

The Effects of Participatory Budgeting on Municipal Expenditures and Infant Mortality in Brazil

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Summary. — This paper investigates whether the use of participatory budgeting in Brazilian municipalities during 1990–2004 affected the pattern of municipal expenditures and had any impact on living conditions. It shows that municipalities using participatory budgeting favored an allocation of public expenditures that closely matched popular preferences and channeled a larger fraction of their budgets to investments in sanitation and health services. This change is accompanied by a reduction in infant mortality rates. This suggests that promoting a more direct interaction between service users and elected officials in budgetary policy can affect both how local resources are spent and living standard outcomes.

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1. INTRODUCTION

Public expenditures are a powerful tool to guarantee access to essential goods and services for all strata of society. However, in many cases distortion and misallocation of public monies—more often than the lack of resources—prevent this from happening. The lack of political accountability is a key problem in much of the developing world. Traditional mechanisms of horizontal accountability, via internal audits, checks and balances or constitutional constraints, are clearly not enough to make politicians take full responsibility and provide full justification for their actions and performance. Neither is electoral accountability in democratic countries: too often we see basic services failing to reach the poor even when they represent an important fraction of the electorate.

Identifying mechanisms to reinforce political accountability has been a key challenge for economists (and policy makers) and the object of intense research in the political economy literature. In the developing world several innovations to improve political accountability have been put into practice. Over the last decade these have tended to be bottom-up mechanisms that imply a greater involvement and participation of citizens, the ultimate service beneficiaries, in decision-making processes and service delivery.

One of the most famous innovations was the participatory budgeting model developed in Porto Alegre. This is an alternative budgetary process that allows citizens to negotiate with government officials over the municipality's budgetary allocation and its investment priorities. Participatory budgeting brings in two key elements to the traditional budgetary practices. First, it improves information flows between policy-makers and service users, leaving the former better equipped to provide goods and services that more closely match the citizens' needs and preferences. Second, it also strengthens accountability by functioning as a commitment device for the politicians as it stimulates more frequent checks on their (publicly promised) actions by the common citizen.

Despite having attracted considerable attention for the improvement in political accountability claimed to have been achieved,¹ and despite the fact that the participatory budgeting model spread across Brazilian municipalities in the 1990s and 2000s and was adopted in a number of other countries,

evidence of its impact on local public expenditures and living standard outcomes is still very limited. My contribution is to fill that gap by analyzing a panel of Brazilian municipalities for the period 1990–2004 in order to understand what effects participatory budgeting had on municipal public expenditures and associated living standard outcomes.

Brazil's decentralized politico-administrative system, in place since the late 1980s, provides an ideal setting for this analysis. All municipalities are entitled to ample powers in service delivery and can therefore be important players in fundamental sectors such as health or education. Furthermore, with the first experiences of participatory budgeting taking place in the late 1980s the data allow me to identify four different waves of adoption in the four legislative periods during 1989–2004, where each legislative period is bounded by a mayoral election. The decision to adopt participatory budgeting depends solely on the existing mayor, who is subject to election every 4 years, and it can be reversed.² For this reason, there exists substantial variation not only in the time of adoption but also in the length of the period in which participatory budgeting is in place. This variation in the use of participatory budgeting across municipalities will be important for the identification of the effects associated with participatory budgeting.

By observing the evolution of budgetary allocations across time in different municipalities I find a robust pattern linking the use of participatory budgeting to a change in the pattern of government expenditures within the period under analysis: the adopting municipalities tend to increase the spending on health and sanitation significantly more than their non-participatory counterparts. More precisely, my findings suggest that participatory budgeting increases the proportion of the public budget spent on health and sanitation by 2–3% points, which is as much as 20–30% of this category's budget share sample mean in 1990.³ This change in the pattern of government expenditures seems to be in line with the participatory meetings' outcomes that systematically place investments in

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sanitation (i.e., improving water and sewage connections, drainage and waste collection) as a top municipal priority. Crucially, this result does not seem to be a consequence of adopting units having larger fiscal budgets. Participatory budgeting appears to be a “budget neutral” mechanism as it is not significantly associated with greater per capita budgetary expenditures.

To show that these changes do generate real effects I further investigate whether there was any subsequent impact on living conditions among the adopting municipalities. It is a well accepted fact that poor sanitation is a leading factor in infant mortality, mainly driven by higher vulnerability of this age group to waterborne diseases (see, for instance, Black, Morris, & Bryce, 2003; Sastry & Burgard, 2004; Victora, 2001). If we believe that the new spending pattern brought by participatory budgeting did result in better sanitary conditions as demanded in the participatory forums, a consequent fall in the infant mortality rates might be expected. My data set allows testing for this hypothesis by using a panel of municipal infant mortality rates for the period during 1990–2004. My findings suggest that municipalities that adopted participatory budgeting registered a significant drop in infant mortality of between 1 and 2 infants for every 1,000 resident infants—about 5–10% of the total infant mortality rate at the beginning of the period in 1990.⁴ This is a significant result for a nation like Brazil, which at the beginning of the 1990s was one of the worst performers in terms of infant mortality rates in the Latin American and Caribbean region with an average infant mortality rate of 48 out of every 1,000 newborns (World Bank, 1990).

These basic results were subjected to a series of robustness checks in order to address concerns about potential endogeneity of the participatory budgeting adoption decision and the validity of its estimated effects. Overall, the pattern of estimated results holds throughout. I interpret these findings as evidence that participatory budgeting can be an important tool in improving information flows between citizens and their political representatives, enhancing government accountability, and ensuring that citizens’ preferences are reflected in the actual implementation of public policies on the ground.

The work presented in this paper contributes to two main strands in the political economy of development literature.

First, given the focus of the participatory mechanism on improving information exchanges between elected politicians and common citizens, this work contributes to the literature that views citizens having information on the actions of politicians and bureaucrats as being key to improving political accountability and government responsiveness (see Besley & Burgess, 2002; Ferraz & Finan, 2007; Strömberg, 2003 and Bjorkman & Svensson, 2009).

Second, and fundamentally, this work contributes to the literature on the analysis and evaluation of mechanisms of participatory development. Influenced by the work of authors such as Chambers (1983), Hirschman (1970), Hirschman (1984), Sen (1985) and Ostrom (1990), theories of participatory development focused on principles of bottom-up decision-making and community empowerment have gained increasing popularity over the past three decades in the realm of development management and substantially affected the policies of governments, donors, and development agencies, such as USAID, the UN, and the World Bank (Mansuri, 2012). Advocates of this model of development argue that greater citizen participation promotes information transfers between government/service providers and final service users and, as a consequence, results in greater allocative efficiency and accountability. These views have been challenged by different authors, who stress the potential for local capture and

exacerbation of pre-existing inequalities (Bardhan & Mookherjee, 2000; Mosse, 2001; Platteau & Abraham, 2002) and a loss of technical efficiency (Bardhan & Mookherjee, 2006; Brett, 2003; Oakley, 1995) that can result from “shifting the locus of decision making downwards” (Mansuri & Rao, 2012).

This work fits within the growing literature that attempts to provide empirical evidence of the effects associated with different participatory mechanisms. This ranges from the setting of political reservations for minority groups in order to ensure that their interests are reflected in policy-making (e.g., Besley, Pande, Rahman, & Rao, 2004; Chattopadhyay & Duflo, 2004; Pande, 2003); the introduction of service report cards (e.g., Bjorkman & Svensson, 2009); the direct involvement of community members in school and health sector management (e.g., Banerjee, Deaton, & Duflo, 2004; Jimenez & Sawada, 1999; Kremer & Vermeesh, 2005); involving citizens and community organizations in the monitoring of public programs (e.g., Olken, 2007; Olken, 2008) or the setting up of participatory institutions (such as the Gram Sabhas in India (e.g., Besley, Pande, & Rao, 2005)). Participatory budgeting is most similar to this last mechanism for encouraging participation in policy making but is truly innovative in its scope and scale. Participatory budgeting aims to improve accountability and responsiveness by opening up the “black-box” of budgetary design and implementation to the whole of society. This allows narrowing down the information asymmetries between policymakers and citizens and encourages further checks by the latter on the former’s activities—particularly relevant in a context characterized by wide-spread clientelistic and corrupt practices as is the case in Brazil.⁵ It has been implemented on a large scale in Brazil—by 2004 about 30% of the Brazilian population lived in municipalities which used participatory budgeting as a means of deciding the allocation of local resources. Its objectives line up with those outlined in the 2004 World Development Report, “Making Services Work for Poor People”, of “putting poor people at the centre of service provision: enabling them to monitor and discipline service providers, amplifying their voice in policy-making, and strengthening the incentives for service providers to serve the poor”. The scope, scale and ambition of participatory budgeting twinned with the distinct lack of concrete evidence of its effects makes evaluation of this new form of encouraging citizen participation in public policy making all the more urgent.

In addition, my findings also contribute to a wider debate on the merits of the decentralization of government. Empirical results in this area have been divergent and inconclusive and have not crystallized into a coherent whole. This paper focuses on an institutional refinement within a decentralized governance framework (that is, the enhanced community participation) and thus provides an additional test of the (argued) advantage of decentralized and participatory regimes for tailoring policies to the demands and needs of the local population (see Ahmad, Devarajan, Khemani, & Shah, 2005; Faguet, 2012; Faguet & Sánchez, 2008; Foster & Rosenzweig, 2001).

The remainder of the paper is organized as follows. Section 2 focuses on background and data. I provide the necessary institutional background regarding participatory budgeting, public expenditures, and main socio-economic context, describe the variables used in the empirical analysis and examine how they have evolved over the period under analysis. Section 3 presents the results of the empirical analysis of the relationship between participatory budgeting, public expenditures, and associated living standard outcomes for Brazilian municipalities over the 1990–2004 period, including a description of the robustness tests performed. Section 4 concludes.

