputation π is an increasing function of $E[\pi]$.

where $E[g/z]$ is the expected supply of public goods as a function of z . Since g is normally distributed with mean $z + m_0$ (and variance $\sigma_0^2 + \sigma_\varepsilon^2$), we then have that

$$v(z, z^*) = \frac{\sigma_\varepsilon^2 m_0}{\sigma_0^2 + \sigma_\varepsilon^2} + \frac{\sigma_0^2 [m_0 + z + z^*]}{\sigma_0^2 + \sigma_\varepsilon^2} \quad (4)$$

By spending resources on the provision of public goods the politician is effectively investing in

his reputation. The (marginal) return of doing so is constant and equal to $\frac{\sigma_0^2}{\sigma_0^2 + \sigma_\varepsilon^2}$, which is

increasing in $\frac{\sigma_0^2}{\sigma_0^2 + \sigma_\varepsilon^2}$ and decreasing in σ_ε^2 . The intuition for this is simple. The greater the uncertainty about the politician's ability to provide public goods, the greater the benefit to him of influencing the electorate's perception about his ability: a high level of public goods will be interpreted as evidence that the politician's ability to supply public goods is high. Likewise, the greater the noise in the provision of public goods, the smaller the scope for the politician to affect the perception about his ability. Indeed, because of the noise, the electorate will interpret a high level of public goods as good luck (and a low level of public goods as bad luck).

A restriction on the politician's ability to obtain personal gains from public resources is an upper bound $\bar{x} \leq b$ on his choice of x , where $\bar{x} = b$ means that there are no such restrictions. The introduction of fiscal rules implies a reduction of \bar{x} from b to a lower level.

Given z^* and \bar{x} , an optimal choice to the politician is a pair $(x'; z')$ that solves

$$\begin{aligned} \max & u(x) + v(z; z^*) \\ \text{s.t.} & x + z \leq b \\ & \bar{x} \geq x \geq 0, z \geq 0 \end{aligned} \quad (5)$$

Notice that $(x'; z')$ must be such that $(x' + z' = b$, for otherwise the politician can increase his payoff by increasing z' (or x' if $x' < \bar{x}$).

In equilibrium, it must be that the electorate correctly anticipates the politician's choice of z , that is, it must be that $z' = z^*$. Since $u(x) + v(z; z^*)$ is strictly quasi-concave in $(x; z)$ for each $z^* \in [0; b]$, the problem (5) has a unique solution for each value of z^* . Moreover, since $v(z; z^*) = w(z) + c(z^*)$, the solution to (5) does not depend on z^* . Hence, there exists a unique equilibrium $(x^*; z^*)$, where both x^* and z^* depend on \bar{x} . We write $x^* = x^*(\bar{x})$ and $z^* = z^*(\bar{x})$ to denote this dependence.

We are interested in the case where $x^*(b) > 0$, so that the politician finds it optimal to incur private expenditures when he is not restricted to do so, i.e., when there are no fiscal rules in place. A necessary and sufficient condition for $x^*(b) > 0$ is that

$$\text{to } \frac{u'(0^+) > \sigma_0^2}{\sigma_0^2 + \sigma_\varepsilon^2} \quad (6)$$

We take condition (6) as given. Similarly, a necessary and sufficient condition for $z^*(b) > 0$ is

$$\text{that } \frac{u'(\bar{x}) < \sigma_0^2}{\sigma_0^2 + \sigma_\varepsilon^2} \quad (7)$$

We then have established the following result.

Proposition 1. There exists a unique equilibrium $(x^*; z^*)$ for each $\bar{x} \in (0; b]$. The pair $(x^*; z^*)$ is such that $z^* = b - x^*$ and:

1. $x^*(\bar{x}) = \bar{x}$ if (7) does not hold;

$$2. \frac{u'(x^*) = \sigma_0^2}{\sigma_0^2 + \sigma_\varepsilon^2}$$

It is immediate to see from above that an institutional shock that reduces the upper bound on private expenditures from b to $\bar{x} < b$ increases the supply of public goods as long as $x^*(b) > \bar{x}$. To summarize:

Proposition 2. A reduction in the politician's ability to extract personal gains from public resources can increase the supply of public goods.

The assumption that the politician does not have any private information about his ability is strong. In the Appendix 2n we show that our results do not depend on this assumption. Also notice that once we establish a career concerns motive for the politician to spend public resources on the provision of public goods, the result of Proposition 2 is a somewhat obvious consequence of the fact that the politician has only two choices: private expenditures and expenditures on the provision of public goods. In the Appendix 3n we show that the result of Proposition 2 survives when the politician has a richer choice set.

