

Privatization as a Political Strategy: Evidence from Brazilian Basic Sanitation

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This version: 10-05-2013

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Abstract

Privatization changes incentives and, as such, changes how efficiently a good or service is provided. Privatization may also be used as a political strategy, inasmuch as it restricts the discretion of future incumbents. We claim that political competition is a key variable for explaining the decision to privatize as a public service. This paper tests this hypothesis in the context of the privatization of sanitation services in Brazil (water supply and sewage collection). Based on a panel of municipalities from 1997 to 2007, we found that privatization becomes more likely the higher the political risk (i.e., the likelihood of not remaining in power) to mitigate the discretion of the future incumbent. Privatization is also more likely in municipalities in which mayors do not belong to the coalition parties of their states' governors, which we also interpret as a strategy to reduce the discretion of political rivals because public provision is sometimes undertaken by state companies. Furthermore, our findings indicate that legislative control is relevant for promoting privatization and that electoral cycles are consistent with the decision to privatize as a strategy to reduce the discretion of future incumbents. Inasmuch as privatization is, by and large, associated with the improved provision of water and sewage services, we submit that political competition leads to better public policy in this case.

Keywords: Sanitation; Privatization; Political Competition; Political Risk.

1. Introduction

Empirical studies by and large associate privatization to higher efficiency, even in natural monopolies, such as sanitation services. There is also evidence that if appropriate

regulations and governance structures are adopted, gains in efficiency can be translated into improvements in quality, as well as equitable access¹. One might therefore wonder why governments tend to be reluctant to employ privatization and opt to maintain public provision, especially in certain public services.

Resistance to privatization may result from the fact that it decreases the discretion of the incumbent administration, reducing its control over assets and services that could be used by the incumbent authority. In sanitation services, for example, governments may tolerate illegal connections and defaulters, not measure consumption, not charge or readjust fees and increase the number of employees. All of these strategies may jeopardize the financial stability of the service provider but can attract political support. Certain administrations, however, do opt for privatization. An interesting question therefore pertains to what motivates some governments to privatize public services. The literature suggests that potential motivations include both economic and political factors.

Efficiency gains are joined by other economic factors, such as the existence of fiscal constraints that result in low investment capacity. Political factors include support from the Legislature, party ideology and alignment with higher levels of government. In addition to those motives, we submit that privatization can be adopted as a political strategy that aims to reduce discretion of the future incumbent, and, as such, to raise political rival costs.

What would lead governments to adopt a strategy that, by reducing the performance discretion of any incumbent opponent, would also reduce its own scope of activity? According to evidence in the delegation literature, one possible answer is related to the electoral risk perceived by the politician. It could be expected that the greater the uncertainty of success in the next election, the greater the government's motivation to "tie the hands" of the next administration. This hypothesis is tested in this study in relation to the privatization of sanitation services (water supply and sewage collection) in Brazil at the municipal level. This empirical strategy has the advantage of exploring the large horizontal variability of political competition and privatization decisions (i.e., between municipalities) in the same institutional context (i.e., the same rules of the game), which is something that would be impossible in a cross-country study. To the best of our knowledge, no other study has evaluated this perspective of local public service privatization, and this assessment is an original contribution of this article.

In almost all Brazilian states, there are state sanitation companies (*companhias estaduais de saneamento básico* – CESBs), which are mostly controlled by state governments. Therefore, in addition to privatizing or providing services directly, mayors have the option of granting the concession to a CESB. The existence of this alternative means that it is possible that privatization in Brazilian sanitation may be adopted by mayors as a political strategy to reduce (or not increase) the scope of activities of state governors from opposition parties. The present article finds support to this hypothesis, and also to the role of the Legislature and the risk of re-election for councilors.

We tested these hypotheses by means of a panel of municipal data for the period from 1997 to 2007. The *panel probit* and *pooled probit* models allow us to take into account the

¹ For evidence from different sectors in different countries, see for example, Shleifer and Vishny (1994), Hart et al (1997), Frydman et al (1999), Ménard and Saussier (2000), Estache et al (2001), Megginson and Netter (2001), Birdsall and Nellis (2003), Hart (2003), Galiani et al (2005), Makadok and Coff (2009), Cabral et al (2010) and Levin and Tadelis (2010).

timing of the decision to privatize, in order to further explore the hypothesis of privatization as a political strategy. The article is divided into five sections, including this introduction. In the second section, privatization of Brazilian sanitation is briefly described. In section three, estimation strategies are discussed. The fourth section discusses the results, highlighting the political determinants of privatization, and the fifth section provides conclusions and implications for future work.

2. Privatization of Brazilian basic sanitation services

Providers of sanitation services in Brazil can be divided into four groups based on their legal-administrative nature and the scope of their work: regional public, local public, regional private and local private. The first group comprises the CESBs, which are controlled by state governments and are responsible for provision in several municipalities. The second corresponds to providers controlled by municipal governments, which are responsible for provision in one municipality or in small local consortia. The third is composed only of the CESB of the state of Tocantins, Brazil, which became a joint stock enterprise with private control. The fourth includes private companies responsible for provision in one municipality or in small consortia.

Table 1 shows that by 2010, few municipalities had opted for privatization and that sanitation services came predominantly from public providers: regional public in the case of water, and local public in the case of sewage. The predominance of public provision and the distinct distribution of public providers between services can be attributed to the National Sanitation Plan (Plano Nacional de Saneamento – PLANASA), which lasted from 1971 to 1992. PLANASA was a centralized model of investment financing through which mechanisms were adopted that induced most municipalities to grant the services to the CESBs of their respective states. Nevertheless, a portion of municipalities did not adopt the Plan. For economic or political reasons, water supply concessions were prioritized by PLANASA².

Table 1
Distribution of municipalities and population according to type of sanitation service provider (2010)

Services / Providers		Total	Local Public		Regional Public		Local Private		Regional Private	
			n.	%	n.	%	n.	%	n.	%
Water	municipalities	5,566	1,527	27.43	3,851	69.19	63	1.13	125	2.25
	population*	191.48	43.23	22.58	139.83	73.02	7.24	3.78	1.19	0.62
Sewage	municipalities	5,566	4,325	77.70	1,062	19.08	67	1.20	112	2.01
	population*	191.48	89.41	46.69	89.32	46.65	11.62	6.07	1.13	0.59

Sources: Ministry of Cities, Brazilian Association of Private Concessionaires of Public Water and Sewage Utilities (Associação Brasileira das Concessionárias Privadas de Serviços Públicos de Água e Esgoto - ABCON) and Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística - IBGE). Note: * Millions of inhabitants.

According to Table 2, in 2010, water was supplied by regional private providers in 125 municipalities and by local private providers in 63 municipalities. Sewage was supplied by regional private providers in 112 municipalities and local private providers in 67

² For more details about PLANASA, see, among others, MPO and Institute of Applied Economics (Instituto de Pesquisa Econômica Aplicada – IPEA) (1995).

municipalities. In most municipalities, privatization occurred in full, i.e., both services were provided privately, although not necessarily at the same time. In other municipalities, only one service was privatized (partial concession). The rules to be followed in public service concessions in Brazil were established in 1995 by the Concessions Law (Law No. 8,987). It is noteworthy that, except in one case, privatization in sanitation, structured as concessions, was adopted only after this law came into effect. This law states that it is necessary to establish a contract with a private company, even in municipalities that are already supplied by state companies. It can therefore be said that the decision to privatize is taken in the municipal level.