2. BACKGROUND AND DATA

(a) *Participatory budgeting*

(i) *Origins*

Participatory budgeting was one of several institutional innovations introduced in Brazil in the late 1980s which took advantage of the re-democratization process and its focus on decentralization.

During the two decades of military dictatorship (1964–85) Brazil's politico-administrative structure was centralized in the federal government and based on a network of political appointees in each state and capitals. Municipalities, the smallest politico-administrative division in Brazil⁶ remained responsible for the provision of some local services throughout this period (such as inner-city transport or waste collection and disposal), but the scope for locally-defined policies was very limited since municipal governments were mainly executors of the agenda set by Brasília. Following democratization and decentralization, in the late 1980s, considerable power and autonomy was devolved to the sub-national governments, which, as of 2008, are comprised of 26 states plus 5,562 municipalities. Municipalities, in particular, gained co-responsibility in the provision of several essential services, and greater fiscal autonomy to handle them. Moreover, they became freer to develop their own laws and to encourage new forms of democratic participation beyond those provided by mayoral elections.⁷ Community organizations, for example, were legitimated as active political actors with a role in the management of public expenditures (Wampler, 2004).⁸

In essence, through the decentralization effort municipal governments gained the status of fundamental players in the provision of basic services for households and communities. Municipalities were given access to increased levels of funds from upper-levels of government, along with the tools to implement their newly granted responsibilities. This context hugely facilitated the introduction of participatory budgeting programs, initially by mayors from the Workers' Party ("Partido dos Trabalhadores"), in different municipalities across Brazil. Porto Alegre, the capital of the southernmost Brazilian state, would become the benchmark for this model.

The Workers' Party was created in 1979 and it was often considered as a novelty among the Brazilian leftist parties for its origins in the union movements and its strong links to the nation's grassroot and community associations (Abers, 1996; Keck, 1992). Early on, in its political agenda, the Workers' Party emphasized the relevance of promoting government accountability, community participation, and the reversal of priorities away from the elites toward the poor and the working classes. Budgetary policy was a critical instrument in these goals (Abers, 1996).

The development of the participatory budgeting model was therefore in accordance with the party's platform and objectives. By promoting the joint management of public resources, participatory budgeting could not only make the municipal government more responsive and transparent but it could also reverse the cycle of patronage politics that was in danger of being perpetuated by the newly empowered local elites. As a result, the first experiences of participatory budgeting, in the late 1980s and early 1990s, took place as soon as the Workers' Party elected its first mayors, and participatory budgeting became the hallmark of the municipal governments controlled by this party. The successful results achieved under the participatory model fostered by the Workers' Party municipal governments "helped to define the meaning of "good government" in Brazil, which now emphasizes direct participation and

transparency" (Avritzer & Wampler, 2005). This point cannot be dismissed in understanding the party's steady trajectory from a few minor mayoralties, in the mid-1980s, to major capital and state governments, from the 1990s onwards, and the presidency, in 2002 (Santos, 1998).

(ii) *Operation*

In Brazilian municipalities, expenditures are mainly composed of four classes: (i) personnel, (ii) debt repayments, (iii) public services (health/sanitation and education taking the lion's share), and (iv) investments in works and equipment (including those in health/sanitation and education). It is precisely in these last two categories, which in financially healthy municipalities represent close to half of the budget, that municipalities have more autonomy and are therefore the focus of the participatory budgeting processes.⁹

The way participatory budgeting is implemented has had several variants across Brazil, tailored to each municipality's characteristics. There is variation in the structure and timing of meetings, in the rules for electing citizen representatives, in the manner in which municipal investment rankings are defined and even on the percentage and components of the municipal budget covered by participatory budgeting. Notwithstanding, the main features of participatory budgeting can be summarized as follows.¹⁰ The program is logistically structured by the city council, which is in charge not only of the organization and advertisement of meetings, but also of providing all the necessary technical information to any participant. For organizational purposes the council officials start by dividing the municipality into different "administrative" regions (roughly corresponding to the existing neighborhoods). Once the different administrative regions are defined, the participatory process formally begins with a set of parallel neighborhood assemblies, open to all residents, where an update of the previous years' approved works is given, local needs are discussed, desired investments are listed, and neighborhood representatives are elected by the attendants.¹¹

It is worth noting that in many municipalities, such as Porto Alegre and other large urban centers, this representation is made up of two tiers due to reasons of scale and the degree of technicality involved in the decisions at later stages. These two tiers are comprised of "councilors" and "delegates" and both are elected through popular assemblies. The councilors ("conselheiros") form the "participatory council" which together with elected municipal officials are responsible for defining the criteria used to rank demands and allocate funds, and vote on the investment plan presented by the mayor and her executive team. These councilors are the elected citizen representatives who interact directly with the elected bodies. The delegates ("delegados") function as intermediaries between the citizens and the participatory council (which are comprised of councilors and elected municipal officials) and supervise the implementation of the budget.

Following the round of neighborhood assemblies and the election of the respective representatives, the elected delegates take part in municipality-wide coordinating meetings, whose purpose is to draw up a final draft for the different regions' investment priorities, which is then passed to the executive and the participatory council.

Under the ordinary budget cycle (i.e., without formal citizen participation) the executive is solely responsible for the elaboration of the budget proposal, which has to include a plan of all revenues and expenditures programmed for the subsequent year. This proposal has to be approved by the city's legislature (comprised of elected municipal officials) in order to become official. Under the participatory model, the allocation of

investments in the budget proposal is defined by the executive together with the participatory council. Under this model public budgeting takes into account the popular priority ranking (obtained by the delegates) together with a set of weights (such as the share of population affected by the project, the index of local poverty and measure of need/shortage of the good demanded) which are designed to promote equity in the distribution of resources as well as to take account of the projects' technical and financial feasibility. The elected municipal officials also have the capacity to initiate projects of general interest or even works considered necessary for a given part of the city and these are also the object of discussion with the participatory council.

Finally, once the budget has been approved by the legislature, the elected delegates and councilors are responsible for supervising its execution and reporting any faults or delays to the mayor. It should be noted that public budgets are indicative, not mandatory, and as such the elected officials (i.e., the executive branch) may or may not abide to the investment projects listed in the budget. Notwithstanding, participatory budgeting does create an additional record keeping of promises between citizens' and elected municipal officials.

To summarize, compared to the ordinary budgetary process, differences can occur mainly at two stages: (i) the direct input of citizens' demands and the direct interaction between popular representatives and executive in the elaboration of the budget proposal; (ii) oversight of the approved works by the (elected) popular representatives (delegates and councilors) once the investment plans become public.

The role of the legislature is not affected, at least in theory, since the budget still has to be approved by this chamber. However, the fact that the budget proposal reaching the legislature comes, under participatory budgeting, with the direct approval and demands of the population may constrain the ability of the legislature to vote against it (Santos, 1998). This can be relevant since the decision of whether or not a municipality adopts participatory budgeting depends exclusively on the mayor and her executive team, and does not have to be at any moment ratified by the legislature. Participatory budgeting may therefore be seen as a means for the mayor and her executive to increase their public decision making power.

A scheme with a reference design of the year-round participatory process (based on Porto Alegre's schedule) is presented below (see Figure 1)

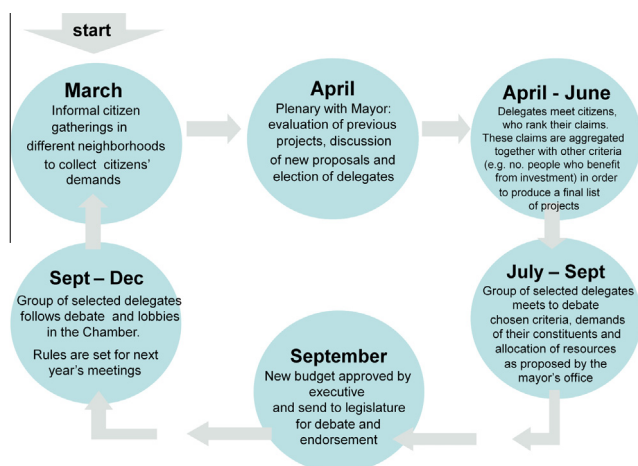


Figure 1. Participatory budgeting yearly cycle.

(iii) Adoption

The expansion of participatory budgeting across Brazilian municipalities closely matched that of the Workers' Party in the first years. Likewise, it evolved slowly, first in the southern urban centers, then in the smaller neighboring municipalities and northern municipalities. From the mid-1990s onward, as the publicity of the most successful experiences spread and participatory budgeting became internationally recognized, it started being replicated by other parties—most, but not all, with political orientations close to the Workers' Party. In fact, from the mid-1990s onward only roughly half of the municipalities with participatory budgeting were governed by Workers' Party mayors.

Table 1 shows the distribution of participatory budgeting experiences across Brazilian regions and time.

The maps in Figure 2 show the geographical distribution of participatory budgeting experiences across the legislative periods shown in the table. Municipal boundaries are shown in gray and the municipalities adopting participatory budgeting are indicated in a darker shade in the maps.

Table 2. shows the evolution of the number of municipalities adopting participatory budgeting and also of municipalities with Workers' Party mayors.

Although the total number of adopting municipalities (169 at the last available count in 2000–04) seems small in a nation as big as Brazil (which contained a total of 5,561 municipalities at the same date) it is worth noting that in 2000 the 169 municipalities that had adopted participatory budgeting accounted for approximately 27% of Brazil's 175 million inhabitants. It is worth noting that the number of participatory budgeting occurrences as shown in the table is not cumulative over time. At the end of every period there are municipalities dropping out of the program as well as new municipalities adopting participatory budgeting.