4 Municipalities and the Fiscal Responsibility Law in Brazil

We start with a brief discussion of Brazilian municipalities. Then we discuss Brazil's fiscal responsibility law.

Municipalities in Brazil

Brazilian municipalities are (heavily) dependent on transfers from the federal and state governments. There are two types of transfers: voluntary and compulsory. Voluntary (discretionary) transfers result from agreements or financial cooperation between the federal or state governments and the municipalities. Constitutional transfers result from federal and state legislation and are subject to specific rules.⁹ Table 1 has a breakdown of the average municipal revenue in tax revenues and transfers on the current revenue. One important fact to notice, for reasons that we discuss later, is that there is no market for sub-national debt in Brazil.

Table 1: Federal and State Transfers and Tax Revenue on Current Revenue

| Term | Transfers/Current Revenue (%) | Tax Revenue/Current Revenue (%) |
|-----------|-------------------------------|---------------------------------|
| 1997/2000 | 88.84 | 11.15 |
| 2001/2004 | 88.30 | 11.69 |

Source: IPEADATA (www.ipeadata.gov.br)

⁹ The 1988 Constitution established a rule of transfers because the taxes were centralized in the federal government during the authoritarian period (1964-1986). In general terms, the rule of distribution of regular transfers depends on local per capita income and population.

Another relevant fact of Brazilian municipalities is the importance of education on local budget. It is result of institutional arrangement imposed by the 1988 Constitution. We found two important points on legislation. First, the municipalities are responsible for the public elementary education system in Brazil (education of younger with age between 6 and 14 years old approximately). Second, the municipalities need to spend at least 25% of their current revenue on education. Accordingly, expenses in education are their single largest social expenditure. Table 2 has a breakdown of social expenditures - education, health, public order and safety, housing, and transportation – by Brazilian municipalities for the two electoral terms (1997-2000 and 2001-2004) we consider in our analysis. Notice that expenses on education are well above the minimum specified by law.

Table 2: Municipal Social Expenditure as Percentage of Total Current Expenditure (%)

| Social Expenditure | 1997-2000 | | 2001-2004 | |
|--------------------------------|-----------|-----------|-----------|-----------|
| | Average | Std. Dev. | Average | Std. Dev. |
| Education | 41.87 | 11.42 | 49.02 | 17.96 |
| Health | 22.08 | 10.64 | 32.91 | 11.59 |
| Housing | 13.23 | 9.02 | 14.71 | 9.02 |
| Transportation | 10.03 | 9.44 | 8.67 | 8.52 |
| Public Order and Safety | 0.02 | 0.08 | 0.03 | 0.09 |

Source: IPEADATA (www.ipeadata.gov.br)

The Fiscal Responsibility Law

The FRL establishes norms for public finance that impose high constraints on fiscal management. It was introduced by the federal government as a response to a run against the Real, the Brazilian currency, and the concomitant confidence crisis that affected the Brazilian economy in the wake of the Asian and Russian crisis of 1997-1998.^{10 11} The FRL was part of a process of reassertion of the federal fiscal authority in Brazil that started in 1995. Along with its companion law, the Fiscal Crimes Law, the FRL is the culmination of a relatively successful set of measures by the federal government in Brazil to control sub-national spending.¹²

The FRL contains instruments that permit risk avoidance and corrections of mismanagement that affect the public accounts. These instruments are based on planning, control, transparency, and accountability.¹³

¹⁰ Many other countries in Latin America adopted fiscal responsibility laws in the late nineties. In most of these countries the adherence to the law was voluntary, though, and their outcomes were questionable. See Abuelasia et al. (2009) for an analysis of the Argentinean case.

¹¹ Lora and Oliveira (2004) test the determinants of economic reforms in Latin America. They find strong support for the hypothesis that crises make reforms viable.

¹² In addition to the FRL, the federal government in Brazil implemented two other important measures to fiscally constrain the sub-national governments: the renegotiation of state debts and the privatization of state banks. Unlike the FRL, these measures were voluntary and had a strong endogenous component to their implementation; see Melo et al. (2010). The offer by the federal government was to refinance 100% of a state's debt under the condition that its state bank would either be privatized or extinguished. Most agreements between the national executive and the states took place in the first semester of 1998, prior to the elections for state governor in that year.