Table 2
Number of municipalities according to first year of private operation and types of privatization (1994 to 2010)

Years	Local Private			Regional Private		
	Full (water and sewage)	Partial		Full (water and sewage)	Partial	
		Water	Sewage		Water	Sewage
1994	0	1	0	0	0	0
1995	2	1	0	0	0	0
1996	0	1	0	0	0	0
1997	2	1	0	0	0	0
1998	11	0	1	0	0	0
1999	5	1	0	84	9	0
2000	8	0	1	0	1	0
2001	5	0	2	19	3	0
2002	5	0	0	0	0	0
2003	3	0	1	1	0	0
2004	6	0	1	0	0	0
2005	0	0	0	0	0	0
2006	0	0	0	0	0	0
2007	6	0	3	3	0	0
2008	2	0	1	3	0	0
2009	1	1	0	1	0	0
2010	1	0	0	1	0	0
Total	57	6	10	112	13	0

Sources: Ministry of Cities and ABCON.

In the same year as the enactment of the Concessions Law (1995), public services were included in the National Privatization Program (Programa Nacional de Desestatização – PND), which initiated a new phase of large-scale Brazilian privatization under the government of President Fernando Henrique Cardoso (FHC). In addition to directly privatizing several state companies, the federal government encouraged other levels of government to adopt this policy³. Table 2 shows that most privatization in sanitation occurred under the FHC government (1995-2002), although this period was marked by several regulatory uncertainties in the sector.

The prevalence of privatization in this period clearly reflects the preferences of the federal government. Nevertheless, in the government of President Luis Ignacio Lula da Silva

³ In an international *survey* on major cases of privatization, Megginson and Netter (2001) highlight the cases that occurred under the FHC government.

(Lula) (2003-2010), who succeeded FHC, privatization was not discouraged. In fact, Laws No. 11,079 (Law of Public-Private Partnerships) and 11,107 (Law of Public Consortia and Associated Management), both of which created new opportunities for private participation⁴, were passed during the Lula administration.

During part of the tenure of the FHC, Brazil suffered the consequences of the crisis from the previous decades, which reduced available federal resources and, along with the liberalization of withdrawal rules, reduced the net revenue of the Time of Service Guarantee Fund (Fundo de Garantia por Tempo de Serviço – FGTS), the main source of funds for investment in sanitation. To address the crisis, mechanisms were adopted to meet *surplus* targets, among which were credit contingencies for the public sector, which in certain years reduced or even banned the Caixa Econômica Federal (CEF) from signing loan contracts to finance sanitation projects. In the Lula government, the decline in the net collection of the FGTS was reversed, and contingencies for sanitation loans were removed⁵. Thus, the prevalence of privatization under the FHC government may also reflect a set of unfavorable public funding circumstances.

Finally, it should be noted that some studies have observed that privatization in the Brazilian sanitation sector may be associated with the previous conditions of provision⁶. In municipalities served by inefficient public providers, the propensity to privatize tends to be higher. If the provider were a CESB, the propensity would be greater towards the end of the term defined in the concession agreement. The case of the former CESB of the state of Mato Grosso can be used as an example. In 2000, due to the inefficiency of this CESB, it was discontinued, and the services were transferred to the municipalities. Over time, certain municipalities have privatized these services.

There should therefore be controls for the circumstances before privatization, such as performance indicators for service providers and contractual conditions, which have been included in the present study. However, specific provision and contract data are not available for all municipalities for every year. This is a limitation of the study, which can, however, be mitigated by controlling for fixed effects. Moreover, the issue of contracts with CESBs is relative because a significant number of these are irregular, have expired or do not exist⁷.

2. Empirical strategies

Plenty of studies have empirically investigated the factors that influence the decision of local governments to privatize public services, including basic sanitation. Several of these studies, however, use data only from the period after privatization, which means that the dependent variables do not represent the decision to privatize but the provision mode during the period⁸. Thus, the results correspond to correlations between the provision mode and other variables but do not properly address the governments' motivations to privatize.

⁴ See, for example, Philippi Júnior and Galvão Júnior (2012).

⁵ See, for example, Motta and Moreira (2005) and Galvão Júnior (2009).

⁶ These studies evaluated restricted sets of privatization cases, which makes generalization difficult. See for example, Mello (2005), Ministry of Cities (2009) and Philippi Júnior and Galvão Júnior (2012).

⁷ See Ministry of Cities (2009), among others.

⁸ Criticism made by Bel and Fageda (2007), Miralles (2009), Bel et al (2010) and Picazo-Tadeo et al (2011).

Observing whether provision is public or private in a given period for a given group of municipalities would enable us to ascertain why some municipalities were served by private providers during that period, but it would not tell us why the government decided to privatize at any given time (Miralles, 2009). The results would be similar whether the explanatory variables were constant over time or whether the decision were reversible; that is, if the government decided the type of provision in every period. However, the variables that determine privatization change over time; certain variables are influenced by the private provision itself, which is not easily reversed⁹.

Therefore, to assess what motivated the government of municipality i to privatize a public service in year t , it is necessary to consider the explanatory variables that are also observed in t . In several studies, this has been performed through *cross-sectional* data estimation, in which only the municipalities that adopted private provision or maintained public provision in the year under review were considered, and cases of previous (or later) privatizations were excluded from the sample¹⁰. Such a strategy, in addition to generating a sample selection bias, does not allow us to control for changes in incentives at different moments in time. Other studies have used explanatory variables measured in the decision year for municipalities that implemented privatization but mean values per period for others¹¹. The use of means values, however, can bias the results because some variables change over time. Thus, methods with *pooled* or panel data are more appropriate¹². In this study, two such methods are adopted.

To substantiate choices using empirical tests, it can be assumed that the mayor of municipality i decides to privatize in t if this increases his expected utility, which is represented by (I) ¹³.

$$\Delta U_t^i = X_{it}\beta_t + \varepsilon_{it}, \quad (1)$$

where ΔU_t^i is the change in expected utility of the mayor of municipality i in the year in which the privatization decision is made (t)¹⁴; X_{it} is a row vector of explanatory variables for the municipality i in year t ; β_t is a column vector of coefficients associated with the variable X_{it} and ε_{it} is a random error.

To make his decision, as represented by (2), the mayor considers the current (observable) values of the explanatory variables. The term D_{it} corresponds to a binary variable that takes the value of one if, in municipality i , the decision to privatize at least one of the sanitation services (water supply and sewage collection) occurred in year t . That is, the

⁹ A contract usually delineates a term and penalties. Thus, the reversal of privatization involves high costs.

¹⁰ Ménard and Saussier (2000) and López-de-Silanes et al (2007), among others.

¹¹ For example, Bel and Miralles (2003), Bel et al (2010) and Picazo-Tadeo et al (2011).

¹² Aspect defended by Miralles (2009). In addition to this work, only those by Chandler and Feuille (1994), Galiani et al (2005) and González-Gómez and Guardiola (2009) were found to use these types of estimation methods.

¹³ This follows, with adaptations, the formalizations of Miralles (2009) and Bel et al (2010).

¹⁴ Chandler and Feuille (1994) consider variations in votes rather than utility. For practical purposes, the two approaches achieve the same goal, so it is reasonable to assume that the utility of governors depends on the number of obtained votes.

variable is equal to one only in municipalities that privatized the service(s) and only in the decision year. In other years and municipalities, it is equal to zero¹⁵.

$$D_{it} = \begin{cases} 1 & \text{if } \Delta U_t^i = X_{it}\beta_t + \varepsilon_{it} > 0 \\ 0 & \text{if } \Delta U_t^i = X_{it}\beta_t + \varepsilon_{it} \leq 0 \end{cases} \quad (2)$$

D_{it} is the dependent variable in the estimations. Because it is a binary variable, the *probit panel*¹⁶ method is used. The latent variable is the change in expected utility (ΔU_t^i). Thus, the factors that influence the probability (*Prob*) of the mayor of a municipality i deciding to privatize at least one of the sanitation services (water supply and/or sewage collection) in year t are estimated. The privatization process in the Brazilian sanitation sector takes an average of approximately 12 months¹⁷. Therefore, it was assumed that the decision to privatize occurred one year before the beginning of private provision. Thus, the explanatory variable X_{it} also refers to the year before privatization¹⁸.