As can be seen from Table 2, not all municipalities with Workers' Party mayors used participatory budgeting (for example during 2001–04 only 78 of the 186 municipalities with Workers' Party mayors employed participatory budgeting). The reason for this typically lies with a fragile financial situation (where debt repayment obligations and labor costs did not allow for new investments) or with the Workers' Party mayor having to govern in coalition with other political parties (see Shah, 2007).

It should be noted that the group of municipalities that have used participatory budgeting in the period under analysis, is not a random sample of the 5,561 Brazilian municipalities. Besides being typically (but not always) governed by left-wing mayors, these group of municipalities was on average, at the beginning of the 1990s, wealthier, more urban and densely populated, and had better household infrastructure and higher levels of educational attainment than the average municipality that did not use participatory budgeting. The differences across a range of socio-economic indicators between adopting

Table 1. Adoption of participatory budgeting

Regions	1989–92	1993–96	1997–2000	2001–04
North	0	1	5	12
Northeast	2	9	18	30
Central-West	0	1	2	7
Southeast	8	27	50	86
South	2	13	44	34
Total	12	51	119	169

I take every 4-year legislative period bounded by a mayoral election as the indicative date for the beginning (or end) of a participatory experience.

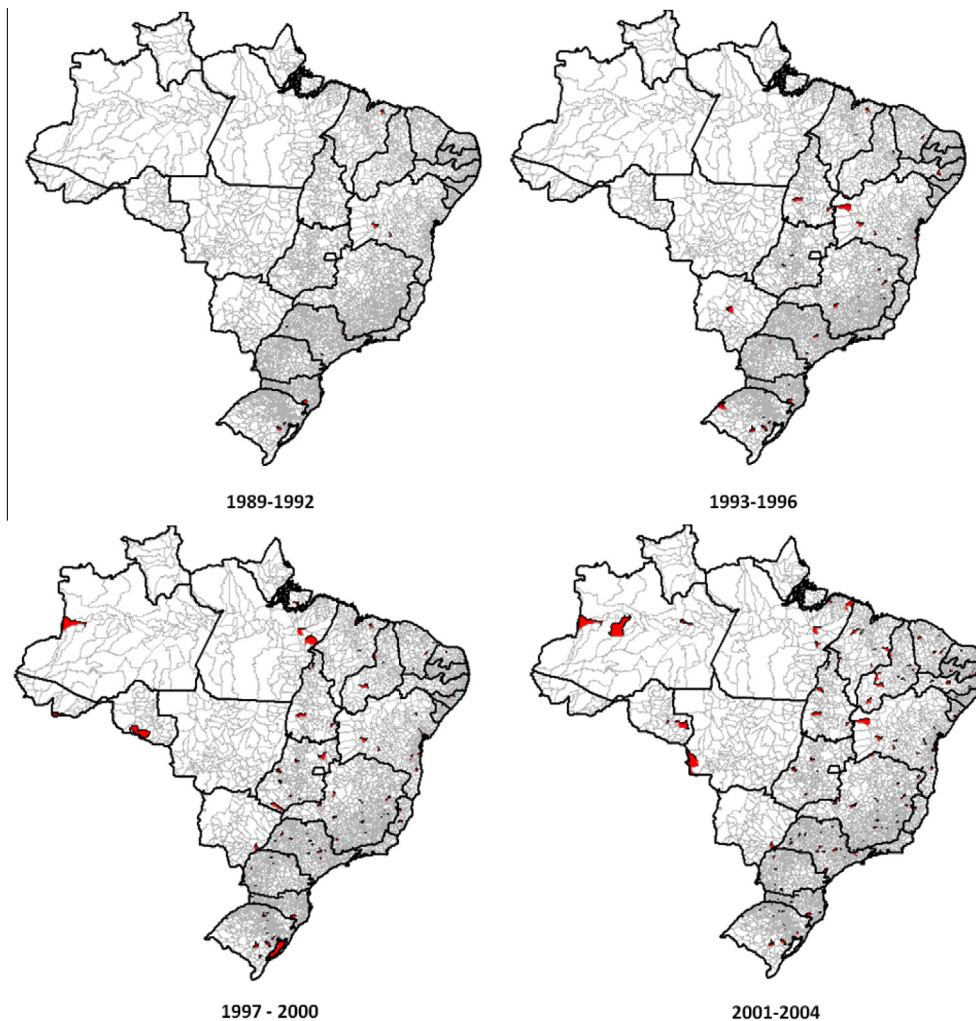


Figure 2. Geographic evolution of participatory budgeting experiences.

Table 2. Municipalities with participatory budgeting across time

No. of municipalities	1986–88	% Pop	1989–92	% Pop	1993–96	% Pop	1997–2000	% Pop	2001–04	% Pop
With PB	1	0.18%	12	9.31%	51	11.67%	119	15.62%	169	27.04%
With Workers' Party mayor	2	0.22%	37	10.44%	55	5.54%	115	5.04%	186	17.56%
Workers' Party and PB	1	—	10	—	20	—	55	—	78	—
Total no. municipalities	3,991	139,287	4,491	145,336	4,974	154,544	5,507	163,793	5,561	175,394

and non-adopting municipalities are presented in Table 4 and will be discussed in more detail in Section 3 of this paper.

The variation in adoption of participatory budgeting both across time and across municipalities is important to investigate the differential impact of participatory budgeting adoption with respect both to the allocation of public expenditures and to changes in infant mortality. To be precise the unit of the observation for the econometric analysis is the “MCA”, i.e., “minimum comparable area,” as opposed to the municipality. The use of MCAs is a standard practice in the analysis of panel administrative data for Brazil, as it allows tracking the same unit across the period under analysis. MCAs represent the municipal borders as of 1970 and typically contain one municipality, but owing to population growth and splits some MCAs can contain more than one municipality. This is because during the period under analysis, and in part resulting from the decentralization process, the nation's

2municipal divisions changed considerably mainly due to municipalities splitting due to population growth (for instance, during 1980–2004 more than 1,500 new municipalities were created). As a result, my econometric analysis is based on 3,651 MCAs, which I track across the 1990–2004 period.¹² Fundamentally for my analysis and conclusions, the patterns of change with respect to the evolution of participatory budgeting adoption across time (as shown in Table 2) look highly similar at municipality or MCA level.

The identification of the effects associated with the adoption of participatory budgeting by municipal governments will be discussed in further detail in the next section.

(iv) Participants and investment priorities

Although the participatory meetings are open to the whole municipal population, as described above, only a fraction of it does in fact participate. There is no available official record,

to my knowledge, about the magnitude and defining characteristics of this participation. The existing information comes from data collected and compiled by local NGOs interested in the subject of participation. For example, according to the NGO Cidade,¹³ as quoted by Abers (2000), in Porto Alegre (a city of approximately 1.2 million inhabitants at the end of the 1980s) in the first two years of participatory budgeting, i.e., in 1989 and 1990, less than a thousand people participated in the participatory budgeting forums. However, as the first demanded investments were undertaken by the municipal government, the number of participants jumped to 8,000 in 1992. After the re-election of the Workers' Party mayor in that same year, participation in the participatory budgeting forums gradually increased to more than 20,000 individuals per year in the late 1990s-early 2000s. In small and mid-sized municipalities, where the overall process of participation is usually simpler and less time-consuming or technically demanding, participation tends to be substantially larger often reaching 20% or more of the total population.

The surveys from NGO Cidade (Cidade, 1998; Cidade, 1999) also allow for a characterization of the average participants of the participatory budgeting forums. For example, data collected at the participatory budgeting forums in Porto Alegre, in 2002, reveal that the participatory assemblies tend to concentrate a higher proportion of (i) women, (ii) elders and retired workers, (iii) married people, (iv) non-qualified workers, (v) people with lower average income, (vi) higher rates of associative life, and (vii) stronger identification with the Workers' Party ideology than the city's average dweller. A comparison with data from earlier surveys shows that the differences between the average city dweller and the average participatory budgeting participant's profile have been decreasing over time, as participation in the participatory budgeting forums extends to different strata of the society. Similarly, the differences also tend to be less apparent at the "higher levels of participation," i.e., among the tiers of elected delegates and councilors. In fact, in Porto Alegre, the average participatory budgeting councilor typically ranks above the city's average with respect to education or income levels.

Information on the investment priorities voted by the participants is not made available by most of the municipalities in a systematic way. Table 3 illustrates a typical list of investment priorities as voted in the popular assemblies that are part of the participatory budgeting process. The information presented in the table refers to the municipality of Porto Alegre, but anecdotal evidence and the existing literature, as well as data published by other municipalities corroborate that it is

also representative of expenditure priorities among other adopting municipalities. The following investments are regularly top-ranked in the first rounds of participatory budgeting (across the full range of adopting municipalities for which there is data):

- basic sanitation, which mainly refers to extension and improvement of sewage networks, drainage, anti-erosion, anti-slippage measures, and waste removal;
- street paving, which usually accompanies installation of sanitation infrastructure;¹⁴
- land regulation, referring to the definition of property rights over occupied land - a major issue in the poor areas of Brazilian cities; and
- street lighting, which falls under the "Housing and Urbanism" class of municipal expenditures.

Investments in basic education and health are also demanded (usually referring to building and improvement of facilities), as the basic infrastructure (sanitation, paving, housing and lighting) needs are gradually met.

These voted priorities can be interpreted from different perspectives, which are not necessarily mutually exclusive. On one hand, they can simply reflect the preferences of the group of citizens that took part in the participatory forums, whose profile was described above, and on the other hand, they can indicate a clear bias toward very visible, easily monitorable works where checking the government's role is more easily done. In either case the relevance of the analysis proposed in this paper is not affected. It still remains important to investigate what average impact this additional information has had on the government's budgeting or, on the contrary, whether participatory budgeting has been in practice an empty populist trick with none or limited impact on the observed pattern of municipal expenditures.