¹³ See http://www.planejamento.gov.br/arquivos_down/lrf/integra_lei/lei_101_ingles.PDF for a detailed description of the FRL.

The FRL specifies in great detail the fiscal rules governing public sector indebtedness, credit operations, and public account reporting. Under the FRL, the federal government is prohibited from financing sub-national governments, thus eliminating the possibility of bailouts.¹⁴ The law also imposes debt ceilings for state and local governments. Any excess debt is to be eliminated within one year, otherwise new financing and voluntary transfers from the federal government are prohibited. Other sanctions include the withholding of federal transfers, denial of credit guarantees, and bans on new debt. In addition, the FRL contains a golden rule provision for capital spending (annual credit disbursement cannot exceed capital spending). Furthermore, the law also grants constitutional status to a number of existing rules and introduces new ones: (a) personnel expenditures (including pension payments) are capped at 60% of the budget for sub-national governments; (b) new, recurrent, expenditure commitments require specification of their full funding for the year in which they become effective, and for the next two years; (c) prohibition of spending commitments that exceed one budgetary period in the last year of tenure for executives at all levels of government; (d) tax exemptions and abatements have to be specified in the budget along with the instruments to offset their impact on the budget for two consecutive years; (e) public financial institutions at all levels of government are not allowed to lend to their main shareholders. The FRL also strengthened the budgetary planning process by imposing that all public expenditures now have to be incorporated into the annual budget, including small amounts of direct financial aid that used to be off-budget and under total discretion of local politicians. Finally, the FRL established new regulation with regard to transfers of public resources to the private sector that impose an impersonal procedure reducing the ability of local politicians to extract political benefits from those transfers. Summing up, after the introduction of the FRL, governors and mayors lost significant degrees of autonomy and discretion with regard to extraction of rents and strategic manipulation of public resources for political purposes.

There are different forms of local politicians to extract political benefits on budget however there are few forms of observing it directly on municipal accounting. We found the possible of observing this effect directly through of accounting named transfers for private sector. It is not an important accounting on budget in terms of values but it is possible to observe our argumentation (results are on panel with fixed effect – see the description of variables on appendix 3).

Table 3: The Fiscal Responsibility Law effect on Transfers for Private Sector

| | <i>Transfers for Private Sector</i> |
|--------------------------------------|-------------------------------------|
| <i>Fiscal Responsibility Law</i> | -21.66* (11.82) |
| Career Controls | <i>Yes</i> |
| Political Controls | <i>Yes</i> |
| Fiscal and Municipal Controls | <i>Yes</i> |
| Observations | 8,423 |
| R² | 0.001 |

Note: Robust Standard Deviations in parentheses. *** Significance at 1%; ** Significance at 5%; * Significance at 10%. We used as controls career concerns variables (accumulate political capital and mayors' experience), political variables (left-wing mayor's party and the effective number of candidates), fiscal

¹⁴ The federal government is also prohibited from making changes in the financial clauses of the debt-restructuring agreement described in footnote 4.

variables (Federal and State transfers received by municipalities) and municipal variables (population, Gini coefficient, and rural population). See the definition, source and descriptive statistics in the appendix 3.

The results show that the FRL reduced on 21.66 reais per capita of transfers for private sector.

As pointed in the Introduction, the FRL was a nationwide institutional innovation, and so exogenous to all municipalities. Hence, there is no self-selection bias in its implementation.¹⁵ However, by changing the returns from being elected a mayor, the FRL can not only affect the decisions of elected officials, but it can also affect the types of individuals who run for mayor.¹⁶

The model in Section 3 implicitly assumes that the set of individuals who run for office is exogenous. To put it differently, the model assumes that the introduction of the FRL in 2000 did not change the set of candidates for the 2000 mayoral elections. There are reasons for believing that this is a good approximation to what happened in the reality, the main being that at the time the law was promulgated nobody was certain of the extent to which the FRL would be a credible binding constraint on the behavior of mayors.

Table 3 shows the effect of the FRL on these two fiscal variables. As we can see, the FRL is statistically significant in determining the government size and tax revenue of the average municipality (the results are significant at 1% level with a fixed-effect panel). The FRL effect is lower on tax revenues than on expenditures, though. The government size increased 35.37 reais per capita and the tax revenue increased only 5.84 reais per capita (definition of variables is in the appendix 3). The Brazilian municipalities depend on regular transfers from federal and state governments and it is very difficult to create conditions that lead to an increase in local tax revenues, even after the implementation of the FRL.