Due to the availability of certain information, the study comprises the period from 1997 to 2007. The municipalities that decided to privatize before 1997 or after 2007 are therefore disregarded, and the 185 municipalities in which privatization was initiated between 1998 and 2008 were analyzed (see Table 2). The estimated models are based on equation (3), in which the vector of explanatory variables X_{it} is divided into two groups: political and ideological variables (X_{it}^P) and control variables (X_{it}^C).

$$\text{Prob}(D_{it} = 1 | X_{it}^P, X_{it}^C) = \beta_0 + X_{it}^P\beta_1 + X_{it}^C\beta_2 + \varepsilon_{it} \quad (3)$$

The political and ideological variables shown in Box 1 were calculated using the results of three municipal elections (1996, 2000 and 2004) and four state and federal elections (1994, 1998, 2002 and 2006). The *proportion of votes* and *competitive mayoral election* variables are of greatest interest and are used to test the central hypothesis of the study: the electoral risks perceived by mayors influence the privatization decision and privatization is adopted to reduce the discretion of the next administration. The *coalition*, *fractionalization*, *competitive councilor election*, *cycle 2 dummy*, *cycle 3 dummy*, *cycle 4 dummy* and *governor affinity* variables are important for the complementary testing of the main hypothesis and in identifying other political strategies that may have motivated privatization in certain municipalities.

We also assume that politicians are motivated by political survival (reelection, election to other offices or election of their successors)¹⁹ and they may use the public services under

¹⁵ D_{it} can take the value of one over two years if the privatization of services in a municipality is not concurrent, which occurred in some cases. In others, only one service was privatized, maintaining the possibility of a new privatization.

¹⁶ Random effects are considered because some explanatory variables are fixed in time. Moreover, in this method, fixed effects may result in incidental parameter bias. See, among others, Greene (2004).

¹⁷ As verified by the Ministry of Cities (2009).

¹⁸ This option is consistent with Chandler and Feuille (1994)'s suggestion of using lagged regressors because the decision to privatize is not instantaneous and, after it has started, it may influence the explanatory variables. Municipalities with privatization and when this privatization started were identified by ABCON and the National Information System on Sanitation (Sistema Nacional de Informações sobre Saneamento - SNIS) of the Ministry of Cities.

¹⁹ This behavior is assumed or demonstrated in several studies, such as Downs (1957), Ferejohn (1986) and Rogoff (1990).

their control, including sanitation services, to obtain support and maximize electoral opportunities (e.g., by tolerating defaulters or maintaining fees and appointments)²⁰.

Box 1
Political and ideological explanatory variables (X_{it}^P)

Variables	Descriptions
Proportion of Votes	Proportion of valid votes in the first round of the election in which the mayor was elected
Competitive Mayoral Election	<i>Dummy</i> that takes the value of one if the mayoral election was competitive
Coalition	<i>Dummy</i> that takes the value of one if more than 50% of councilors are in the mayor's coalition
Fractionalization	Rae and Taylor's (1970) index of fractionalization on the council
Competitive Councilor Election	<i>Dummy</i> that takes the value of one if the councilor election was competitive
Cycle 2 <i>Dummy</i>	<i>Dummy</i> that takes the value of one in the second year of the electoral cycle (mayor's second year in office)
Cycle 3 <i>Dummy</i>	<i>Dummy</i> that takes the value of one in the third year of the electoral cycle (mayor's third year in office)
Cycle 4 <i>Dummy</i>	<i>Dummy</i> that takes the value of one in the fourth year of the electoral cycle (mayor's fourth year in office)
Governor Affinity	<i>Dummy</i> that takes the value of one if the mayor belongs to a party that is in the governor's coalition
President Affinity	<i>Dummy</i> that takes the value of one if the mayor belongs to a party that is in the president's coalition
Public Administration	Ratio of employees in public administration to total number of formal employees
Low Income	Ratio of formal employees earning less than twice minimum wage to total formal employees
PSDB <i>Dummy</i>	<i>Dummy</i> that takes the value of one if the mayor belongs to PSDB or traditionally affiliated parties *
PT <i>Dummy</i>	<i>Dummy</i> that takes the value of one if the mayor belongs to PT or traditionally affiliated parties**
FHC <i>Dummy</i>	<i>Dummy</i> that takes the value of one during the government of President Fernando Henrique Cardoso (FHC)

Notes: * Brazilian Social Democratic Party (Partido da Social Democracia Brasileira – PSDB), Liberal Front Party (Partido da Frente Liberal – PFL), which became the Democratic Party (DEM). ** Workers' Party (Partido dos Trabalhadores – PT), Brazilian Socialist Party (Partido Socialista Brasileiro – PSB), Brazilian Communist Party (Partido Comunista do Brasil – PC do B), Brazilian Republican Party (Partido Republicano Brasileiro – PRB) and Liberal Party (Partido Liberal – PL).

Several studies suggest that the determinants of privatization include fiscal, economic, political and ideological aspects. Few of them submit that privatization may be used as a political strategy, so as to reduce discretion of the next government or bureaucracy²¹. Following this line of reasoning, an unexplored question relates to what would motivate governments to employ a strategy that by reducing the discretion of any incumbent opponent, would also decrease their own scope of activity. The delegation of power literature suggests the electoral risk perceived by the politician as an answer to this question²². The greater the

²⁰ As argued by Estache et al (2001), Ménard and Saussier (2000) and Galiani et al (2005), among others.

²¹ See, for example, Bös (1991), Boycko et al (1996), Dweck (2000), and Dinc and Gupta (2011).

²² Volden (2002), Baum (2007), Melo et al (2009) and Pereira et al (2010), among others.

uncertainty of electoral success in the next election is (reelection or election of a successor), the greater the motivation of the governor to reduce discretion of the next administration²³.

If such motivation exists, mayors who face lower probability to remain in power would be more likely to privatize. The *proportion of votes* and *competitive mayoral election* variables are *proxies* for the degree of electoral risk perceived by mayors. The former is indicated by some studies as a determinant of a mayor's electoral performance or that of the candidate he supports in the next election²⁴. According to Pereira et al (2009), it is plausible to expect that if a mayor does not face difficulties, the likelihood of success in the next election is high. Moreover, as highlighted by Peltzman (1992) and Mendes and Rocha (2007), voters who are loyal to particular candidates or parties will support them in the next election regardless of their *performance* during their term in office. One can therefore assume that the lower the proportion of votes obtained in the previous election is, the greater the electoral risk perceived by the mayor.

Santos (1997) proposes, as an index of electoral competitiveness, the ratio of the number of candidates to twice the number of seats, subtracting one unit from the result. If the value is greater than 0.6, then the election is classified as competitive. If the number of candidates were equal to the number of seats, there would be no competition. Thus, it is necessary to have at least two candidates per seat (one seat in the case of mayors). The subtraction of the unit seeks to strengthen the classification of the election as competitive. The variable *competitive mayoral election (dummy)* follows this procedure.

According to Cossio (2001), the level of population information, the sophistication of the electorate and government transparency tend to be higher as the degree of electoral competitiveness increases. Furthermore, a greater number of options (candidates) limits the maintenance of hegemony and the employment of illegal practices to obtain votes. Thus, according to Alston et al (2009) and Melo et al (2009), in a competitive political environment, the probability of a governor being succeeded by a political opponent is greater and consequently the perceived electoral risk of such a governor is higher²⁵. The *competitive mayoral election* variable would therefore also be a *proxy* for perceived electoral risk.