(b) Public expenditures

(i) Decentralization

By law, the municipal executive has been responsible for the provision of goods and services considered to be of "local interest," that is, whose relevance is essentially restricted to the municipality. In practice, this has traditionally been limited to garbage collection, disposal and general cleaning services, sewerage networks construction and maintenance, public lighting, roads, general urban infrastructure works, public transportation and, in some cases, also water treatment and delivery. Although there was also some municipal activity in primary education and primary health care, these services

Table 3. Investment priorities voted at participatory forums

Year	1st	2nd	3rd
2004	Housing	Social	Education
2003	Housing	Education	Paving
2002	Housing	Education	Paving
2001	Paving	Housing	Basic sanitation
2000	Housing	Paving	Health
1999	Basic sanitation	Paving	Housing
1998	Paving	Housing	Basic sanitation
1997	Housing	Paving	Basic sanitation
1996	Paving	Basic sanitation	Land use regulation
1995	Paving	Land use regulation	Basic sanitation
1994	Land use regulation	Paving	Basic sanitation
1993	Basic sanitation	Paving	Land use regulation
1992	Basic sanitation	Education	Paving

Source: Municipality of Porto Alegre.

were far from being an exclusive municipal responsibility as there was a strong presence of state, and even federal, managed schools and health centers. The same was also true for water treatment and delivery services. Despite being considered a municipal responsibility, state companies were still the predominant provider of water services in the 1980s as a consequence of the model used for the development of this sector during the military regime, which was based on a state company's management through concession contracts.¹⁵

After the new constitutional charter of 1988, although the presence of federal and state governments was not completely dismissed (as they are still encouraged to intervene in case of insufficient local capacity), municipalities were strongly stimulated to enlarge their participation in the education and health sectors, and progressively received larger transfers from upper levels of government in order to assume those tasks.¹⁶ As a result, primary health care, pre-school and primary education are now (almost) exclusively municipal responsibilities. In the sanitation sector municipal governments have also been assuming an increasing role in the water services since the end of the existing contracts with state companies. This complements their pre-existing central role in providing local sewerage services.

(ii) *Composition and evolution of expenditures*

Figure 3 shows the allocation of municipal expenditures by category at beginning and the end of the period under analysis.¹⁷ "Education and Culture" absorbed the largest share of the budget during the whole of the sample period, accounting for 27% of the budget in 1990 and 30% of the budget in 2004. In contrast to the fairly stable budget share of the "Education and Culture," the share of the budget dedicated to "Health and Sanitation" rose from 13% to 23%—a 10% point increase over this 14 year period. The losing sectors in share terms were "Housing and Urbanism" and "Other Expenditures" (which includes the remaining classes). This observation is in line with the usual evaluation of the Brazilian decentralization process, which highlights the success achieved in health/sanitation and education sectors as opposed to the limited progress made as regards municipal housing or social welfare programs (see Souza, 2001).

(c) *Socio-economic outcomes*

Indicators from the Brazilian Population Census and from international organizations show that, right after democratization in 1985 and prior to the first experiences with participatory budgeting, there was substantial room for improvement of social indicators on several fronts. Although access to goods and services and overall well-being varied vastly within the nation (as well as within states and even within municipalities), with the densely populated southern states performing significantly better, the level for most relevant indicators was generally low when compared to other Latin American countries. At the beginning of the 1990s the infant mortality rate was close to 50 infants for every 1,000 newborns (World Bank, 1990) with systematic high rates of morbidity and mortality from infectious and parasitological diseases (diarrhea being one of the most prevalent).¹⁸ At this time there was a major deficit in the sanitation infrastructure as less than 20% of the nation's households were connected to the public sewage network. According to the Census of 1991, there was also a serious lack of access to proper housing and education levels were extremely low as the average illiteracy for adults (over 25) and school drop-out rates were both above 20%. With such widespread deficiencies, it is not immediately obvious which investments should be prioritized. In this context, the information channels opened by participatory budgeting might serve as a useful tool for identifying what citizens in Brazilian municipalities saw as the expenditure priorities.¹⁹

(d) *Evolution and potential role of participatory budgeting*

Over the last 10–15 years, Brazil's commitment to improving educational and health outcomes yielded considerable gains. Infant mortality has decreased by almost 40% and overall mortality from infectious and parasitological diseases has been substantially reduced (World Bank, 2004). This decline in infant mortality rates is registered in the Brazilian Population Census (IBGE) data which show that the average infant mortality rate in Brazil dropped from 48 to 33 out of 1,000 newborns during 1991–2000—a decline of over 30%. During this period, there has also been a large expansion in basic school enrollments and widespread reductions in grade repetition.

The demands listed in the participatory forums suggest that improvements in basic sanitation were an early and urgent priority. Figure 4 charts the share of MCA budgets dedicated to health and sanitation separately for MCAs which adopted participatory budgeting and those that did not during 1990–2004. We can observe that there has been a gradual channeling of resources to this sector for all MCAs, but that among adopting MCAs the increase became more accentuated precisely at the point when adoption of participatory budgeting became more widespread, i.e., after 1996 (the bars in the graph indicate the percentage of municipalities that in each period were effectively using participatory budgeting, out of the total number of municipalities that have adopted participatory budgeting at some point in time during 1990–2004).

In the remainder of this paper I investigate in a more systematic manner whether this apparent divergence in budgetary behavior between adopting and non-adopting MCAs can be linked to the adoption of participatory budgeting. Following the existing consensus in the public health literature on the leading role of improved health and sanitation in reducing infant mortality, I also investigate whether the adoption of participatory budgeting can be linked to improvement in living standards along this key dimension.

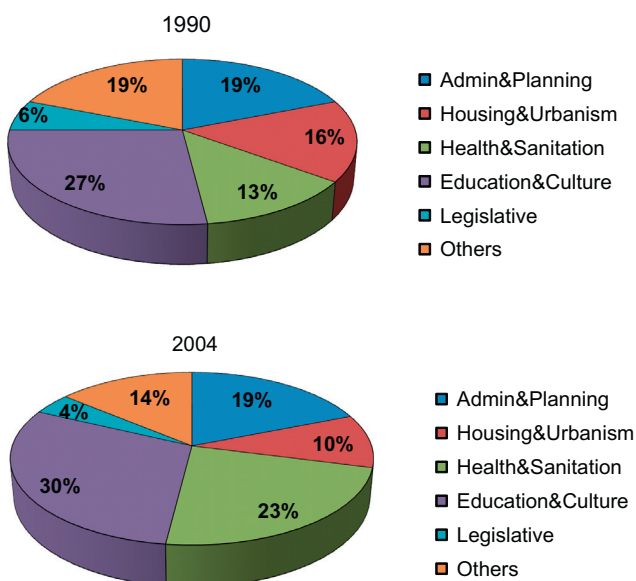


Figure 3. *Municipal expenditures by category.*

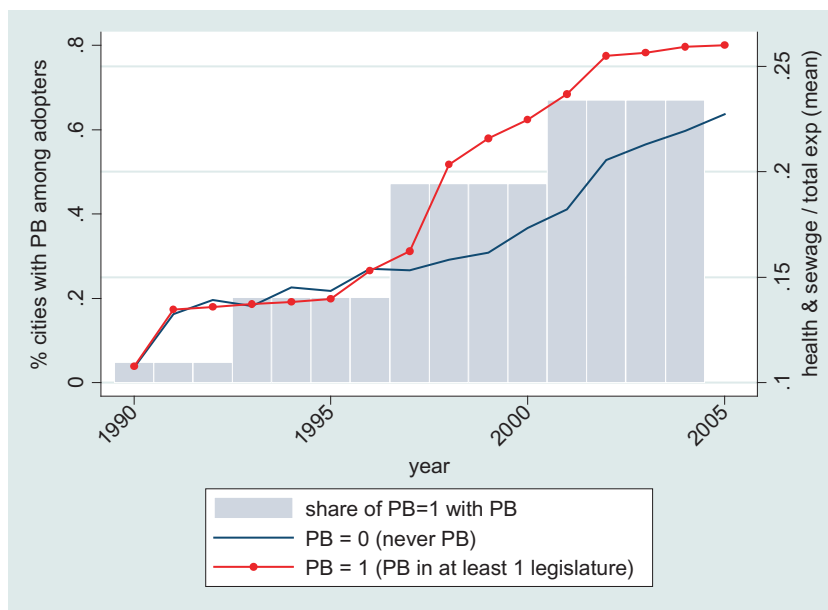


Figure 4. Evolution of municipal expenditures share in health and sanitation: adopters ($PB = 1$) vs. non-adopters ($PB = 0$).

The results presented in the following section should be interpreted as estimated average treatment effects associated with the adoption of participatory budgeting. The scarcity of quantitative data regarding the participatory experiences during the period under analysis does not allow me to exploit in the heterogeneity of participatory experiences' rules and procedures across time and municipalities with respect to elements potentially critical for the success of such experience (such as the percentage of the budget under discussion or the method used for the election of delegates/councilors).

The existing (and much more abundant) qualitative evidence on the participatory budgeting experiences in Brazil, obtained from case-studies and surveys based on a much smaller sample of adopting municipalities, has emphasized a number of critical elements for the success of a participatory budgeting experience across a range of municipalities, such as^{20, 21}:

- the political commitment of the municipal government to ensure the effective integration of projects arising from participatory forums within the overall government plan;
- the involvement of time and money by the municipal government to logistically organize forums and incentivize citizen participation;
- the proportion of the municipal budget subject to deliberation: typically the larger the proportion the greater the involvement of citizens and political agents in the participatory process, and, obviously, the greater the probability that popular demands will result in policy;
- the institutional design for the selection of citizen representatives (delegates/councilors) participation in the forums is typically preferred to a method based on secret vote for the election of representatives as the former increases accountability and civic engagement; and
- the method for aggregation of preferences: the method used to aggregate preferences is based on a set of criteria in order to promote fairness in the distribution of resources as well as to take into account the projects' technical and financial feasibility. These criteria need be as transparent as possible and also subject to popular debate, in order to avoid possible distortion of voter preferences under the guide of "technical" analysis, for instance.

