

Power to the People: The Effects of Participatory Budgeting on Municipal Expenditures and Infant Mortality in Brazil

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Abstract

Participatory budgeting, via which the common citizen is given the ability to interact with the elected politicians in the drafting of the local budget, became a popular political reform in Brazilian municipalities in the 1990s and attracted widespread attention across the world. This paper investigates whether the use of participatory budgeting in Brazilian municipalities in the period 1991-2004 has affected the pattern of municipal expenditures and had any measurable impact on living conditions. I show that the municipalities that made use of this participatory mechanism favoured an allocation of public expenditures that closely matched the “popular preferences” and channeled a larger fraction of their total budget to key investments in sanitation and health services. I also find that this change in the composition of municipal expenditures is associated with a pronounced reduction in the infant mortality rates for municipalities which adopted participatory budgeting. This suggests that promoting a more direct interaction between service users and elected officials in budgetary design and implementation can affect both how local resources are spent and associated living standard outcomes.

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1 Introduction

Public expenditures are a powerful tool to guarantee access to essential goods and services to all strata of the society. However, systematic 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, which is an alternative budgetary process that allows citizens to negotiate with government officials over the municipality's budgetary allocation and its investment priorities. With respect to traditional budgetary practices participatory budgeting aims at improving information flows between policy-makers and service users. As a consequence, it works as a commitment device from the politicians' point of view 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 achieved¹ 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, no

¹For the city of Porto Alegre the world Bank reports a rise in the rate of households with access to water services from 80% to 98% between 1989 and 1996, an increase in the number of children in primary schools to twice as much in the same period and even a growth in the tax revenue collected by 50% due to a higher motivation to pay taxes given the increased transparency brought along by participatory budgeting.

sound empirical evidence exists of its impact on local public expenditures and living standard outcomes. My contribution is to fill that missing 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 with 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 my data allows me to identify four different waves of adoption in the four legislative periods between 1989 and 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 four years, and it is not irreversible by any means.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 will be essential for the identification strategy employed in the paper.

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 government expenditures in a way that seems to match the “popular preferences” as expressed in the participatory forums. This pattern shows that the adopting municipalities tend to increase the spending on health and sanitation as compared to their non-participatory counterparts (from an average of 13% to 25% of the total budgetary expenditures).³ This is in line with the participatory meetings' outcomes that systematically place investments in sanitation (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

²This 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).

³To be precise, in the econometric analysis, the unit of observation is what I will designate by “minimum comparable areas” (MCAs), which I can track across the 1990 to 2004 period. MCAs refer to municipal boundaries in 1970 and are the minimum geographical areas that can be tracked across my sample period. The MCAs typically contain one municipality but owing to population growth and splits some MCAs may contain more than one municipality. Further details on these MCAs are provided in the next section.

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 effects⁴, 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 for infant mortality, mainly driven by higher vulnerability of this age group to waterborne diseases (see Black et al, 2003; Victora, 2001; Sastry and Burgard, 2005). 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 to test for this. Using a panel of municipal infant mortality rates for the period between 1990 and 2004 I am able to observe a significant drop in the number of deaths among children up to one year old. Municipalities which adopted participatory budgeting recorded a drop in infant mortality of between 1 to 3 infants for every 1,000 infants (which is about 10-20% of the total infant mortality rate in 2004).⁵ This is a significant result for a country which had an average infant mortality rate of 48 out of every 1,000 newborns at the beginning of the 1990s (World Development Indicators). This rate was above the Latin American and Caribbean average for the same period and singled out Brazil as one of the worst performers in the region, below countries of inferior economic development such as Paraguay, Belize or Ecuador (World Development Indicators).

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. First, in order to deal with potential omitted variable bias, a set of variables reflecting the political orientation of each municipality in the panel across the period under analysis was added to the baseline specification.⁶ The estimated effects (on expenditure allocation and infant

⁴Beyond the potential satisfaction derived by the citizens from the direct political participation, as, for example, was observed by Olken (2008) in the evaluation of a direct democracy mechanism in Indonesia

⁵These 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 et al (2008).