The support of the Legislature is fundamental for the effective implementation of privatization. It might therefore be expected that the likelihood of privatization will be higher in coalition governments. Having a majority in the Legislature reduces the need for political negotiation²⁶. Therefore, the *coalition* variable is employed. To control for difficulties in negotiations, the *fractionalization*²⁷ variable, which can also be a measure of a politician's electoral risk (mayors and councilors), is used. On the one hand, greater fractionalization tends to increase the need for negotiation, influencing the politician's performance and thus the

²³ Melo et al (2009) and Pereira et al (2010) found evidence to suggest this type of reasoning among Brazilian politicians in their delegation of power and degree of autonomy to regulatory agencies, audit institutions and the judiciary.

²⁴ For corroborative evidence in the case of Brazilian municipalities, see Mendes and Rocha (2007) and Menezes et al (2011).

²⁵ Menezes et al (2011) present evidence that increased competition reduces the likelihood of the reelection of the mayor.

²⁶ Picazo-Tadeo (2010) presents evidence of the relevance of having a majority in the Legislature to the privatization of local water services in Spain.

²⁷ This variable corresponds to the index of electoral fractionalization proposed by Rae and Taylor (1970), which is calculated as the difference between unity and the sum of the squares of the proportion of each party's seats on the council.

results of the next election. On the other hand, a high level of fractionalization signals the existence of voters with different preferences, which may hinder the ability of a political group to stay in power²⁸.

In this context, whether councilor support of privatization is also influenced by electoral risk is questionable. If it is not a popular measure, it is reasonable to expect that councilors who face greater risks in relation to success in the next election would tend not to approve it. It must be considered that the absence of a reelection limit for the Legislature in Brazil means that the councilors themselves suffer the electoral consequences of unpopular actions. The *competitive councilor election* variable is used as a *proxy* for the electoral risk perceived by councilors and is calculated according to Santos (1997).

Several studies have evaluated whether governors behave differently at different stages of their election cycles²⁹. Regarding privatization, Picazo-Tadeo et al (2010) examined whether the decision to privatize local Spanish water supply services was influenced by the stage in the electoral cycle. Considering privatization to be an unpopular measure and voters to be "myopic", the authors expected to find a higher probability of privatization in the first half of cycles. Their study found, however, the opposite result, which they interpreted as being due to bureaucratic delays.

The perspective of privatization as a political strategy allows for a different interpretation of such evidence: at the beginning of their terms, governments have fewer incentives to privatize because they want to benefit from greater discretion in the management of services, which can be used to satisfy their political goals. Throughout their terms, certain leaders may realize that their electoral risks have increased (or have not decreased). Thus, these leaders now have more incentives to privatize to "tie the hands" of their successors. To evaluate this possibility, the *cycle 2 dummy*, *cycle 3 dummy* and *cycle 4 dummy* variables are incorporated into the estimations.

The previous section noted the existence of CESBs in almost all Brazilian states, mostly controlled by state governments. In addition to privatizing or directly providing services, mayors therefore have the option of granting concessions to a CESB. It is possible for privatization to be adopted as a political strategy to reduce (or not increase) the scope of the state government's activities. As a consequence, we expected that mayors from parties that are not affiliated with those of their state governors are more likely to privatize. To capture the potential influence of alignment with the governor on privatization, the *governor affinity* variable was used.

This variable can also capture other factors that would have an impact on privatization. The support of the governor or the president (*president affinity*) and the transfer of popularity could facilitate access to resources from higher levels of government. Such resources, which make higher spending possible without the pressure to increase tax revenues, may be reflected in the result of the next election. Thus, the support of the governor and the president can influence a mayor's election risk, ease of access to public funding and hence the decision to privatize.

²⁸ For further discussion on the index and its potential effects on the behavior of politicians and their electoral performances, see, e.g. Rae and Taylor (1970), Rae (1971), Cossio (2001) and Menezes et al (2011). No studies were found to use a similar measure of the fractionalization of the Legislature to explain privatization.

²⁹ Political and economic cycle models. See, among others, Rogoff and Silbert (1988) and Rogoff (1990).

The literature indicates that sector workers and low-income populations are most likely to be affected by the privatization of sanitation services³⁰. Therefore, we expect that the municipalities in which these interest groups represent a large portion of the population are less likely to undergo privatization. Politicians would have less incentive to privatize in places where such a measure, which is unpopular in itself, resulted in a notably high electoral cost. In the absence of municipal data for the entire period on the number of employees in the industry and people in different income brackets, the *public administration* and *low income* variables are used as *proxies*.

It is traditionally argued that right-wing parties are more likely to privatize than those on the left. However, studies in different countries have found no robust evidence that the ideology of governmental leaders influences the privatization of public services³¹. In general, ideology (left or right) *dummies* are used. In this study, we employ *dummies* for the parties (and coalition parties) that essentially polarized the race for the presidency in the analyzed period: *PDSB dummy* and *PT dummy*. One should also consider the possibility that the large privatizations of the FHC government encouraged mayors to privatize irrespective of their party. Thus, complementing the analysis of the first section, the *FHC dummy* aims to ascertain whether the likelihood of privatizing sanitation services differed during the FHC period from that of the subsequent government (President Luis Inácio Lula da Silva).

Only municipalities in states with at least one case of privatization are included in the estimations³². This seeks to restrict our sample to municipalities that share similar incentive structures. It is possible that the existence of state provision results in unobserved characteristics that encourage privatization in municipalities in some states and deter it in others. One can assume, for example, that laws and taxes or the performance of CESBs influence the decision³³.

To assess the robustness of the results, we estimate alternative specifications, which are summarized in Box 2. First, it should be noted that candidates in competitive elections tend to obtain a smaller proportion of the vote. Thus, *proxies* for the electoral risk perceived by mayors are correlated, which may impact their coefficients if they are tested together (*specification III*). These proxies are therefore also tested separately under different specifications. Under *specification I*, *proportion of votes* is used; under *specification II*, *competitive mayoral election* is used.

Box 2
Summary of specifications adopted in the estimations

Specifications / Features	I	II	III	IV	V	VI
Ideological and Political Variables	Yes	Yes	Yes	Yes	Yes	Yes

³⁰ According to Estache et al (2001) and Galiani et al (2005), private companies have more incentives to reduce wages, reduce the number of employees, increase fees, abolish subsidies and reduce illegal connections and defaulters. Several studies argue that the greater the importance of government jobs in the area is, the more mayors are pressured not to privatize. See, for example, Chandler and Feuille (1994) and Bel and Fageda (2007).

³¹ See Ménard and Saussier (2000), Miralles (2009), Picazo-Tadeo et al (2010), among others.

³² There was at least one case of privatization in 12 out of the 26 Brazilian states: Amazonas, Pará, Tocantins, Bahia, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, Paraná, Santa Catarina, Mato Grosso and Mato Grosso do Sul.

³³ There may also be a *neighboring effect*. This study does not intend to evaluate the existence of such an effect but only considers the possibility of its existence. For details on this effect, including results found in other countries, see, for example, Bel and Miralles (2003), Miralles (2009) and Bel et al (2010).

<i>Proportion of Votes</i> Variable	Yes	No	Yes	Yes	No	Yes
<i>Competitive Mayoral Election</i> Variable	No	Yes	Yes	No	Yes	Yes
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Exclusion of States without Privatization	Yes	Yes	Yes	Yes	Yes	Yes
Exclusion of Municipalities from Tocantins	No	No	No	Yes	Yes	Yes

In the first section, it was mentioned that Brazilian sanitation privatization takes two forms (local and regional). Differences in incentives for each of these forms can be captured by the Tocantins *dummy* because privatization was only regional in this state. It is interesting to assess, however, whether the results are the same for municipalities that only adopted local privatization. Thus, *specifications IV, V and VI* correspond, respectively, to *specifications I, II and III* but with the exclusion of municipalities in Tocantins.