These elements should be bear in mind when assessing the results presented in this paper.

(e) Data sources

The information on participatory budgeting adoption comes from the following sources: a compilation I made in collaboration with members of the Workers' Party, which provided data for the period 1986–92, surveys conducted by the "Fórum Nacional de Participação Popular" (National Forum of Popular Participation)—an association of NGOs interested in the theme of citizens' participation—for the period 1992–2000 (see [Grazia & Torres Ribeiro, 2003](#)), and data provided by [Avritzer and Wampler \(2005\)](#), for 2001–04. The survey studies are based on questionnaires sent to all municipalities in the nation and collected by local NGOs. For the years where there is overlap the data that I collected for the earlier years matched the survey based estimates.

The data set collected indicates for all Brazilian municipalities whether the municipal government engaged in any form of participatory budgeting during budgetary design and implementation. This data set refers uniquely to a listing of municipalities that in each year, from 1986 to 2004, reported using participatory budgeting, as further information regarding individual experiences is not publicly available. Therefore, it is not possible to identify potential nuances in the degree of participation mentioned above, nor the investment priorities voted for by the participants in each and every municipality. My knowledge about these issues is based on case study evidence and data published by some municipalities and NGOs for a subset of municipalities.

The financial data on public expenditures classified by the categories mentioned above and used throughout this paper are originally from the National Treasury ("Secretaria do Tesouro Nacional") and are available for every municipality since 1990. To simplify the data collection process I made use of the tabulations available from the Institute of Applied Economic Research (IPEA—"Instituto de Pesquisa Econômica Aplicada"). These data allowed me to build a panel of budgetary expenditures for 3,651 Brazilian MCAs for the period 1990–2004.

Infant and child mortality rates are the living standard or socio-economic variables of choice in the analysis. The reason for this is twofold: first, these variables are an important and globally accepted measure of the development and overall socio-economic level of a nation; and, second, infant and child mortality rates are available for all Brazilian municipalities on an early basis since the late 1970s, as opposed to other socio-economic measures, which can only be obtained at municipal level every 10 years with the population Census. The mortality rates used in econometric analysis are measured as a ratio of the number of deaths to the number of living residents in the same age group (up to 1 and up to 4 years old, respectively, for infant and child mortality). The infant and child mortality data used to evaluate health outcomes in this paper are from Datasus, the official data centre of the Brazilian Ministry of Health. Its database includes yearly mortality figures, by age group, for every Brazilian municipality since 1979, from which I compiled infant and child mortality for every MCA. The municipal infant and child resident populations, necessary to compute the mortality rates, have been available since the early 1990s from the Brazilian Institute of Geography and Statistics (IBGE).

Descriptive statistics for the variables included in the econometric analysis and for overall socio-economic and population indicators are presented in Table 4 for the cross-section of Brazilian municipalities (or, more precisely, MCAs) in 1990.

Table 4 also lists for each of the variables the mean difference between participatory budgeting adopters and non-adopters and associated standard error for the test of equality of means.

3. ANALYSIS: METHOD AND RESULTS

Participatory budgeting is expected to add two key elements to the conventional budgetary process. First, by bringing together citizens and elected politicians to discuss the allocation of public expenditures, participatory budgeting is expected to generate a pure informational gain regarding the citizens' needs and preferences. As a result, policy-makers are able provide goods and services and to develop policies that better match these preferences, as revealed in the participatory forums. This might be particularly useful in contexts characterized by several service failures and deficiencies. Second, by opening-up the "black-box" of budgetary design and implementation to the whole of society, participatory budgeting is expected to strengthen political accountability as it works as a commitment device for the elected politicians. At the end of each participatory cycle, the citizens know the amount of public money that is supposed to be spent and the exact projects or services that are supposed to result from spending that money. As a result, under the participatory budgeting model

Table 4. *Descriptive statistics as of 1990*

Variable	Obs	Mean (whole sample)	Mean difference (adopters—non-adopters)	Std. error
<i>Census data (1991)^a</i>				
Area (km ²)	3,650	2,336	7,221***	972.2
Resident population ('000)	3,650	40.2	228.3***	14.0
Urban population (%)	3,650	54.9	27.5***	1.5
Households w/ electricity (%)	3,650	73.4	17.8***	1.5
Households connected to public water system (%)	3,650	42.2	27.1***	1.6
Households connected to public sewage system (%)	3,650	18.0	20.5***	1.8
Average education adults more than 25 years old (no. years)	3,650	3.1	1.7***	0.1
Enrollment rate among 7–14 years olds (%)	3,650	72.7	10.4***	0.9
Illiterate population more than 15 years old (%)	3,650	30.1	-14.2***	1.1
Monthly per capita household income (R\$ 2000)	3,650	0.7	0.6***	0.03
Inequality (theil) index	3,650	0.5	0.0	0.01
Resident doctors per 1,000 inhabitants	3,650	0.3	0.5***	0.0
Graduate nurses (% total resident population)	3,650	7.2	0.0	0.0
Life expectancy	3,650	62.8	2.1***	0.2
Infant mortality (<i>UNDP</i>) ^b	3,650	49.7	15.6***	1.6
<i>Ministry of health data</i>				
Infant mortality (less than 1 year old) ^c	3,270	0.03	0.00	0.00
Child mortality (less than 4 years old) ^c	3,270	0.01	0.00	0.00
<i>Treasury data</i>				
Total per capita budgetary expenditure ^d	3,270	85.09	13.99***	4.51
Spend administration and planning (over total budget)	3,270	0.19	0.03***	0.00
Spend housing and urbanism (over total budget)	3,270	0.16	0.02**	0.01
Spend health and sanitation (over total budget)	3,270	0.11	-0.00	0.00
Spend education and culture (over total budget)	3,270	0.25	-0.02***	0.00
Spend legislative (over total budget)	3,270	0.05	-0.01**	0.00
New investment (over total budget)	3,270	0.25	-0.01	0.01

Based on minimum comparable areas (MCA's).

* Significantly different from zero at 10%.

** Significantly different from zero at 5%.

*** Significantly different from zero at 1%.

^a Census data is from 1991.

^b Infant mortality rate as defined by the UN—probability of death before reaching age 1 per 1,000 live births.

^c Mortality rate calculated as the ratio of number of deaths by the number of residents.

^d BRL at constant prices of 1994.

they can more accurately monitor and evaluate the elected politicians' actions.

These two mechanisms—the pure information mechanism and the increased accountability/commitment mechanism—have implications that can be tested empirically. The information mechanism predicts that when participatory budgeting is adopted we should be able to observe an allocation of expenditures that more closely matches the popular demands. As suggested in Section 2(a) this should imply a larger allocation of resources to the health and sanitation sector. The commitment mechanism in turn has implications not only on the allocation of public but also on the living standards resulting from the additional goods and services provided in line with the popular demands. In particular, given the association between improved sanitary conditions and infant mortality, a fall in the latter indicator might be expected.

This section investigates whether the adoption of participatory budgeting, and the associated information and accountability gains it is expected to generate, can be linked to any differentiated effect on public expenditure allocation and associated health outcomes by analyzing a panel of Brazilian MCAs during 1990–2004.

(a) *Baseline specification and results*

The econometric analysis is based on panel data regressions of the form:

$$y_{it} = \alpha_i + \gamma_t + \beta PB_{it} + \delta X_{it} + \varepsilon_{it}, \tag{1}$$

where y_{it} is the outcome variable interest in MCA i at time t and PB_{it} is a measure of participatory budgeting in the MCA at time t . PB_{it} would typically be a binary variable, indicating the use (or not) of participatory budgeting in the allocation of public resources. However, because some MCAs contain more than one municipality, this variable is the proportion of the MCA total budgetary expenditure that belongs to municipalities using participatory budget. Thus, this variable can assume any value between 0 and 1.

X_{it} is a vector of time-varying control variables including the mayor's party,²² the MCA's total budgetary expenditure²³ and state-specific time trends. The political controls allow me to ascertain whether participatory budgeting has had any effect on the outcome variables of interest which is separate

from that due to the political orientation of different mayors. The state-specific time trends, on the other hand, control for time-varying effects on the outcome variables of interest that are common within a given state, such as state-wide policies.

α_i is a MCA fixed effect to account for MCA-specific and time-invariant factors such as culture, geography or any other persistent characteristics, that might affect the outcome of interest, and γ_t is a year fixed effect that captures time-specific (but MCA-invariant) shocks, such as macro shocks, election years, or nation-wide policies.

Standard errors are heteroskedasticity-robust and clustered by MCA to deal with potential serial correlation (Bertrand, Duflo, & Mullainathan, 2004).

The baseline specification makes use of the full sample of 3,650 MCAs. The effects of participatory budgeting adoption on the allocation of public expenditures and on health outcomes are estimated both from the cross-sectional variation in adoption (adopting MCAs versus non-adopting MCAs) and from the within variation in adoption among the 228 adopting MCAs. It exploits the full sample variation in the decision to adopt participatory budgeting and in the timing and length of the adoption period.