Table 4: Effect of Fiscal Responsibility Law on Government Size and Tax Revenue in Brazilian Municipalities

| | <i>Government Size</i> | <i>Tax Revenue</i> |
|--------------------------------------|------------------------|--------------------|
| <i>Fiscal Responsibility Law</i> | 35.37*** | 5.84*** |
| | (3.52) | (1.05) |
| Career Controls | <i>Yes</i> | <i>Yes</i> |
| Political Controls | <i>Yes</i> | <i>Yes</i> |
| Fiscal and Municipal Controls | <i>Yes</i> | <i>Yes</i> |
| Observations | 8,417 | 8,054 |
| R² | 0.16 | 0.20 |

Note: Robust Standard Deviations in parentheses. *** Significance at 1%; ** Significance at 5%; * Significance at 10%. We used as controls career concerns variables (accumulate political capital and mayors' experience), political variables (left-wing mayor's party and the effective number of candidates), fiscal variables (Federal and State transfers received by municipalities) and municipal variables (population, Gini coefficient, garbage collection, and rural population). See the definition, source and descriptive statistics in the appendix 3.

5 Empirical Analysis

¹⁵ We try to investigate whether there was some to change on electoral competition. We did not find any empirical evidence of it. See the appendix 2.

¹⁶ Beginning with Besley and Coate (1997) and Osborne and Slivinski (1996), there is a growing literature in political economy on the so-called "citizen-candidate" models. A number of recent papers, both theoretical and empirical, look at the impact of changes on the return from being elected to office on the decisions of individuals of whether to run for office. Theoretical papers include Caselli and Morelli (2004), Messner and Polborn (2004), and Mattozzi and Merlo (2008). Empirical papers include Brollo et al. (2009) and Ferraz and Finan (2009). See also Besley (2004) for both a theoretical and empirical analysis.

In this section we describe our empirical strategy and the data, and then present and discuss the results.

Our conjecture is that the introduction of the FRL leads to a higher supply of public goods. In order to test this hypothesis we use a fixed effect panel model with robust standard errors to estimate the impact of the FRL on three specific measures of the supply of public goods, all related to education: number of teachers, classrooms, and school enrollments. The main equation for our model is

$$y_{i,t} = FRL_t \beta_1 + x_{i,t}^l \beta_2 + z_i + \varepsilon_{i,t} \quad (8)$$

where i denotes the municipalities; t denotes the period of administration (term), with $t = 1$ before (1997-2000) and $t = 2$ after FRL (2001-2004); y is the variable interest; x is a vector control; FRL_t is a dummy variable that represents the implementation of the FRL, with $FRL_1 = 0$ and $FRL_2 = 1$; z_i is the fixed-effect term and $\varepsilon_{i,t}$ is a normally distributed stochastic component.

Brazil has approximately 5,560 municipalities. It is important to point out that from 1991 to 2000 the number of Brazilian municipalities grew by almost one thousand. Even though most new municipalities were created before 1997, there is a number of them who were created between 1997 and 2000. In order to prevent an inconsistent inter-temporal analysis, we use the minimum comparable areas (MCA) compiled by the Brazilian Institute of Geography and Statistics (IBGE) to deal with municipalities that are either split or merged.¹⁷

The variables we use to measure the supply of public goods are number of teachers, classrooms, and school enrolments, which come from the Brazilian school census. Since data from the census is only available from 1999 on, we build our measures of the supply of education in each term by taking the average of the two last years in each term (1999-2000 for the first term and 2003-2004 for the second term).¹⁸

In order to deal with specific characteristics of the municipalities, we include the following control variables in our model: career concerns variables (accumulate political capital and mayors' experience), political variables (left-wing mayor's party and the effective number of candidates), fiscal variables (Federal and State transfers received by municipalities) and municipal variables (population, Gini coefficient, garbage collection, and rural population). See the definition, source and descriptive statistics in the appendix 3.

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Table 5 shows the effect of the FRL on the number of teachers, classrooms, and school enrolments. As we can see, it is possible to observe an increase on all three variables.

[Table 5 about here]

The results from Table 5 are robust across different types of municipalities. In Table 6 we show that the effect of the FRL on the supply of education does not depend on whether the municipality has a greater or a smaller dependence on transfers. Table 6 also shows that the

¹⁷ Minimum comparable areas (MCA) consist of geographical areas defined by the Brazilian Institute of Geography and Statistics (IBGE) that are not subject to changes in the number of municipalities. They consist of municipalities and have constant codes over time. Consequently, even if municipalities split up or merge, they will remain in the same MCA.