Two sets of additional estimations were performed to test the robustness of the results. In the first set, the dependent variable D_{it} takes the value of one for all years after the decision to privatize. Thus, results indicate the factors influencing private provision in each year and not the determinants of privatization. It can be assumed that political and ideological variables influence the decision to privatize, but after the decision is taken, they are not necessarily related to the maintenance of private provision³⁴. We use these estimations as an additional identification strategy.

In the second set of estimations, we adopted the strategy proposed by Chandler and Feuille (1994): the use of the *pooled probit* method, excluding municipalities that privatized services after the decision year of the sample. Thus, these municipalities were not considered in the years following the decision to privatize. In these tests, sanitation services are analyzed separately. That is, separate estimations are made for the decision to privatize the supply of water and for the decision to privatize sewage collection. It is therefore possible to ascertain whether the determinants of privatization are the same for both services.

Finally, Box 3 shows the control variables (X_{it}^C) that the literature presents as potential determinants of the decision to privatize local public services or related to features of the institutional environment and structure of sanitation service in Brazil.

First, several studies note that financial (fiscal) aspects are determinants of privatization³⁵. It is argued that governments may privatize public services due to reduce spending, to balance budgets or because of an inability to invest. The variables used to control for these potential effects are *fiscal restriction* and *degree of dependence*³⁶. The latter represents the degree of a municipality's dependence on resources that do not belong to its own tax base (i.e., that are transferred from other levels of government). According to some studies, transfers have an impact on taxation, spending, borrowing and investment capacity³⁷.

³⁴This was a fundamental assumption of the non-significance of political and ideological variables that were observed in some studies that did not consider the timing of the decision to privatize. The results tend to be significant when time is taken into account. See Bel and Fageda (2007), Miralles (2009), Bel et al (2010) and Picazo-Tadeo et al (2011).

³⁵ See Chandler and Feuille (1994), López-de-Silanes et al (1997), Dweck (2000), Estache et al (2001), Bel and Fageda (2007), Miralles (2009), Bel et al (2010) and Picazo-Tadeo et al (2010), among others.

³⁶ Income and expenses may be influenced by electoral cycles (political and economic cycles). Therefore, it was decided to consider the mean values of the fiscal variables for the four years prior to analysis.

³⁷ See, among others, Mendes and Rocha (2003), Macedo and Corbari (2009), Queiroz and Postali (2010) and Varela et al (2010).

Box 3
Control variables (X_{it}^c)

Variables	Descriptions
Fiscal Restriction	Ratio of total expenditure to total revenue (mean of the previous four years)
Degree of Dependency	Ratio of revenues from transfers to revenue budget (mean of last four years)
GDP <i>per Capita</i>	Municipal GDP <i>per capita</i> (R\$ 2000)
Education	Ratio of employees with formal education of at least high school level to total formal employees
Youths	Ratio of population with less than 19 years of age to total population
Seniors	Ratio of population with over 60 years of age to total population
Population	Total population (millions of inhabitants)
Density	Ratio of total population to area, subtracting the area used for cultivation (1,000 inhabitants per km ²)
Capital <i>Dummy</i>	<i>Dummy</i> that takes the value of one if the municipality is a state or federal capital
Metropolitan Region <i>Dummy</i>	<i>Dummy</i> that takes the value of one if the municipality belongs to a metropolitan area
Tocantins <i>Dummy</i>	<i>Dummy</i> that takes the value of one if the municipality belongs to the state of Tocantins
Mato Grosso <i>Dummy</i>	<i>Dummy</i> that takes the value of one if the municipality belongs to the state of Mato Grosso
Health and Sanitation Spending	Ratio of expenditure on health and sanitation to total expenditure (mean of last four years)
Sanitation Morbidity	Number of hospitalizations due to diseases related to sanitation per 100 inhabitants
Access to Water	Proportion of households with access to public water mains
Sewage Access	Proportion of households with access to public collection of sewage

Efficiency gains are noted as another important justification for privatization. In empirical studies, *population* is the traditional measure used to ascertain this motivation (*proxy* for demand) because it influences the size and efficiency of services³⁸. On the one hand, the larger the population, the higher the number of contributors tends to be, which increases revenue capacity and the funds available for investment. Moreover, the cost of the *per capita* provision of some public services, such as sanitation, decreases as the number of consumers decreases³⁹. Thus, smaller municipalities might be more motivated to privatize with the expectation that private companies can operate in more than one location, taking advantage of economies of scale and reducing delivery costs, which can be reflected in prices. Larger municipalities would have fewer incentives to privatize because they have internal economies of scale. A counterpoint to the last argument is the possibility that potential consumers influence the profitability and thus the attractiveness of the municipality.

³⁸ See Chandler and Feuille (1994), Ménard and Saussier (2000), Bel et al (2010) and Picazo-Tadeo et al (2010), among others.

³⁹ See, for example, Case et al (1993), Bel et al (2010) and Ménard and Saussier (2000).

In sanitation services, economies of density also determine the cost of provision. Thus, one can assume that for governors, the more dispersed the population, the greater the incentive to privatize tends to be. Dispersion could increase the need for specific investments, increasing risks and discouraging privatization⁴⁰. Moreover, according to Glaeser (2005), proximity tends to cause a population to become more organized, which would increase the vulnerability of politicians to pressure. For a private company, the higher the population density, the more attractive an area is. It is therefore important to control for the population concentration effect, which is performed through the *density* variable.

Municipalities in metropolitan regions or capitals tend to be more developed and have higher population concentrations and sizes. For the previously mentioned reasons regarding controls, these attributes can result in higher tax revenues, investments, demand for public services and vulnerability of politicians, which are all factors that influence privatization decisions. The *capital* and *metropolitan area dummies* are therefore included. As discussed in the first section, these variables, along with the *Tocantins* and *Mato Grosso dummies*, can also capture different incentives arising from the institutional setting and the configuration of service provision. In capitals, privatization may be hampered by political issues because almost all CESBs are controlled by state governments. The only privatized CESB is in Tocantins, which may result in greater incentives to grant concessions in the municipalities of this state. The CESB in Mato Grosso was discontinued and could thus have stimulated privatization. In metropolitan areas, there are fewer incentives because the ownership of these services is undefined.

The conditions of service prior to the change in provision, both in terms of quality and access, can encourage privatization. Ménard and Saussier (2000) suggest that the probability of privatization should be lower if large and specific investments are necessary due to the involved uncertainties. However, the opposite can be observed in areas that have financial restrictions. That is, if unfavorable conditions result from the complexity of provision, the incentive to privatize would be lower, but if they are the result of financial constraints, the incentive would be greater.

As noted in the first section, there is no information on conditions of service prior to privatization. Two *proxies* are therefore used for quality: *health and sanitation spending* and *sanitation morbidity*. The quality of service determines the incidence of various diseases. It is reasonable to assume, therefore, that hospitalizations due to diseases related to sanitation and spending on health care and the sector reflect quality⁴¹. The *water access* and *sewage access* variables are employed to control for previous coverage. A problem is that the data needed to calculate these variables are only available in census years. Prior to 2000, data from the 1991 Census were used; thereafter, data from the 2000 Census were used.

4. Results

⁴⁰ As pointed out by Ménard and Saussier (2000), Miralles (2009) and Bel et al (2010), among others.

⁴¹ Several studies discuss diseases related to sanitation. See, for example, Heller (1997). The spending variable could also capture a possible incentive for privatization due to the level of expenditure in the sector. Because of election cycles, it was decided to consider the mean values of this variable in the four years prior to the analysis.