(i) *Public expenditures*

Table 5 links the adoption of participatory budgeting to the allocation of budgetary expenditures. The left hand side variables (i.e., the explained variables) are the different classes of expenditures from the public accounts. More precisely, they measure the proportion of the MCA total budgetary expenditure ("BME") that is allocated to each one of those classes or categories. The right hand side variables are as described above. For brevity, out of the existing 16 expenditure categories that can be tracked across the 1990–2004 period, only the most important in size are shown in the table.²⁴

The findings in the table suggest that there are significant differences in the allocation of expenditures associated with adoption of participatory budgeting. MCAs with a greater share of participatory budgeting spend a larger proportion of their total budget on health and sanitation (see column 2), at the expense of education and culture (column 4), administration and planning (column 1), and housing and urbanism (column 3). The estimated effect suggests an average difference of above 3% points, between an MCA without participatory

Table 5. *The effect of participatory budgeting on the allocation of public expenditures*

OLS—fixed effects	Administration and planning/BME (1)	Health and sanitation/BME (2)	Housing and urbanism/BME (3)	Education and culture/BME (4)	Legislative/BME (5)	Others/BME (6)
PB ^a	-0.010** [0.005]	0.033*** [0.005]	-0.015*** [0.004]	-0.012*** [0.004]	-0.003 [0.002]	0.007 [0.004]
Control variables ^b	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
MCA effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	47,707	47,707	47,707	47,707	47,707	47,707
No. categories (MCA's)	3,650	3,650	3,650	3,650	3,650	3,650
R-squared	0.43	0.50	0.46	0.49	0.30	0.50

Robust s.e. in brackets, clustered at "MCA" level.

The dependent variables measure the proportion of the MCA total public budgetary expenditure ("BME") allocated to each one of the categories.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

^a PB represents the % of budget within the MCA decided in municipalities with participatory budgeting. Typically this is a binary variable, but since some MCAs contain more than one municipality, it can assume any value between 0 (for years when participatory budgeting was not used anywhere in the MCA) and 1 (for any year when the whole MCA is using participatory budgeting).

^b Control variables include: political party of the mayor, MCA total budget, state-specific time trend.

Table 6. *The effect of participatory budgeting on per capita expenditures*

OLS—fixed effects	Total budgetary expenditure <i>pc</i>	Exp. on administration and planning <i>pc</i>	Exp. on health and sanitation <i>pc</i>	Exp. on housing and urbanism <i>pc</i>	Exp. on education and culture <i>pc</i>	Exp. on legislative <i>pc</i>	Other Exp. <i>pc</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PB ^a	-0.524 [5.492]	-1.807 [1.454]	5.515*** [1.918]	-4.411*** [1.370]	-2.073 [1.866]	-0.239 [0.623]	2.491 [1.725]
Control variables ^b	Yes	Yes	Yes	Yes	Yes	Yes	Yes
year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MCA effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	34,798	34,798	34,798	34,798	34,798	34,798	34,798
No. categories (MCA's)	3,650	3,650	3,650	3,650	3,650	3,650	3,650
R-squared	0.83	0.73	0.65	0.62	0.79	0.48	0.50

Robust s.e. in brackets, clustered at "MCA" level. Per capita expenditures, at constant prices, for the period 1994–2004 (after introduction of Real). The dependent variables measure MCA per capita expenditures.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

^a PB represents the % of people within the MCA living in municipalities with participatory budgeting.

^b Control variables include: political party of the mayor, state-specific time trend.

budgeting and an MCA that adopts participatory budgeting, of the budget share allocated to health and sanitation, which is as much as 30% of the variable's sample mean at the beginning of the period (see Table 4).

Interestingly, it seems that this incremental effect does not follow from a superior financial capacity of adopting MCAs. When the same regression is estimated in per-capita terms instead of budget shares (i.e., using per capital expenditures instead of expenditure shares) as shown in Table 6 the pattern of coefficients for the key heads of budgetary expenditure is highly similar to that in Table 5, but participatory budgeting appears to be budget neutral as the per capita total budgetary expenditures are not significantly different between adopting and non-adopting MCAs.

(ii) Health outcomes

Table 7 looks at the link between the adoption of participatory budgeting and infant and child mortality. As before, the right hand side variable of interest ("PB") measures the presence of participatory budgeting within the MCA. The left hand side variables are the infant and child mortality rates at MCA level, which are measured as the ratio of the number of deaths to the number of living residents of age up to 1 and 4 years old in the MCA, respectively.

The results, in columns 1 and 2 of Table 7, suggest the existence of a negative association between infant and child mortality rates and the use of participatory budgeting. Moreover the magnitude of the estimated effects of participatory budgeting adoption on mortality reduction is considerable. They represent about 9% and 7% of the infant and child mortality rates sample means in 1990, respectively (see Table 4).

It is likely that these effects on the mortality rates arise from the greater expenditure on health and sanitation associated with participatory budgeting. To investigate whether this is the case, I also estimate the following regression that includes, in addition to the variables in the model above, an interaction term between the expenditure share on health and sanitation and the adoption of participatory budgeting:

$$y_{it} = \alpha_i + \gamma_t + \beta_1 PB_{it} + \beta_2 ExpShare(Health\&sanitation)_{it} \\ + \beta_3 PB * ExpShare(Health\&Sanitation)_{it} + \delta X_{it} + \varepsilon_{it},$$

where the coefficient β_3 captures the differential impact of this category of expenditures between MCAs with and without participatory budgeting.

The results in columns 3 and 5 of Table 7 display, not surprisingly, a negative association between having a greater proportion of the budget spent on health and sanitation and mortality rates. This estimated effect persists when a measure for the presence of participatory budgeting and its interaction with the health and sanitation budget share is included (columns 4 and 6). More importantly, in columns 4 and 6 we see that allocating more resources to health and sanitation (out of the total budget) seems to have a significantly larger effect on infant and child mortality rates when it appears together with the use of participatory budgeting. The estimated β_3 coefficient is negative and significant and three times larger than the estimated β_2 . This suggests that there is an efficiency gain from introducing participatory budgeting: every Real allocated to the health and sanitation sector has a larger impact on infant and child mortality when it is introduced in an MCA which has adopted participatory budgeting relative to one that has not.

It is important to note that the effects discussed above, both for the public expenditures and the health outcomes are estimated controlling for the political party of the governing mayors as well as state-specific time-trends. Given that in the period under analysis approximately half of the municipalities using participatory budgeting were governed by Worker's Party mayors, the inclusion of the political control allowed me to test whether or not participatory budgeting is simply a proxy for the presence of this party and its particular model of government, or alternatively, produces effects that are independent of the political orientation of the governing mayor. The results in both Tables 5–7 suggest that adoption of a system of local government based on participatory budgeting produces effects on public expenditures and health outcomes that are independent of the political orientation of a given political party. Moreover, these effects appear to be also beyond and independent from any state-specific policy that might be in place during the period under analysis and influence the allocation of the public budget or the trend on the infant/child mortality rates. This is important given that during the period under analysis, and particularly from the mid-1990s onwards, state public administrations went through major reforms which might have generated effects on living standard outcomes similar to those described above for participatory budgeting.²⁵

A plausible scenario is that demand for basic health and sanitation is high in a number of Brazilian MCAs, however the adoption of participatory democracy is needed to align

Table 7. *The effect of participatory budgeting and health and sanitation expenditures on mortality*

OLS—fixed effects	Infant mortality (1)	Child mortality (2)	Infant mortality (3)	Infant mortality (4)	Child mortality (5)	Child mortality (6)
PB ^a	-0.002*** [0.001]	-0.0004*** [0.000]		0.001 [0.001]		0.000 [0.000]
Exp on health and sanitation/BME			-0.005*** [0.002]	-0.004** [0.002]	-0.001** [0.000]	-0.001** [0.000]
(Exp on Health & Sanitation/BME) * PB				-0.012** [0.005]		-0.003*** [0.001]
Control variables ^b	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
MCA effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	47,707	47,707	47,707	47,707	47,707	47,707
No. categories (MCA's)	3,650	3,650	3,650	3,650	3,650	3,650
R-squared	0.44	0.48	0.44	0.45	0.48	0.48

Robust s.e. in brackets, clustered at "MCA" level.

Mortality rates calculated as the ratio of number of deaths by the number of residents in the relevant age group.

** Significant at 5%.

*** Significant at 1%.

^aPB represents the % of budget within the MCA decided in municipalities with participatory budgeting.

^bControl variables include: political party of the mayor, MCA total budget, state-specific time trend.

the preferences of citizens and politicians. In effect participatory democracy represents a mechanism for unlocking this demand and for allowing for it to be expressed in the actual public policies which are implemented at the MCA level in Brazil. Just electing mayors of a particular political hue is not sufficient to achieve this. What we are likely observing is the effect of changing the system of local government as opposed to changing the political orientation of the governing mayor. The fact that this may be a system effect is encouraging as it suggests that participatory democracy may be successfully adopted and implemented by a range of political parties as indeed has been the case in Brazil and elsewhere. In essence, it represents a system for potentially improving the aggregation of citizens' preferences in the formulation of public policy at the local level.

(b) *Robustness tests*

(i) *Nearest neighbors*

As discussed above the MCAs which adopted participatory during 1990–2004 do not seem to represent a random sample of the 3,650 Brazilian MCAs under analysis. The data from the Brazilian Census 1991 in Table 4 show that MCAs which adopted participatory budgeting tend to be, on average, richer, more educated, more urbanized, more densely populated and to have better housing infrastructure than non-adopting MCAs.²⁶ There is a concern that the differences between these two groups which pre-date the adoption of participatory budgeting may both affect the propensity to adopt and also influence public expenditure and health outcomes.

Brazil's huge territorial diversity in terms of socioeconomic development allows me to match adopting MCAs to non-adopting MCAs that are comparable in indicators considered relevant for the outcomes under analysis. I use two variables in this matching: per capita household income levels and average education among adults at the beginning of my sample period, as these are likely to affect both the propensity for an MCA to adopt participatory budgeting and the public expenditures and health outcomes under analysis. Separate matching exercises are carried out for each of these variables. In this exercise, all 3,650 MCAs are ranked based on the level of the two 1991 indicators and for each adopting municipality its nearest neighbor non-adopting counterpart is selected. This approach

produces a control group of non-adopting MCAs whose distribution of covariates (i.e., per capita household income levels and average education) is similar to that of the treated group of adopting MCAs. This considerably restricts the sample I have available for estimation but implies that I am comparing adopting MCAs to non-adopting MCAs that are similar in terms of these two indicators at the beginning of my sample period.