¹⁸ We also construct our measures of the supply of education in the second term by taking the average of all four years in the term. The results practically stay the same.

effect of the FRL on the supply of education public goods is positive regardless of the population size, but is stronger for municipalities with 200.000 or more inhabitants, where elections for mayor have a runoff.

[Table 6 about here]

Main conclusions

To be added

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Table 5: Effect of Fiscal Responsibility Law on Educational Public Goods

| | <i>Municipal Teachers</i> | | | | <i>Municipal Classrooms</i> | | | | <i>Municipal Students</i> | | | |
|--------------------------------------|---------------------------|-------------|-------------|-------------|-----------------------------|-------------|-------------|-------------|---------------------------|-------------|-------------|-------------|
| | <i>[1A]</i> | <i>[1B]</i> | <i>[1C]</i> | <i>[1D]</i> | <i>[2A]</i> | <i>[2B]</i> | <i>[2C]</i> | <i>[2D]</i> | <i>[3A]</i> | <i>[3B]</i> | <i>[3C]</i> | <i>[3D]</i> |
| <i>Fiscal Responsibility Law</i> | 0.30*** | 0.29*** | 0.29*** | 0.27*** | 0.10*** | 0.08*** | 0.08*** | 0.09*** | 0.30*** | 0.28*** | 0.28*** | 0.35*** |
| | (0.003) | (0.003) | (0.003) | (0.01) | (0.003) | (0.003) | (0.003) | (0.009) | (0.006) | (0.006) | (0.006) | (0.01) |
| Career Controls | <i>No</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>No</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>No</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> |
| Political Controls | <i>No</i> | <i>No</i> | <i>Yes</i> | <i>Yes</i> | <i>No</i> | <i>No</i> | <i>Yes</i> | <i>Yes</i> | <i>No</i> | <i>No</i> | <i>Yes</i> | <i>Yes</i> |
| Fiscal and Municipal Controls | <i>No</i> | <i>No</i> | <i>No</i> | <i>Yes</i> | <i>No</i> | <i>No</i> | <i>No</i> | <i>Yes</i> | <i>No</i> | <i>No</i> | <i>No</i> | <i>Yes</i> |
| Observations | 10,900 | 9,085 | 9,085 | 8,575 | 10,903 | 9,085 | 9,085 | 8,575 | 10,903 | 9,083 | 9,083 | 8,573 |
| R² | 0.57 | 0.64 | 0.64 | 0.68 | 0.17 | 0.15 | 0.13 | 0.21 | 0.31 | 0.34 | 0.34 | 0.44 |

Note: Robust Standard Deviations in parentheses. *** Significance at 1%; ** Significance at 5%; * Significance at 10%.

Table 6: Effects of Fiscal Responsibility Law on Educational Area (com a media 99/00 e 2001/2004)

| | <i>Greater Dependency of Transfers</i> | | | <i>Smaller Dependency of Transfers</i> | | |
|--------------------------------------|---|-------------------|-----------------|---|-------------------|-----------------|
| | <i>Teachers</i> | <i>Classrooms</i> | <i>Students</i> | <i>Teachers</i> | <i>Classrooms</i> | <i>Students</i> |
| <i>Fiscal Responsibility Law</i> | 0.30*** | 0.05*** | 0.27*** | 0.28*** | 0.18*** | 0.47*** |
| | (0.02) | (0.02) | (0.05) | (0.03) | (0.03) | (0.07) |
| Career Controls | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> |
| Political Controls | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> |
| Fiscal and Municipal Controls | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> |
| Observations | 1,314 | 1,341 | 1,341 | 1,178 | 1,178 | 1,178 |
| R² | 0.69 | 0.15 | 0.15 | 0.78 | 0.46 | 0.57 |
| | <i>Smaller Municipalities Population (lower than 100.000 inhabitants)</i> | | | <i>Municipalities where the second-round is permitted (above 200.000 inhabitants)</i> | | |
| | <i>Teachers</i> | <i>Classrooms</i> | <i>Students</i> | <i>Teachers</i> | <i>Classrooms</i> | <i>Students</i> |
| <i>Fiscal Responsibility Law</i> | 0.28*** | 0.08*** | 0.35*** | 0.24** | 0.27*** | 1.18*** |
| | (0.009) | (0.008) | (0.01) | (0.11) | (0.08) | (0.43) |
| Career Controls | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> |
| Political Controls | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> |
| Fiscal and Municipal Controls | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> |
| Observations | 7,692 | 7,692 | 7,690 | 153 | 153 | 153 |
| R² | 0.71 | 0.17 | 0.43 | 0.87 | 0.72 | 0.62 |

Note: Robust Standard Deviations in parentheses. *** Significance at 1%; ** Significance at 5%; * Significance at 10%.