Table 3 shows the *probit panel* estimation results⁴². First, it is worth noting that there is evidence to support the hypothesis that a mayor who faces the prospect of failure in the next election (no reelection or election of a successor) would be more likely to privatize. This assertion arises from the fact that the coefficients of the *proxies* for the election risk perceived by mayors (*proportion of votes* and *competitive mayoral election*) are generally significant, and their signs are as would be expected to corroborate the hypothesis. This property is observed regardless of whether the municipalities of Tocantins are considered.

It can be observed that the smaller the *proportion of votes*, the greater the likelihood of a mayor privatizing sanitation services. Moreover, this probability is also greater if the mayor disputed a competitive election (*competitive mayoral election*). As discussed in section two, the proportion of votes in the previous election and the degree of competitiveness in this election can influence the outcome of the next election, which would, in turn, predict the electoral risks perceived by the mayor. The smaller the proportion of votes and the greater the competition, the greater the risks are.

Table 3
Determinants of privatization: political and ideological variables (*panel probit*)

Variables	I	II	III	IV	V	VI
<i>Proportion of votes</i>	-1.505 ^(a) (0.391)		-1.112 ^(a) (0.418)	-0.826 ^(c) (0.467)		-0.365 (0.492)
<i>Competitive mayoral election</i>		0.354 ^(a) (0.096)	0.235 ^(b) (0.106)		0.325 ^(a) (0.116)	0.288 ^(b) (0.127)
<i>Coalition</i>	0.282 ^(c) (0.153)	0.235 (0.153)	0.260 ^(c) (0.153)	0.852 ^(a) (0.270)	0.839 ^(a) (0.271)	0.843 ^(a) (0.272)
<i>Fractionalization</i>	0.831 (0.557)	0.833 (0.552)	0.712 (0.556)	3.486 ^(a) (0.977)	3.284 ^(a) (0.981)	3.254 ^(a) (0.981)
<i>Competitive councilor election</i>	-0.226 ^(b) (0.102)	-0.214 ^(b) (0.103)	-0.254 ^(b) (0.104)	-0.068 (0.200)	-0.054 (0.202)	-0.035 (0.204)
<i>Cycle 2</i>	0.703 ^(a) (0.117)	0.709 ^(a) (0.117)	0.710 ^(a) (0.117)	0.148 (0.136)	0.153 (0.137)	0.154 (0.137)
<i>Cycle 3</i>	0.311 ^(b) (0.137)	0.322 ^(b) (0.137)	0.315 ^(b) (0.137)	0.077 (0.146)	0.084 (0.146)	0.083 (0.146)
<i>Cycle 4</i>	0.406 ^(a) (0.134)	0.413 ^(a) (0.134)	0.406 ^(a) (0.135)	-0.100 (0.174)	-0.110 (0.176)	-0.110 (0.176)
<i>Governor affinity</i>	-0.203 ^(b) (0.091)	-0.201 ^(b) (0.091)	-0.208 ^(b) (0.092)	-0.287 ^(b) (0.119)	-0.288 ^(b) (0.119)	-0.290 ^(b) (0.119)
<i>President affinity</i>	0.032 (0.121)	0.049 (0.121)	0.035 (0.121)	0.082 (0.154)	0.095 (0.154)	0.088 (0.154)
<i>Public administration</i>	-0.178 (0.175)	-0.190 (0.174)	-0.172 (0.175)	-0.181 (0.381)	-0.108 (0.384)	-0.110 (0.387)
<i>Low income</i>	-0.073 (0.254)	-0.107 (0.253)	-0.070 (0.255)	-0.393 (0.372)	-0.425 (0.374)	-0.405 (0.375)
<i>Dummy PSDB</i>	0.041 (0.125)	0.032 (0.125)	0.044 (0.126)	0.144 (0.146)	0.134 (0.146)	0.139 (0.146)
<i>Dummy PT</i>	-0.057 (0.159)	-0.050 (0.159)	-0.051 (0.160)	-0.124 (0.200)	-0.123 (0.199)	-0.116 (0.200)
<i>Dummy FHC</i>	0.288 ^(b)	0.289 ^(b)	0.285 ^(b)	-0.226	-0.225	-0.226

⁴² Due to the space constraints, the results of the controls are not reported. These results can be provided by the authors upon request.

	(0.126)	(0.126)	(0.126)	(0.192)	(0.194)	(0.194)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Tocantins' municipalities	Yes	Yes	Yes	No	No	No
N	33,284	33,559	33,284	31,967	32,242	31,967

Standard errors in parentheses. ^(a) Significant at 1%. ^(b) Significant at 5%. ^(c) Significant at 10%.

As expected, the Legislature's support (*coalition*) is important for the adoption of privatization in most specifications. Difficulty in political negotiations with the Legislature also has *fractionalization* as a control. The coefficients of this variable are positive but significant only when municipalities in the state of Tocantins are disregarded (*specifications IV to VI*). The greater the fractionalization in the Legislature, controlling for major's coalition, less likely the opposition will block an attempt to privatize sanitation services. These results, although less robust, provide further evidence that the political game is an important drive to explain privatization.

Moreover, the support of councilors is also influenced by the electoral risks they face. Although privatization may be an unpopular measure, and it is possible for councilors to be reelected indefinitely, in facing greater uncertainty regarding their success in the next election, they tend to not approve the privatization act. The *proxy* for the electoral risk perceived by councilors (*competitive councilor election*) is, however, significant only when the municipalities of the state of Tocantins are included (*specifications I to III and VI*).

The *fractionalization* variable could also be considered a *proxy* for the electoral risk perceived by councilors. As previously mentioned, the coefficients associated with this variable are positive, i.e., the opposite of what would be expected to validate the hypothesis of councilor rationality. Thus, although the results are not robust, this variable could be interpreted as a measure of general electoral risk that could be taken into account by mayors but that does not influence councilors.

By analyzing the *dummies* that represent the stage in the mayoral election cycle in which the privatization decision was made (*cycle 2, cycle 3 and cycle 4*), it can be observed that the probability is lower in the first year. This evidence corroborates the expectation that, over the course of their terms, governments may think that their electoral risks have increased (or not decreased), which may subsequently motivate them to privatize to "tie the hands" of the next government leader. It is important to note that these results are less robust because they are significant (positive) only when municipalities of Tocantins are considered (*specifications I to III*).

A more robust result (significant in all specifications) is the lower probability of privatization when the mayor is in the same party or coalition of the state governor (*governor affinity*). That is, mayors who are not aligned with their respective governors are more likely to privatize. This result could also be due to difficulties in obtaining funding from other levels of government that are run by political opponents, which would influence the capacity for investment and the electoral risk of mayors. According to this line of reasoning, alignment with the president should also present the same results. However, the coefficients of the variable *president affinity* are not significant.

We take this result as an additional support to the hypothesis of privatization as a political strategy to reduce (or not increase) the discretion of state governments. It is noteworthy that CESBs are present in almost all Brazilian states, the majority of which are

controlled by state governments. Thus, mayors have fewer incentives to provide services to the CESBs of their state (or retain the concession) if it is governed by opposing political parties.

As presented earlier, sector workers and low-income populations would be most affected by privatization – the former due to potential layoffs or changes in working conditions and the latter due to the possible termination of subsidies, rate increases and intolerance to defaulting and illegal connections. Therefore, it is expected that in municipalities in which these interest groups represent a larger portion of the population, the probability of privatization would be lower. The negative coefficients of *proxies* for these interest groups (*public administration* and *low income*) corroborate these hypotheses, although they are not significant in all specifications.