⁶In the econometric analysis the term municipality refers to minimum comparable areas (MCAs) which I can track across the 1990 to 2004 period. The MCAs typically contain one municipality but owing to population growth and splits some MCAs may contain more than one municipality.

mortality) are not significantly affected by the inclusion of these political controls. This indicates that the effects of participatory budgeting are wider than those stemming from specific party policies. This result is in line with the observation that a number of political parties in Brazil implemented participatory budgeting. Indeed if I exclude municipalities under the control of mayors from the Workers Party (the main political party behind the introduction of participatory budgeting in Brazil) my main results continue to hold.

Second, we might also worry about the comparability of municipalities that adopted participatory budgeting and those that did not. Ex-ante differences between the two sets of units (adopters and non-adopters) might make the latter an unsuitable comparison group and consequently cast doubt on the validity of the estimated effects. Brazil's huge territorial diversity in terms of socioeconomic development allows me to match adopting municipalities to non-adopting municipalities 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 – where the matching is carried out at the beginning of my sample period. In this matching exercise each adopting municipality is matched with its closest non-adopting counterpart along these two dimensions. This approach restricts the sample I have available for econometric estimation but implies that I am comparing adopting municipalities to municipalities that are similar in terms of these two indicators at the beginning of my sample period. 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.

Third, a similar and potentially more serious concern is that unobservable factors might be at the basis of these ex-ante differences, conditioning both the outcome variables of interest and the decision of adopting participatory budgeting. Once again the timing and duration of participatory budgeting adoption across the Brazilian municipalities provides us 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 (228 units in the sample) and can then estimate, within this group, the effect of participatory budgeting. With such a procedure I am able “control” for whatever particular non-observable factors the set of adopting municipalities

Tracking MCAs as opposed to municipalities allows me to follow the same geographical unit across the 1990 to 2004 period.

share that may have affected both the decision to adopt participatory budgeting, the allocation of public expenditures and associated living standard outcomes. Again the pattern of results I observe for the full sample hold with the restricted sample of municipalities that adopted participatory budgeting during my sample period.

I interpret these findings as evidence that participatory budgeting can be an important tool in enhancing government accountability and ensuring that citizens' preferences are reflected in the actual implementation of public policies on the ground.

My paper contributes to three 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, my paper 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 and Burgess (2002), Strömberg (2003), Ferraz and Finan (2007) and Björkman and Svensson (2006)).

Second, my paper contribute to the growing literature on the analysis and evaluation of 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 (Pande (2003), Besley et al. (2004a), Chattopadhyay and Duflo (2004)); the introduction of service report cards (Bjorkman and Svensson (2006)); the direct involvement of community members in school and health sector management (Banerjee, Deaton and Duflo (2004a), Jimenez and Sawada (1999), Kremer and Vermeesh (2005)); involving citizens and community organizations in the monitoring of public programs (Olken (2007, 2008)) or the setting up of participatory institutions (such as the Gram Sabhas in India (Besley, Pande and 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 to narrow down the information asymmetries between policy-makers and citizens and encourages further checks from the latter on the former's activities – particularly relevant in a context characterized by wide-spread clientelistic and corrupt practices as it is the case in Brazil.⁷ It has been implemented on a large scale in Brazil – by 2004 about 30

⁷There 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

percent 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.

Third, this paper contributes 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, by focusing on an institutional refinement within a decentralized governance framework (that is, the enhanced community participation), provides a test of the (argued) advantage of decentralized and participatory regimes for tailoring policies to the demands and needs of the local population (see Foster and Rosenzweig (2001), Ahmad, Khemani and others (2005) and Faguet (2002)).

The remainder of the paper is organized as follows. Section 2 focuses on background and data. Under each of the sub-sections in Section 2 – on participatory budgeting, public expenditures and health outcomes – I provide the necessary institutional background, define the variables used in the empirical analysis and examine how they have evolved over my sample period. Section 3 presents my analysis of the relationship between participatory budgeting and public expenditures and associated living standard outcomes for Brazilian municipalities over the 1990 to 2004 period. Basic results presented in the first sub-section of Section 3 are then subjected to a raft of robustness checks in the second and third sub-sections. Section 4 concludes.

the resignation and expulsion of several members of the Brazilian Congress and of President Luiz Inacio da Silva former cabinet in more recent years. At municipal level Trevisan (2003) provides a good account of different forms of corruption found in Brazil.