Appendix 1

Table A.1.1. shows the correlation between the social expenditure, public education goods (teachers, students, and schools) and the probability of mayor's reelection on both the 2000 and 2004 local elections.

We used both a Probit model and the same controls variables of main results. The definition of variables and their descriptive statistics can be seen on appendix 3.

Table A.1: Probability of mayor's reelection

| Independent Variables | Dependent variable: Reelection | | | | | | | |
|--|--------------------------------|-----------------------|-------------------|-------------------|-------------------|------------------|----------------|------------------|
| | 2000 | 2004 | 2000 | 2004 | 2000 | 2004 | 2000 | 2004 |
| Social Expenditure | 0.0003*** (0.0009) | 0.0001** (0.00006) | | | | | | |
| Municipal Teachers | | | 0.14*** (0.02) | 0.08*** (0.02) | | | | |
| Municipal Students | | | | | 0.07*** (0.01) | 0.08** (0.02) | | |
| Municipal Schools | | | | | | | 0.03 (0.02) | 0.07** (0.01) |
| Career, Political, Fiscal and Municipals controls | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> | <i>Yes</i> |
| Log pseudolikelihood | -1209.92 | -1416.44 | -1971.39 | -2914.24 | -1977.24 | -2914.65 | -2914.72 | -2914.72 |
| Pseudo R² | 0.05 | 0.04 | 0.05 | 0.03 | 0.04 | 0.03 | 0.04 | 0.03 |
| Obs.P | 0.38 | 0.28 | 0.38 | 0.24 | 0.38 | 0.24 | 0.38 | 0.24 |
| Pred.P | 0.37 | 0.27 | 0.38 | 0.23 | 0.38 | 0.23 | 0.38 | 0.23 |

Notes: *** 1%, **5%, *10%. For each independent variable we report (dF/dx), i.e., the marginal change in the probability of success for the average values of the other independent variables. In parentheses, we report the standard error robust (Huber/White/Sandwich).

Such as social expenditure as public education goods are correlated positively with the probability of mayor's reelection except for the student variable. Moreover, the public education goods are more correlated with the mayor's reelection than with the social expenditure.

Appendix 2

The Brazilian political system is enough opening for new candidates (Mainwaring, 2002), including a race for executive local. Politicians are relatively free to find new parties whether they to want to be a candidate. Samuels (1997) shows that the elevated mobility is consequence of individualism. Thus, there are parties for all politician demands. In 1996 election, for instance, 23 different parties won the local election. Table A.2.1. shows the name of parties and the number of municipalities which a specific party occupied in 1996 election:

Table A.2.1: Name of parties and the number of municipalities which the party held in 1996 election

| <i>Party</i> | | <i>Party</i> | | <i>Party</i> | | <i>Party</i> | | <i>Party</i> | |
|--------------|------|--------------|-----|--------------|----|--------------|----|--------------|-------------|
| PMDB | 1304 | PTB | 382 | PSC | 49 | PSL | 11 | PTN | 2 |
| PFL | 936 | PL | 223 | PPS | 32 | PST | 9 | PRTB | 2 |
| PSDB | 925 | PSB | 150 | PRP | 31 | PT do B | 5 | PRONA | 1 |
| PPB | 624 | PSD | 120 | PMN | 30 | PSDC | 2 | <i>Total</i> | <i>5403</i> |
| PDT | 436 | PT | 114 | PV | 13 | PSN | 2 | | |

Source: IPEA (www.ipeadata.gov.br)

Into this world, differences between individual politicians and parties can not exist. Thus, the effective number of parties can represent the effective number of candidates to see whether the FRL change the politic participation of candidates. Table A. 2.2. shows the effective number of parties on two elections: 1996 and 2000:

Table A.2.2: Effective Number of Candidates (Parties)

| Descriptive Statistics | 1996 | 2000 |
|-------------------------------|-------------|-------------|
| Average | 2.21 | 2.16 |
| Standard Deviation | 0.56 | 0.53 |
| Maximum | 5.86 | 6.00 |
| Minimum | 1 | 1 |

Source: IPEADATA. See appendix 3 on the variable Effective Number of Candidates.