As is the case in studies of different services in different countries, the results suggest that party ideology does not influence privatization. The coefficients of the *PSDB* and *PT dummies* are not significant. These results tend to support the hypothesis that the decisions of parties contesting the center of the political spectrum tend to converge. Moreover, the biggest incentive for privatization under the FHC government (*FHC dummy*) arises only when the Tocantins municipalities are taken into consideration.

In addition to alternative specifications, two sets of estimations were performed to test the robustness of the results. The evidence presented by these tests is analyzed below. This analysis is also restricted to political and ideological variables. Table 4 presents the results of the first set of robustness tests. In these estimations (*panel probit*), the dependent variable is equal to one starting from the year of the decision to privatize. Thus, the results indicate the factors influencing private provision in each year and not the determinants of privatization. Based on evidence from other studies, political variables are expected to be correlated to private provision at the time of the privatization decision; after it is adopted, such correlations would not necessarily be observed.

Noteworthy results in Table 4 include the *proxies* for electoral risk perceived by mayors (*proportion of votes* and *competitive mayoral election*). Unlike previous estimations (Table 3), the coefficients associated with these variables are not significant. In other words, these proxies are correlated with private provision only at the time of the decision to privatize. These results indicate that the prospect of failure in the next election determines the decision to privatize, but once this decision is taken, it does not influence the maintenance of private provision. The results thus support the hypothesis that electoral risk motivates mayors to decide to privatize.

Table 4.
Determinants of privatization: political and ideological variables (*panel probit*)

Variables	I	II	III	IV	V	VI
<i>Proportion of votes</i>	0.676		0.520	0.022		0.573
	(1.008)		(0.943)	(1.170)		(1.151)
<i>Competitive mayoral election</i>		0.061	0.094		0.238	0.177
		(0.229)	(0.247)		(0.247)	(0.281)
<i>Coalition</i>	1.396 ^(a)	1.189 ^(a)	1.153 ^(a)	1.517 ^(b)	1.508 ^(b)	1.452 ^(b)
	(0.481)	(0.427)	(0.420)	(0.738)	(0.689)	(0.698)
<i>Fractionalization</i>	7.423 ^(a)	6.099 ^(a)	6.135 ^(a)	9.407 ^(a)	7.716 ^(a)	7.559 ^(a)
	(1.966)	(1.701)	(1.670)	(2.715)	(2.373)	(2.505)

<i>Competitive councilor election</i>	1.083 ^(a)	0.971 ^(a)	1.008 ^(a)	1.065 ^(c)	1.182 ^(c)	1.051 ^(c)
	(0.369)	(0.337)	(0.336)	(0.583)	(0.603)	(0.576)
<i>Cycle 2</i>	1.881 ^(a)	1.659 ^(a)	1.633 ^(a)	0.685 ^(a)	0.628 ^(a)	0.657 ^(a)
	(0.192)	(0.178)	(0.176)	(0.232)	(0.218)	(0.228)
<i>Cycle 3</i>	1.740 ^(a)	1.490 ^(a)	1.468 ^(a)	0.519 ^(b)	0.395	0.519 ^(b)
	(0.205)	(0.190)	(0.189)	(0.264)	(0.247)	(0.258)
<i>Cycle 4</i>	1.497 ^(a)	1.324 ^(a)	1.320 ^(a)	0.367	0.313	0.398
	(0.229)	(0.211)	(0.208)	(0.267)	(0.250)	(0.261)
<i>Governor affinity</i>	-0.508 ^(b)	-0.439 ^(b)	-0.432 ^(b)	-0.648 ^(a)	-0.579 ^(a)	-0.587 ^(b)
	(0.203)	(0.183)	(0.180)	(0.246)	(0.222)	(0.234)
<i>President affinity</i>	0.325	0.279	0.302	0.283	0.219	0.239
	(0.282)	(0.249)	(0.246)	(0.343)	(0.307)	(0.321)
<i>Public administration</i>	0.773	0.699	0.658	-0.128	-0.352	0.373
	(0.549)	(0.492)	(0.484)	(1.223)	(1.098)	(1.041)
<i>Low income</i>	2.138 ^(b)	1.599 ^(b)	1.536 ^(b)	0.647	0.065	1.007
	(0.857)	(0.762)	(0.749)	(1.499)	(1.303)	(1.291)
<i>Dummy PSDB</i>	0.175	0.140	0.135	0.187	0.122	0.148
	(0.298)	(0.262)	(0.257)	(0.325)	(0.296)	(0.306)
<i>Dummy PT</i>	0.431	0.354	0.297	-0.070	-0.109	-0.064
	(0.369)	(0.328)	(0.329)	(0.428)	(0.379)	(0.395)
<i>Dummy FHC</i>	-1.059 ^(a)	-0.955 ^(a)	-0.940 ^(a)	-1.508 ^(a)	-1.435 ^(a)	-1.516 ^(a)
	(0.343)	(0.308)	(0.306)	(0.436)	(0.396)	(0.425)
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Tocantins' municipalities</i>	Yes	Yes	Yes	No	No	No
<i>N</i>	33,284	33,559	33,284	31,967	32,242	31,967

Standard errors in parentheses. ^(a) Significant at 1%. ^(b) Significant at 5%. ^(c) Significant at 10%.

Table 5 shows the results of the second set of robustness tests. In these, the *pooled probit* method is used and municipalities that privatized the analyzed service in the years following the decision are excluded from the sample. Estimations are made separately for each service (water provision and sewage). The determinants of privatization for each are thus estimated. First, it should be noted that the results are generally similar to those shown in Table 3, reinforcing the validity of the hypothesis that the electoral risk perceived by mayors encourages the privatization decision because privatizing "ties the hands" of the next government. The *proportion of votes* coefficients are negative, and the *competitive mayoral election* coefficients are positive in all specifications. Moreover, the coefficients associated with *fractionalization* are positive and significant.

Table 5
Determinants of privatization: political and ideological variables (*pooled probit*)