2 Background and Data

2.1 Participatory Budgeting

2.1.1 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 Brazil's politico-administrative structure was centralized in the federal government and based on a network of political appointees in each state and capitals. However, since re-democratization considerable power and autonomy has been devolved to the subnational governments, which are currently (as of 2008) comprised of 26 states (plus a Federal district - Brasília) and 5,562 municipalities (the smallest politico-administrative division).⁸

In reality, during the military regime the municipalities remained responsible for the provision of some local services (such as inner-city transport or waste collection and disposal); however, the scope for locally-defined policies was very limited as municipal governments were, above all, executors of an agenda set by Brasília. Following democratization and decentralization in the late 1980s, their responsibilities were significantly enlarged. Not only did municipalities gain co-responsibility in the provision of several services and greater fiscal autonomy to handle them⁹, they also became freer to develop their own laws and to encourage new forms of democratic participation (other than those provided via mayoral elections).¹⁰ Community organizations were legitimated as active political actors¹¹, particularly in the man-

⁸For administrative purposes municipalities can divide their territory in districts and sub-districts, as it happens in Sao Paulo. These sub-divisions have no political or financial independence from the municipal administration, though.

⁹The constitution codified more resources to be transferred to subnational units and increased the range of taxes and tariffs that could be levied by the municipal governments (Baiocchi (2001)).

¹⁰See article 14 in the Brazilian Constitution and Baiocchi (2001).

¹¹Actually the constitutional text goes further than this with regards to popular participation. Article 26 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. They clearly differ from the institution under analysis in this paper 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)).

agement of public expenditures which had been a typical instrument employed in the “patron-client” type of politics which had been common in Brazil (Wampler (2004)).

In essence, through the decentralization effort which took place at the end of the 1980s 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 country’s grassroot and community associations (Keck (1992), Abers (1996)). 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 towards the poor and the working classes. Budgetary policy was a critical instrument in these goals (Abers (1996)). In the words of Abers (1996):

“PT [the Workers Party] has made the transformation of budget policy one of its central government objectives because the manipulation of city spending has historically been the backbone of local clientelistic structures. Typically, local government spending favours large scale, centrally located public works at the expense of services and projects providing basic needs for the poor. Such big infrastructure projects fill the coffers of the powerful construction companies that finance political campaigns. At the same time, what limited funds are spent on the urban periphery are usually dependent on promises by local neighborhood leaders to support particular mayoral or city-council candidates in the upcoming elections.”

The development of the participatory budgeting model was in accordance with the party’s platform and objectives. Its implementation took place as soon as the Workers Party elected its first mayors. 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. In effect it was a mechanism for strengthening the credibility of the Workers Party. As a consequence, it became the hallmark of the municipal governments controlled by the Workers Party. The successful results achieved “helped to define the meaning of “good government” in Brazil, which now emphasizes direct participation and transparency” (Avritzer and Wampler (2005)). This point cannot be dismissed in understanding the party’s steady trajectory from a few minor mayoralties, in the mid-1980s, to the presidency, in 2002 (Santos (1998)).

2.1.2 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 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.¹²

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.

The main features of participatory budgeting can be summarized as follows.¹³ 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. As such, for organizational

¹²In 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.

¹³The 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), Abers (1996, 2000) or Souza (2001).

purposes the council officials start by dividing the municipality into different “administrative” regions (roughly corresponding to the existing neighborhoods). In a first stage, the 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.¹⁴ These representatives are responsible for collecting the local demands and effectively interact and negotiate with the elected officials in the drafting process of the budget. For logistical and technical reasons, participatory budgeting is not simply a direct democracy process – in reality it combines elements of both direct democracy (i.e. direct mobilization of citizens in decision-making venues) and representative democracy (i.e. by electing representatives among the attendants).

It is worth noting that in many municipalities, such as Porto Alegre and other large urban centres, this representation is made 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 “councillors” and “delegates” and both are elected through popular assemblies. The councillors (“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 councillors 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 councillors and elected municipal officials) and supervise the implementation of the budget.

In a second stage, these delegates take part in municipality-wide coordinating meetings where a final draft for the different regions’ investment priorities is drawn and passed to the executive.

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

¹⁴Only the registered inhabitants of the region have the right to vote. In order to promote participation, it is also usually the case that these neighbourhood representatives are elected proportionally to the number of participants at a meeting.

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 now 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.

In the last stage, once the budget has been approved by the legislature, the elected delegates and councillors are responsible for supervising its execution and reporting any faults or delays to the mayor.