The description of effective number of candidates can be sawn on appendix 3. The results for two elections are very similar on average, standard deviation, maximum, and minimum. The results are similar. Therefore, there is not evidence that competition on local executive to change.

Appendix 3: Definitions of variables used in the estimations, their sources and descriptive statistics

Dependent variables

Government Size – The variable considers average per capita of current expenditure in each municipality for two different terms (1997-2000 and 2001-2004). The mayor's term is fixed by law (four years). The values are in Reais and were deflated based on the National Consumer Price Index (INPC – 2000). Source: IPEA (www.ipeadata.gov.br).

Tax Revenue – The variable considers average per capita of tax revenue in each municipality for two different terms (1997-2000 and 2001-2004). Brazilian municipalities have

two types of taxes: property tax (IPTU) and service tax (ISS). The values are in Reais (Brazilian currency) and were deflated based on the National Consumer Price Index (INPC – 2000). Source: IPEA (www.ipeadata.gov.br).

Transfers for Private Sector – The variable consider average per capita of transfers for Private Sector in each municipality for two different terms. Considering that the methodology of municipality accounting changed, we have date of 1998-2000 for the first term and 2001for the second term. The values are in Reais (Brazilian currency) and were deflated based on the National Consumer Price Index (INPC – 2000). Source: IPEA (www.ipeadata.gov.br).

Municipal Teachers, Classrooms, and Students – The variable considers logarithm of average public teachers (classrooms or students) in each municipality in the two final years of each fixed term (1999-2000 and 2003-2004). We compared the last two years of municipal term because we did not have data from School Census published for four years in the first term (1997-2000). This variable is taken from School Census - INEP – Ministry of Education (www.inep.gov.br)

Controls variables

Career controls

Accumulate Political Capital – The variable considers the percentage of votes gets by elected mayor in the first-round election before of term started (1996 and 2000 elections). This variable meets the historical politician on both public and private jobs to evaluate by voters. Finan and Ferraz (2008) used different variables to control mayor's experience: reelection and past experience (on both local administration and local legislator). We achieve to use the percentage of votes in the first round considering that political capital depends on public's approval or disapproval of a politician's performance (see Nee and Opper, 2008). Then, the percentage of votes captures this two sides. Source: IPEA (www.ipeadata.gov.br).

Mayor's experience – The variable considers the aging of mayors in the election year (1996 and 2000). Source: MUNIC (IBGE). Empirical works in labor area frequently to use the aging of individuals as proxy of experience.

Political Controls

Left-wing Mayor's Party – This variable is a dummy with value one if the mayor's political party is located in the left-wing of the ideological spectrum in two consecutive terms (1997-2000 and 2001-2004), and zero, otherwise. Source: Brazilian Electoral Court (TSE – www.tse.gov.br) and ideological classification by Coopedge (1997)

Effective number of candidates - The variable considers the effective number of candidates. It is a frequent operationalization for the fragmentation (1996 and 2000). The effective number of candidates was building considering the candidates of a party or coalition of parties which received vote on Executive Municipal Election (1996). Our measure is similar to find on Lakso and Taagepera (1979) to compute the effective number of parties:

$$N = \frac{1}{\sum_{i=1}^n p_i^2}$$

where N is the effective number of candidates and p_i^2 is the square of percentage of votes received by each candidate. Source: Supreme Electoral Court (TSE).

Fiscal and Municipal Controls

Federal Transfers – The variable considers logarithm of per capita transfers from federal government to municipalities established by law in the first year of term (1997 and 2001). The values are in Reais and were deflated based on the National Consumer Price Index (INPC – 2000). Source: IPEA (www.ipeadata.gov.br).

State Transfers – The variable considers logarithm of per capita transfers from state government to municipalities established by law in the first year of term (1997 and 2001). The values are in Reais and were deflated based on the National Consumer Price Index (INPC – 2000). Source: IPEA (www.ipeadata.gov.br).