Variables/Services	Water						Sewage					
	I	II	III	IV	V	VI	I	II	III	IV	V	VI
<i>Proportion of votes</i>	-1.215 ^(a) (0.458)		-0.770 (0.484)	-0.518 (0.500)		-0.032 (0.517)	-1.778 ^(a) (0.446)		-1.431 ^(a) (0.486)	-0.956 ^(b) (0.486)		-0.500 (0.512)
<i>Competitive mayoral election</i>		0.361 ^(a) (0.113)	0.280 ^(b) (0.124)		0.333 ^(a) (0.127)	0.330 ^(b) (0.138)		0.341 ^(a) (0.105)	0.187 (0.117)		0.327 ^(a) (0.118)	0.276 ^(b) (0.129)
<i>Coalition</i>	0.373 ^(b) (0.186)	0.326 ^(c) (0.187)	0.344 ^(c) (0.188)	0.899 ^(a) (0.288)	0.884 ^(a) (0.291)	0.884 ^(a) (0.291)	0.360 ^(b) (0.179)	0.316 ^(c) (0.179)	0.343 ^(c) (0.180)	0.865 ^(a) (0.276)	0.855 ^(a) (0.277)	0.857 ^(a) (0.278)
<i>Fractionalization</i>	1.519 ^(b) (0.671)	1.401 ^(b) (0.671)	1.339 ^(b) (0.672)	3.651 ^(a) (1.055)	3.358 ^(a) (1.057)	3.360 ^(a) (1.058)	1.324 ^(b) (0.643)	1.309 ^(b) (0.642)	1.210 ^(c) (0.644)	3.468 ^(a) (1.003)	3.319 ^(a) (1.004)	3.264 ^(a) (1.005)
<i>Competitive councilor election</i>	-0.055 (0.128)	-0.050 (0.128)	-0.084 (0.130)	0.073 (0.207)	0.031 (0.210)	0.031 (0.212)	-0.159 (0.121)	-0.120 (0.120)	-0.178 (0.122)	0.070 (0.203)	0.067 (0.205)	0.041 (0.207)
<i>Cycle 2</i>	0.865 ^(a) (0.142)	0.869 ^(a) (0.142)	0.873 ^(a) (0.143)	0.113 (0.146)	0.114 (0.147)	0.115 (0.147)	0.774 ^(a) (0.133)	0.779 ^(a) (0.133)	0.781 ^(a) (0.134)	0.162 (0.142)	0.168 (0.142)	0.169 (0.143)
<i>Cycle 3</i>	0.515 ^(a) (0.166)	0.515 ^(a) (0.166)	0.520 ^(a) (0.167)	0.051 (0.156)	0.057 (0.157)	0.057 (0.157)	0.459 ^(a) (0.154)	0.462 ^(a) (0.154)	0.463 ^(a) (0.154)	0.115 (0.150)	0.123 (0.151)	0.122 (0.151)
<i>Cycle 4</i>	0.626 ^(a) (0.163)	0.626 ^(a) (0.163)	0.632 ^(a) (0.164)	-0.184 (0.197)	-0.197 (0.199)	-0.198 (0.199)	0.518 ^(a) (0.153)	0.522 ^(a) (0.153)	0.521 ^(a) (0.153)	-0.053 (0.177)	-0.063 (0.178)	-0.061 (0.179)
<i>Governor affinity</i>	-0.309 ^(a) (0.106)	-0.308 ^(a) (0.107)	-0.315 ^(a) (0.107)	-0.341 ^(b) (0.132)	-0.343 ^(b) (0.133)	-0.343 ^(b) (0.133)	-0.233 ^(b) (0.099)	-0.221 ^(b) (0.098)	-0.236 ^(b) (0.099)	-0.295 ^(b) (0.122)	-0.293 ^(b) (0.122)	-0.296 ^(b) (0.122)
<i>President affinity</i>	0.159 (0.146)	0.189 (0.145)	0.171 (0.146)	0.128 (0.166)	0.140 (0.167)	0.138 (0.167)	0.084 (0.135)	0.114 (0.134)	0.090 (0.136)	0.066 (0.156)	0.080 (0.156)	0.073 (0.156)
<i>Public administration</i>	-0.100 (0.211)	-0.103 (0.211)	-0.087 (0.212)	-0.086 (0.396)	0.012 (0.399)	0.009 (0.400)	-0.197 (0.205)	-0.227 (0.203)	-0.194 (0.206)	-0.033 (0.383)	0.028 (0.385)	0.030 (0.387)
<i>Low income</i>	0.150 (0.305)	0.150 (0.305)	0.162 (0.307)	-0.192 (0.406)	-0.180 (0.409)	-0.182 (0.410)	0.245 (0.288)	0.207 (0.285)	0.245 (0.289)	-0.185 (0.383)	-0.233 (0.384)	-0.207 (0.386)
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Tocantins' munic</i>	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	No
<i>N</i>	31,950	32,222	31,950	31,585	31,857	31,585	32,064	32,336	32,064	31,594	31,866	31,594

Standard errors in parentheses. ^(a) Significant at 1%. ^(b) Significant at 5%. ^(c) Significant at 10%.

In both services and in all specifications, it can be observed that the support of the Legislature is important for the adoption of privatization because the coefficients associated with the *coalition* variable are positive and significant. On the other hand, we do not find robust support to the effect of the electoral risk perceived by councilors and hence the rationality in their decision to support privatization (*competitive councilor election*). Furthermore, as observed in Table 3, the electoral cycle only influences the likelihood of privatization if the municipalities of the state of Tocantins are considered (*specifications I to III*). For both services, the likelihood of this privatization is less in the first year of the cycle.

The results support the hypothesis that, given the possibility of granting the concession to a CESB, the privatization of sanitation services would be adopted as a political strategy to reduce (or not increase) the scope of the activities of state governments. The coefficients of the *governor affinity* variable are negative and significant for both services and in all specifications. The coefficients associated with the *president affinity* variable are not significant. Finally, it should be noted that by using this estimation strategy, no coefficient associated with party ideology or the FHC government is significant.

5. Conclusion

Privatization changes incentives and, as such, how efficiently a good or service is provided. Efficiency gains can be appropriated, at least partially, by the local government, and, as a consequence, explain the decision to privatize a public utility. Moreover, privatization reduces the degree of discretion that the incumbent politician has over the provision of that service and thereby restricts his ability to use it for political gain. Examples of the discretionary use of public service for short-term political purposes include employing too many citizens, forgiving debt defaulters and postponing rate increases. Privatization, by reducing discretion over the provision of public services, reduces the political resources under the control of the political incumbent. This effect of privatization can cause it to be used as a political strategy to “tie the hands” of political rivals, particularly when there is a high probability of their coming to power in the next term.

This article, using a database panel of Brazilian municipalities from 1997 to 2007, provides reasonably robust evidence to support this hypothesis for the case of water services and sanitation. The results indicate that the electoral risks perceived by mayors motivate the decision to privatize, which is consistent with the hypothesis that it would be adopted to “tie the hands” of the subsequent administration. That is, facing the prospect of failure in the next election, mayors privatize to decrease the discretion of any incumbent opponent, even if it reduces their own scope of activity. Variables were used as *proxies* for the mayor’s electoral risk to measure the degree of political competition in the election in which this mayor was elected. A second and consistent result was the increased likelihood of privatization in municipalities in which the mayor does not belong to the parties of the governor's coalition. Because there is a provision for state companies to be controlled by state governments, privatization reduces the scope of activity of the governor's opponents. This effect is identified by the *proxy* of party affinity between the mayor and governor.

In summary, an estimation using the *panel probit* and *pooled probit* methods, controlling for temporal aspects of the decision, which is relatively rare in the literature, provided robust evidence that the decision to privatize sanitation is consistent with its use

as a political strategy. Moreover, this result is unprecedented because this hypothesis had not been tested empirically in local privatization, which facilitates the exploration of the great variability between the municipalities that share the same institutional environment.

Additionally, the importance of the support of the Legislature to approve privatization (coalition governments) was evaluated, as was the possibility of councilors having rationality in the option to support it. This approach was based on the assumption that these variables would also be influenced by electoral risks. It is reasonable to expect that councilors who face greater uncertainty in relation to success in the next election would tend not to approve it. This assumption is based on the fact that in Brazil, reelection to the Legislature is unlimited, which means that the councilors themselves suffer the electoral consequences of unpopular measures. In a similar manner to mayors, measures of the degree of competition in the election in which councilors were elected were used as *proxies* for the electoral risks they perceived. The results were favorable to both the importance and the rationality of the Legislature. However, in the case of rationality, the results were less robust.

As in other studies of cases in different countries, party ideology is not associated with significant effects on the likelihood of privatization. Interest groups are also not associated with any significant effect on this probability. As expected from the discussion in the first section, the propensity to privatize was higher during the FHC government. Finally, it is important to note that (less robust) results indicate that the stage of the electoral cycle influences the decision, with less probability of privatization in the first year of the cycle. This evidence suggests that governments have fewer incentives to privatize at the beginning of their terms because they want to benefit from greater discretion in the management of sanitation services, which can be used to accomplish their political objectives. However, throughout the term, governments may perceive their electoral risks to have increased (or not have decreased), and thus have a greater incentive to privatize.

These results may be specific to the case of privatization of water and sewage services in Brazil. Because this study is, to the best of our knowledge, the first to test the hypothesis of privatization as a political strategy at the local level, it would be useful to develop similar studies in other contexts to assess the external validity of the findings described in this report. Moreover, the incorporation of a variable that captures any contractual differences in the concession of public services may be important to distinguish between different models of privatization.

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