To summarize, compared to the ordinary budgetary process, differences can occur mainly at two stages: 1) the direct input of citizens' demands and the direct interaction between popular representatives and executive in the elaboration of the budget proposal; 2) oversight of the approved works by the (elected) popular representatives (delegates and councillors) 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, some studies point to the fact that the budget proposal reaching the legislature comes, under participatory budgeting, with the direct approval and demands of the population and this 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 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 in Figure 1.

2.1.3 Evolution

The expansion of participatory budgeting across Brazilian municipalities mapped closely with that of the Workers Party in the first years. Likewise, it evolved slowly,

first in the southern urban centres, then in the smaller neighbouring municipalities and northern municipalities. From the mid-1990s onwards, 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. For a better understanding of participatory budgeting’s geographic evolution, maps with the distribution of participatory budgeting experiences across time are provided in Figure 2.

Table 1 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) seems small in a country 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.

As it can be seen from Table 1, not all municipalities with Workers Party mayors used participatory budgeting (for example between 2001 and 2004 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 labour 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)).

During the period under analysis (1990 to 2004), and, in part, resulting from the decentralization process, the municipal divisions of Brazil changed considerably mainly due to municipalities splitting as a result of population growth. Between 1980 and 2004, for example, more than 1,500 new municipalities were created. To address this fact and in order to follow the same geographical units across the 1990 to 2004 period, the econometric analysis in this paper will be based on the municipal borders as of 1970 (which are almost identical to the existing ones in 1980).¹⁵ These units, which correspond to the 1970 municipal boundaries, are known as “minimum comparable areas” (MCAs). My panel data consists of 3,651 MCAs which I can track across the 1990 to 2004 period. Each MCA typically contains one municipality

¹⁵If we consider a municipality A that in the course of the 1990’s split into two municipalities B and C then, in order to have a comparable geographical unit across time, I will add up data from B in C in the years after the split.

but owing to population growth and splits, as mentioned above, some MCAs can contain more than one municipality.¹⁶ Since these MCAs will be the relevant unit of observation for all the analysis presented hereafter, in Table 2 I replicate the analysis for the evolution of participatory budgeting shown in Table 1 for MCAs as opposed to municipalities. As can be seen from comparing Tables 1 and 2 the patterns of change look highly similar at municipality or MCA level.

It is worth noting that the number of participatory budgeting occurrences as shown in the tables is not cumulative over time. At the end of every period there are MCAs dropping out of the program as well as new MCAs adopting participatory budgeting. This variation in the time of adoption both within and across MCAs will be essential for the identification strategy.

2.1.4 Data

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 1986-1992. Surveys conducted by the “Fórum Nacional de Participação Popular” (National Forum of Popular Participation) - an association of NGO’s interested in the theme of citizens’ participation -, for the period 1992-2000. And data provided by Avritzer and Wampler (2005), for 2001-2004. The survey studies are based on questionnaires sent to all municipalities in the country and collected by local NGO’s. I also checked that for years where there is overlap the data that I collected for the earlier years matched the survey based estimates and found that the match was exact.

The data set I collected indicate for all Brazilian municipalities whether the municipal government engaged in any form of participatory budgeting during budgetary design and implementation. The data used in this paper refer uniquely to a listing of municipalities that in each year, from 1986 to 2004, reported using participatory budgeting. 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 by the partici-

¹⁶Owing to the intense splitting activity in Brazil from the 1980s use of MCAs as opposed to municipalities is standard practice in the analysis panel administrative data for Brazil. All my econometric analysis has also been carried out just using a sub-sample of municipalities that suffered limited or no territorial changes (less than 10% change in total area) between 1970 and 2004. The results from this restricted sample do not significantly differ from the ones presented below.

pants in each and every municipality. My knowledge about citizen priorities is based on data published by some municipalities and NGO's for a subset of municipalities.

2.2 Public Expenditures

2.2.1 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 were far from being an exclusive municipal responsibility as there was a strong presence of state, and even federal, managed schools and health centres. 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 state company's management through concession contracts.¹⁷

After the new constitutional chart 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.¹⁸ 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

¹⁷For 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.

¹⁸The 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.

pre-existing central role in providing local sewerage services.

2.2.2 Composition and Evolution of Expenditures

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.¹⁹ Since 2002, there are 28 of these functions or categories considered, for which total spending has to be presented separately. In Table A2 in the Appendix, I provide a listing and description (as provided by the Brazilian law) of these categories.