Population – The variable considers total population in each municipality (1996 and 2000). Source: IPEA (www.ipeadata.gov.br)

GINI coefficient – The variable considers the Gini coefficient in each municipality (1991 and 2000). Source: IPEA (www.ipeadata.gov.br)

Garbage collection – The variable considers the percentage of households with garbage collection in each municipality (1991 and 2000). Source: IPEA (www.ipeadata.gov.br)

Rural Population – The variable considers the percentage of rural population in each municipality (1996 and 2000). Source: IPEA (www.ipeadata.gov.br)

Table A.3.1: Descriptive Statistics

| Name of Variables | Observations | | Average | | Std. Dev. | | Minimum | | Maximum | |
|--------------------------------|----------------------|--------------------|----------------------|--------------------|----------------------|--------------------|----------------------|--------------------|----------------------|--------------------|
| | <i>Period(Years)</i> | | <i>Period(Years)</i> | | <i>Period(Years)</i> | | <i>Period(Years)</i> | | <i>Period(Years)</i> | |
| Government Size | <i>First term</i> | <i>Second Term</i> | <i>First term</i> | <i>Second Term</i> | <i>First term</i> | <i>Second Term</i> | <i>First term</i> | <i>Second Term</i> | <i>First term</i> | <i>Second Term</i> |
| | 5377 | 5398 | 326.70 | 354.37 | 183.98 | 184.00 | 14.33 | 42.96 | 2235.39 | 2742.38 |
| Tax Revenue | <i>First term</i> | <i>Second Term</i> | <i>First term</i> | <i>Second Term</i> | <i>First term</i> | <i>Second Term</i> | <i>First term</i> | <i>Second Term</i> | <i>First term</i> | <i>Second Term</i> |
| | 4734 | 5398 | 19.93 | 27.35 | 42.45 | 46.96 | 0 | 0 | 1044.73 | 930.28 |
| Political Capital Accumulated | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> |
| | 5399 | 5504 | 0.54 | 0.55 | 0.12 | 0.12 | 0.22 | 0.23 | 1 | 1 |
| Mayor's experience | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> |
| | 3657 | 5513 | 46.94 | 48.71 | 9.84 | 9.42 | 22 | 19 | 90 | 85 |
| Left- Wing Mayor's Party | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> |
| | 5402 | 5404 | 0.30 | 0.31 | 0.46 | 0.46 | 0 | 0 | 1 | 1 |
| Effective number of candidates | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> | <i>1996</i> | <i>2000</i> |
| | 5399 | 5504 | 2.21 | 2.16 | 0.56 | 0.53 | 1 | 1 | 5.89 | 6.00 |
| Federal Transfers | <i>1997</i> | <i>2001</i> | <i>1997</i> | <i>2001</i> | <i>1997</i> | <i>2001</i> | <i>1997</i> | <i>2001</i> | <i>1997</i> | <i>2001</i> |
| | 1856 | 5398 | 1.95 | 2.16 | 0.62 | 0.30 | 4.31 | 1.52 | 3.13 | 3.19 |
| State Transfers | <i>1997</i> | <i>2001</i> | <i>1997</i> | <i>2001</i> | <i>1997</i> | <i>2001</i> | <i>1997</i> | <i>2001</i> | <i>1997</i> | <i>2001</i> |
| | 3386 | 3078 | 1.45 | 1.52 | 0.61 | 0.51 | 2.66 | 2.33 | 2.69 | 2.68 |
| Municipal Teachers | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> |
| | 5343 | 5557 | 1.78 | 2.08 | 0.47 | 1.43 | 0.30 | 1.07 | 4.42 | 4.69 |
| Municipal Classrooms | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> |
| | 5343 | 5557 | 1.10 | 1.18 | 0.52 | 0.48 | 0.30 | 0 | 2.98 | 3.17 |
| Municipal Students | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> | <i>1999-2000</i> | <i>2003-2004</i> |
| | 5341 | 5557 | 3.11 | 3.39 | 0.53 | 0.48 | 0.92 | 2.18 | 5.78 | 6.12 |
| Population | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> |
| | 4974 | 5507 | 31578.24 | 30833.33 | 183830.3 | 186750.6 | 768 | 795 | 9839066 | 1.04e+07 |
| Gini coefficient | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> |
| | 5507 | 5507 | 0.52 | 0.56 | 0.05 | 0.05 | 0.34 | 0.35 | 0.79 | 0.81 |
| Garbage collection | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> |
| | 5175 | 5506 | 52.71 | 79.76 | 32.51 | 24.64 | 0 | 0 | 100 | 100 |
| Rural Population | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> | <i>1991</i> | <i>2000</i> |
| | 4974 | 5507 | 1.62 | 1.84 | 6.53 | 6.83 | 0 | 0 | 72.98 | 66.39 |

Note: First Term (1997-2000); Second Term (2001-2004)