Panels A and B of Table 8 present the estimation results of the baseline equation, where the nearest-neighbor is defined according to, respectively, the MCA per capita household income level and the MCA average education level among adults over 25 years old in 1991. Columns 1–6 provide the estimated effects of participatory budgeting on public expenditures and columns 7 and 8 on infant and child mortality.

The main results I observe for the full sample go through for the restricted matched samples when I ex-ante match on either per capita household income or adult education level. More precisely, the estimation results suggest (i) an average difference of approximately 2% points on the budget share allocated to health and sanitation between an MCA that adopts participatory budgeting and an MCA without participatory budgeting (which is as much as 20% of the variable's sample mean at the beginning of the period, in 1990, for this sub-sample of "matched" MCAs), and (ii) an average reduction in infant mortality of approximately one infant for every 1,000 residents in the relevant age group (which is as much as 5% of the infant mortality rate sample means at the beginning of the period).

(ii) *Adopters only*

The nearest neighbors approach above relies on the assumption that selection into treatment (i.e., adoption of participatory budgeting) is exclusively based on observables. A separate and potentially more serious concern is that unobservable factors might be at the basis of the ex-ante differences between MCAs, conditioning both the outcome variables of interest and the decision to adopt participatory budgeting. Once again the timing and duration of the participatory budgeting adoption across the Brazilian municipalities provides us with a "natural" setting to address this problem. By taking advantage of the variation in the time of adoption I am able to restrict the analysis to the group of adopters (i.e., the 228 MCAs that have adopted participatory budgeting at least

Table 8. *Nearest neighbors*

OLS—fixed effects	Administration and planning/BME (1)	Health and sanitation/BME (2)	Housing and urbanism/BME (3)	Education and culture/BME (4)	Legislative/ BME (5)	Others/ BME (6)	Infant mortality (7)	Child mortality (8)
<i>A-Household per capita income</i>								
PB ^a	-0.007 [0.005]	0.020*** [0.006]	-0.012** [0.004]	-0.005 [0.004]	-0.003* [0.002]	0.008 [0.005]	-0.001* [0.001]	-0.0002 [0.0001]
Control variables ^b	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MCA effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,248	6,248	6,248	6,248	6,248	6,248	6,248	6,248
No. of categories (MCA's)	453	453	453	453	453	453	453	453
R-squared	0.50	0.59	0.53	0.49	0.36	0.54	0.46	0.50
<i>B-Average education level</i>								
PB ^a	-0.006 [0.005]	0.019*** [0.005]	-0.012*** [0.005]	-0.004 [0.004]	-0.003** [0.002]	0.007 [0.005]	-0.001* [0.001]	-0.0002 [0.0002]
Control variables ^b	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MCA effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,100	6,100	6,100	6,100	6,100	6,100	6,100	6,100
Nr of categories (MCA's)	440	440	440	440	440	440	440	440
R-squared	0.52	0.60	0.54	0.50	0.37	0.54	0.47	0.50

Robust s.e. in brackets, clustered at MCA level.

Sample restricted to 228 adopting MCA's and their nearest control neighbors based on household per capita income (panel A) and on average number of years of education in 1991 (panel B).

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

^a PB represents the % of budget within the MCA decided in municipalities with participatory budgeting.

^b Control variables include: political party of the mayor, MCA total budget, state-specific time trend.

for one legislative period during 1990–2004)²⁷ and can then estimate, within this group, the effect of participatory budgeting. With such a procedure I am able to “control” for whatever particular non-observable factors the set of adopting municipalities share that may have affected both the decision to adopt participatory budgeting, the allocation of public expenditures and associated living standard outcomes.

Table 9 presents the estimation results of the baseline equation after imposing this sample restriction. Columns 1–6 provide the estimated effects of participatory budgeting on public expenditures and columns 7 and 8 on infant and child mortality.

Again the pattern of results I observe for the full sample holds with the restricted sample of municipalities that adopted participatory budgeting during my sample period. More precisely, with this “adopters-only” specification the estimation results suggest (i) an average increase of 1.2% points in the budget share allocated to health and sanitation once the MCA adopts participatory budgeting (which is about 11% of the “adopters-only” sub-sample average budget share in health and sanitation at the beginning of the period), at expenses of a reduction of the share of the public budget directed to housing and urbanism expenditures by around 1.2% points; and (ii) an average reduction in infant mortality of approximately one infant for every 1,000 resident up to 1 year old (which is about 5% of this sub-sample average infant mortality rate in the period).

(iii) *Different trends by socio-economic Level*

Finally, an additional concern is that the differences between adopting and non-adopting MCAs shown in Table 4 MCAs might not only affect the propensity of adopting participatory budgeting, but might also place these two groups of MCAs in different trends of public spending and infant/child mortality rates during the period under analysis. To address this

concern, I add to the baseline specification a time trend interacted with the different levels of socio-economic variables of interest at the beginning of the period under analysis, in the following manner:

$$y_{it} = \alpha_i + \gamma_t + \beta_1 PB_{it} + \delta X_{it} + \phi T * L_{i91} + \varepsilon_{it},$$

where T is a time trend, and L_{i91} is an indicator variable for high/low level MCA along the socio-economic variable of interest. L_{i91} is defined according to whether MCA i was above/below the mean level of that socio-economic variable of interest in the 3,650 MCAs in 1991. In line with the nearest neighbors approach above I chose the per capita household income levels and average education among adults as the relevant socio-economic variables at the baseline. Table 10 presents the estimation results of the equation above using the full sample of 3,650 MCAs.²⁸

The estimated ϕ coefficient appears significantly associated with a greater spending in health and sanitation, a lower spending in housing and urbanism and education and culture, and with a lower infant mortality rate. This suggests that MCAs with higher average income or education at the beginning of the period under analysis, do tend to allocate a greater proportion of their budgets to health and sanitation and register lower rates of infant and child mortality rates over time. However, the estimation results still suggest that there are significant differences in these outcomes variables associated with the adoption of participatory budgeting. In fact, the findings in Table 10 look fairly similar to those presented using the baseline specification in Tables 5 and 7 for the main coefficients of interest.

Overall, the baseline results and the associated robustness tests suggest that adoption of participatory budgeting by Brazilian municipalities results in a change in the allocation of public expenditures toward health and sanitation, in line with the popular demands expressed in the participatory forums.

Table 9. *Adopters only*

OLS—Fixed effects	Administration and planning/BME	Health and sanitation/BME	Housing and urbanism/BME	Education and culture/BME	Legislative/BME	Others/BME	Infant mortality	Child mortality
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PB ^a	-0.002 [0.005]	0.012** [0.005]	-0.012** [0.005]	-0.003 [0.004]	-0.004** [0.002]	0.009* [0.005]	-0.001* [0.001]	-0.0002 [0.0002]
Control variables ^b	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MCA effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,229	3,229	3,229	3,229	3,229	3,229	3,229	3,229
No. categories (MCA's)	228	228	228	228	228	228	228	228
R-squared	0.51	0.62	0.58	0.49	0.45	0.56	0.55	0.55

Robust s.e. in brackets, clustered at MCA level.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

^a PB represents the % of budget within the MCA decided in municipalities with participatory budgeting.

^b Control variables include: political party of the mayor, MCA total budget, region-specific time trend.

Table 10. *Controlling for different trends by socio-economic level*

OLS—fixed effects	Administration and planning/BME	Health and sanitation/BME	Housing and urbanism/BME	Education and culture/BME	Legislative/BME	Others/BME	Infant mortality	Child mortality
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PB ^a	-0.010** [0.005]	0.031*** [0.005]	-0.014*** [0.004]	-0.011*** [0.004]	-0.003** [0.002]	0.008* [0.004]	-0.002*** [0.001]	-0.0003** [0.0001]
Control variables ^b	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MCA effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	47,707	47,707	47,707	47,707	47,707	47,707	47,707	47,707
No. categories (MCA's)	3,650	3,650	3,650	3,650	3,650	3,650	3,650	3,650
R-squared	0.43	0.50	0.46	0.49	0.30	0.50	0.44	0.48

Robust s.e. in brackets, clustered at MCA level.

* Significant at 10%.

** Significant at 5%.

*** Significant at 1%.

^a PB represents the % of budget within the MCA decided in municipalities with participatory budgeting.

^b Control variables include: political party of the mayor, MCA total budget, state specific time trend, baseline average income specific time trend.

Moreover, the changes in the infant and child mortality rates associated with the adoption of participatory budgeting strongly suggest that the expansion in health and sanitation spending within adopting municipalities results in substantial declines in these important health and living standards indicators.

These latter improvements are likely to have come about because participatory budgeting led to more attention being paid to health and sanitation in the overall of public expenditures. Further, in MCAs that adopted participatory budgeting each Real spent on health and sanitation seemed to have a larger impact in reducing infant and child mortality than in non-adopting MCAs. This is possible not only because participatory budgeting narrows down the information asymmetries between citizens and elected politicians, but also because it promotes a greater monitoring on the projects that integrate the public budget.