It should be added that before 2002 the expenditures disaggregation level was not so extensive and some of the actual classes were bundled together. This is the case with, for instance, health, sanitation and environmental policy, which were added up under the general “Health and Sanitation” category, or education, culture, sports and leisure that fell under the general “Education and Culture” category (all other changes before/after 2002 are made explicit in Table A3 in the Appendix). As this “bundling” affects most of the period under study, it determines the expenditure categories (16 in total) that can be effectively tracked across the whole of my 1990 to 2004 period: “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”.

Figure A1 in the Appendix shows the average expenditure allocation for the Brazilian MCAs in 1990 and in 2004. Expenditures in “Education and Culture” absorb the largest share of the budget in both years accounting for 27% of the budget in 1990 and 30% of the budget in 2004. There is thus modest increase in MCA budgets dedicated to “Education and Culture” across the 1990 to 2004 period. In contrast, the share of the MCA budget dedicated to “Health and Sanitation” rises from 13% to 23% - a 10% increase over this 14 year period. The losing sectors in share terms are “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 that 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)).

¹⁹The basic structure of Brazilian municipal accounts is provided in Table A1 in the appendix.

2.2.3 Data

The financial data on expenditures classified by the categories mentioned above and used in this paper is originally from the National Treasury (“Secretaria do Tesouro Nacional”) and it is available for every municipality since 1990. To simplify the data collection process I made use of the tabulations already available from the Institute of Applied Economic Research (“Instituto de Pesquisa Econômica Aplicada” - IPEA). This data allowed me to build a panel of budgetary expenditures for 3,651 Brazilian MCAs for the period 1990-2004. Summary statistics for the main classes of expenditures considered, at the beginning of the period as well as for the whole sample are presented in Tables 4 and 5.

2.3 Health Outcomes

2.3.1 Background

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 existed substantial room for improvement of social indicators on several fronts. Although access to goods and services and overall well-being varied vastly within the country (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. Summary statistics for some “living standards” variables for 1991 can be found in Table 4. At the beginning of the 1990s the infant mortality rate was close to 50 infants for every 1,000 newborns (UNDP) with systematic high rates of morbidity and mortality from infectious and parasitical diseases (diarrhoea being one of the most prevalent).²⁰ At this time there was a major deficit in the sanitation infrastructure as less than 20% of the country’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

²⁰See, for instance, Simões (2002) or Sastry and Burgard (2004).

by participatory budgeting might serve as a useful tool for identifying what citizens in Brazilian municipalities saw as the expenditure priorities.²¹

Table 3 illustrates a typical list of investment priorities as voted in the popular assemblies that are part of the participatory budgeting process. Although the information presented here refers to Porto Alegre, anecdotal evidence and the existing literature, as well as data published by other municipalities corroborate that it is also representative of expenditure priorities among adopting municipalities. Investments in 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 infrastructure²²), 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 fall under the “Housing and Urbanism” expenditures) are regularly top-ranked in the first rounds of participatory budgeting (across the full range of adopting municipalities for which there is data). 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 forums²³, and on the other hand, they can indicate a clear bias towards 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.

²¹Verba, 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)).

²²For that reason the expenditures in street paving usually fall under the “Health and Sanitation” class of the municipal accounts.

²³Although the meetings are open to the whole municipal population, surveys conducted at the participatory budgeting forums reveal a higher participation of women, elders and retired workers, generally with higher than average associative life and income below the city mean (NGO Cidade, www.ongcidade.org).

2.3.2 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 parasitical diseases has been substantially reduced (World Bank, 2004). This decline in infant mortality rates is clearly registered in the Census data, presented in Table A4 in the Appendix, which shows that average infant mortality rate in Brazil dropped from 48 to 33 out of 1,000 newborns between 1991 and 2000 - a decline of over 30%. For a better understanding of the regional variation and evolution in infant mortality rates in Brazil, Figures A2a and A2b in the Appendix illustrate how this indicator varied and evolved across municipalities in 1991 and 2000 (UNDP and IPEA). There has also been a large expansion in basic school enrolments 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 3 charts the share of MCA budgets dedicated to health and sanitation separately for MCAs which adopted participatory budgeting and those that did not between 1990 and 2004. In Figure 3, we can observe that there has been a gradual channelling 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, after 1996 (the bars in the graph indicate the percentage of MCAs that in each period were effectively using participatory budgeting). In the next section 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.