It is also important to add that the existing statistical evidence does not support the hypothesis of a possible worsening in other living standard indicators associated with the adoption of participatory budgeting. Data from the 2000 demographic Census show that at this date there were statistically significant differences between adopting and non-adopting MCAs across the socio-economic variables listed in Table 4. Adopting MCAs still performed on average significantly better than non-adopting MCAs across the range of socio-economic indicators by 2000,

even though for the vast majority of the indicators (e.g., education, life expectancy, per capita income, most household infrastructure) the gap between adopters and non-adopters had narrowed down during 1991–2000. The one exception is actually with respect to the percentage of the households in the MCA connected to the public sewage network, for which the gap between adopting and non-adopting MCAs has actually widened during 1991–2000. This evidence increases my confidence that the adoption of participatory budgeting does skew public expenditures toward sanitation, in line with the citizen's demands at the participatory forums. Furthermore, even though this compositional change in the public expenditures takes place at the expense of (mainly) expenditures in housing and urbanism and education and culture, it is important to see that we do not observe any evidence of worsening of outcomes associated with these sectors for the adopting MCAs.²⁹ This suggests that participatory budgeting might be an important tool in reducing inefficiency/waste in the allocation of public expenditures.

4. CONCLUSION

The adoption of participatory budgeting has been a highly popular reform at the municipal level in Brazil. The perceived success of participatory budgeting in key municipalities like

Porto Alegre led to its widespread adoption across Brazilian municipalities and stimulated the development of similar budgeting programs across the developing and also the developed world.

However, very little evidence exists of its effects in Brazil, or elsewhere, on local finances and living standards. Despite all the praise and endorsement received from international organizations such as the United Nations (whose city development program praised participatory budgeting as an important innovative experience in city management) and the World Bank (which is a strong advocate of the relevance of community participation in improving development outcomes), whether participatory budgeting is effective in improving political accountability and government responsiveness is an open question.

To fill this important gap in the literature I have put together a municipality panel data set covering the whole of Brazil for the period 1990 to 2004. This data set includes municipal level information on adoption of participatory budgeting, public expenditures and health outcomes. Using this data set I identify the effects on public expenditure and associated living standard outcomes associated with adoption of participatory budgeting by exploiting the rich variation in time

of adoption and duration of adoption both within and across municipalities across time.

These results suggest that adoption of participatory budgeting at the municipal level is associated with increased expenditure on basic sanitation and health services (such as water and sewage connections, waste removal), an early and urgent demand in the participatory forums. These services accordingly take up an increased share of total municipal budgets. Associated with this reallocation of resources at the municipal level we also observe a significant reduction in the infant mortality rates among municipalities that adopted participatory budgeting. Participatory budgeting is no *magic bullet*, though (Boulding & Wampler, 2010). Simple adoption of this model of public budgeting does not translate into automatic welfare improvements. There is substantial evidence in the literature that participatory budgeting needs not only financial resources (to back the investment projects) but also, and crucially, political commitment from the local governments (Avritzer, 2010). However, the results presented in this paper, as an average effect of participatory budgeting, do suggest that this reform appears to have brought government functioning closer to citizens' preferences and to have resulted in improvements in living standards along at least one key dimension.

NOTES

1. For the city of Porto Alegre, for instance, the World Bank (Social Development Notes, Note No. 71, March 2003) reports that during 1989–96 the proportion of households with access to water services rose from 80% to 98%, the percentage of the population served by the municipal sewage system increase from 46% to 85%, the number of children enrolled in public schools doubled, and on average an additional 30 km of roads were paved every year.

2. This budgetary model can be dropped at any point by the adopter or one of the following mayors (more details on participatory budgeting functioning and variation in adoption are provided later).

3. To be precise, in my econometric analysis, the unit of observation is what I will designate by “minimum comparable area” (MCA), which I can track across the 1990–2004 period. The logic behind the use of MCA-level data and the methodology used for its calculation are explained in the next section.

4. These results are in line with recent estimates for the impact of improved sanitary conditions on infant mortality in Brazil in Soares (2007) and Gamper-Rabindran, Khan, and Timmins (2008).

5. There are well-known examples of these corruption scandals at different levels of government in Brazil. At federal level, for instance, they led to the impeachment of a President, in 1992, and to the resignation and expulsion of several members of the Brazilian Congress and of President Luiz Inácio da Silva's former cabinet in more recent years. At municipal level Trevisan (2003) provides a good account of different forms of corruption found in Brazil.

6. For administrative purposes municipalities can divide their territory into districts and sub-districts, as happens in São Paulo. These subdivisions have no political or financial independence from the municipal administration, though.

7. See article 14 in the Brazilian Constitution and Baiocchi (2001).

8. The constitutional text goes beyond the encouragement of new forms of popular participation. Article 26, for example, requires the participation of civic associations in city policies. Articles 204 and 227 require popular participation in the formulation and control of health and social security policies (Avritzer, 2006). Several governments have created these popular councils for issues of health, education, housing, and other fields. These popular councils differ from the institution under analysis in this chapter as they are not open to all citizens but rather made up of representatives of associations, which are “bequeathed the right to participate and that rarely have any decision-making power” (Abers, 1998).

9. In some municipalities, the participatory mechanisms also affect other spending categories and even the revenue collection. This usually happens when participatory budgeting has been in place for a longer period.

10. The purpose here is not to give a detailed description of a participatory budgeting process, especially given its specificity in each one of the adopters, but rather to underline the common features that constitute the essence of this participatory innovation in Brazil. For case studies with a thorough description of participatory budgeting (gross majority with reference to Porto Alegre) see Santos (1998) or Abers (1996), Abers (2000).

11. Only the registered inhabitants of the region have the right to vote. In order to promote participation, it is also usually the case that these neighborhood representatives are elected proportionally to the number of participants at a meeting.

12. For example, if municipality A splits into two municipalities (say B and C) in 1990 then, in order to have a comparable geographical unit across time, data from municipalities B and C will be added up for the years after 1990.

13. NGO Cidade: [accessed July 2012].
14. For that reason the expenditures in street paving usually fall under the “Health and Sanitation” class of the municipal accounts.
15. For its own nature, and different from the water services, during the military period the maintenance and enlargement of the sewage systems was kept mostly as a municipal responsibility. The delivery rates for this service (i.e., number of houses connected to public sewerage network) were in any case extremely low at the end of the dictatorship.
16. The level of fiscal decentralization in Brazil is considerably high. According to the BNDES (the Brazilian Development Bank) the transfers from central government amount on average to USD 35 billion per year, which represents approximately 15% of the federal government’s total revenue.
17. Brazilian public accounts have, by law and since 1990, assigned all the budgetary expenditures by “function”, depending on the governmental service/responsibility they refer to. As a result, a total of 16 expenditure categories can be effectively tracked across the whole of the 1990–2004 period, including: “Administration and Planning”, “Legislative”, “Judiciary”, “National Security”, “External Relations”, “Social Assistance”, “Health and Sanitation”, “Labour”, “Education and Culture”, “Housing and Urbanism”, “Agriculture”, “Industry”, “Services”, “Communications”, “Energy”, and “Transport”.
18. See, for instance, Simões (2002) or Sastry and Burgard (2004).
19. Verba, Scholzman and Brady (1995) highlight the relevance of this political participation by observing that “From the electoral outcome alone, the winning candidate cannot discriminate which of dozens of factors, from the position taken on a particular issue to the inept campaign run by the opposition. . . , was responsible for the electoral victory” (as quoted by Besley et al., 2005).
20. See Wampler (2003), Avritzer and Wampler (2005) and Avritzer (2010) for a review of the results and explanatory factors behind the success or failure of different participatory experiences across Brazil.
21. Note that “success” in this literature is assessed from a broader perspective than that of the analysis presented in this paper and includes not only improvement in living standards, but also democracy deepening, empowerment or increased redistributive justice.
22. More precisely, I control for the mayor’s party by adding a vector of variables for the percentage of the MCA’s budget which is under control of a mayor from party p . Given the large number of political parties in Brazil, I focus on the eight largest parties as defined by the performance in the last decade’s municipal elections. Therefore, $p = \{PMDB, PSDB, DEM, PL, PPB, PTB, PT, PDT\}$. Parties that merged or acted in coalition with any of these eight parties over the period under analysis are also taken into account. The remaining parties are the omitted category.
23. The total budget is at (constant) 1994 prices.
24. In Table 5 other expenditure categories are included under the header “Other”, which includes expenditures in “Social Assistance”, “External Relations”, “National Security”, “Judiciary”. “Labor”, “Communications”, “Energy”, “Transport”, “Agriculture”, “Industry” and “Services”.
25. The reform of the public administration was initiated in the mid-1990s (by Min. Bresser Pereira) and included, among other objectives, a greater emphasis on transparency and citizen participation in public affairs. The reform was aimed at different tiers of the public administration (including municipal governments) but its effective implementation in the field seems to have been far from homogeneous across the country both in its timing and effectiveness (Abrucio & Gaetani, 2006). Although the adoption of participatory budgeting by municipal government might be facilitated by this reformist trend, participatory budgeting seems to generate effects beyond those potentially associated with the reforms. In fact, the adoption of participatory budgeting preceded the major wave of reforms initiated in the mid-1990s (and effectively not implemented in the field before the late 1990s–early 2000s), and the results presented in Tables 5–7 do go through even when the sample is restricted to years before 1996 (i.e., to the first three waves of participatory budgeting adoption).
26. MCA level data on these variables are not available on a yearly basis which constrains my ability to include them in the panel specifications reported above. The Brazilian Demographic Census, which produces socioeconomic data for all municipalities in the country, are only available every 10 years.
27. The legislative periods are bounded by the mayoral elections, which take place every 4 years.
28. For brevity only the estimation results using the average per capita household income level at the baseline are shown. Using alternatively the average education level among adults at the baseline as the relevant socioeconomic variable produces the same results. In fact, the results are robust to the selection of alternative socio-economic variables among the ones presented in Table 4, which is unsurprising given the high level of correlation between them.
29. These results are in line with those presented in World Bank (2008) which showed that participatory budgeting in Brazilian municipalities is significantly and positively associated with improvements in housing infrastructures (i.e., access to plumbing and piped water) and with improvements in poverty rates. This World Bank study is however based on a much smaller sample than the one used in this paper as it only covers the period up to 1996.

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