2.3.3 Data

The mortality rates used in my 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 for 4 years old, respectively, for infant and child mortality). The infant and child mortality data used to evaluate health outcomes in this paper is 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). Summary statistics for these two variables (infant and child mortality rates) are presented in Tables 4 and 5, for cross-section and also for the whole sample 1990-2004.

3 Method and Results

3.1 Mechanisms

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 (see sub-section 2.1.2 above and Figure 1). As a result, under the participatory budgeting model 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 empirically tested. The information mechanism predicts that when participatory budgeting is adopted I should be able to observe an allocation of public expenditures that more closely matches the popular demands. As described in sub-section 2.3.1 this should imply a larger allocation of public resources to the health and sanitation sector. The

commitment mechanism, on its turn, has implications that go beyond the allocation of public expenditures. It is through the commitment mechanism that the budgeted expenditures do indeed result in the goods and services demanded by the population. As a result, when participatory budgeting is adopted I should be able to observe changes in the allocation of public expenditures as well as changes in the population living standards resulting from the additional goods and services provided in line with the popular demands. More specifically, for the reasons presented in sub-section 2.3.2 above, with respect to the living standard outcomes I expect to observe an improvement in the infant and child mortality rates following the adoption of participatory budgeting.

In the remainder of this section, I investigate whether the adoption of participatory budgeting can effectively be linked to these predicted effects on public expenditure allocation and associated living standards outcomes by analyzing a panel of Brazilian MCAs between 1990 and 2004.

3.2 Identification

The empirical test requires variation in the adoption of participatory budgeting across my sample of MCAs. As described in sub-section 2.1.3, the timing and duration of participatory budgeting adoption across the Brazilian MCAs provides a significant amount of variation both between and within MCAs during my sample period 1990-2004 (see Table 2). I will exploit these different sources of variation in my identification strategy.

In the baseline specification (sub-section 3.3), the econometric analysis makes use of the full sample of 3,650 MCAs. Thus, the effects associated with participatory budgeting on the allocation of public expenditures and on the infant and child mortality rates will be estimated both from the cross-sectional variation in adoption (adopting MCAs versus non-adoption MCAs) and from the within time variation in adoption among the 228 adopting MCAs.

In the matching specification (sub-section 3.4), I also make use of these two sources of variation in order to estimate the effects associated with the adoption of participatory budgeting. The difference, with respect to the baseline specification, is that I no longer make use of the full sample of non-adopting MCAs. Instead, I take advantage of the cross-sectional variation found for several socioeconomic measures

across Brazil to restrict the sample of non-adopting MCAs to the ones that more closely match the adopting MCAs in indicators considered relevant for the adoption of participatory budgeting and for the outcomes under analysis, as of 1991. This procedure restricts the sample to approximately 450 MCAs that are substantially more comparable in terms of the indicators considered, at the beginning of my sample period, and increases my confidence on the validity of the estimated results.

Finally, in the “adopters only” specification in sub-section 3.5, I restrict the sample available for econometric analysis to the group of 228 adopting MCAs. This is, MCAs with some occurrence of participatory budgeting adoption between 1990 and 2004. I am able to estimate the effects associated with the adoption of participatory budgeting within this restricted sample because there is considerable variation in the time of adoption among the adopting MCAs across my sample period. As shown in Table 2, at the start of every legislative period²⁴ there are new MCAs adopting participatory budgeting, as well as MCAs dropping out of the program. This restriction is an important test to my results. By focusing on the sub-sample of adopting MCAs, I am able to control for all the possible characteristics this sub-group of MCAs share that might have justified the adoption of participatory budgeting as well as a specific pattern of public expenditures allocation and its associated living standard outcomes.

Further econometric details as well as the estimation results associated with each one of these specifications are provided in the next sub-sections.

3.3 Baseline Specification

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

$$y_{it} = \alpha_i + \gamma_t + \beta PB_{it} + \varepsilon_{it}$$

where y_{it} is the outcome variable of interest in MCA i at time t , and PB_{it} is the measure of participatory budgeting in the MCA. α_i is a MCA fixed effect to account for MCA-specific and time-invariant factors, such as culture or geography, 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 and country-wide policies.

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

²⁴The legislative periods are bounded by the mayoral elections, which take place every 4 years.

3.3.1 Public Expenditures

Table 6 links the adoption of participatory budgeting to the allocation of budgetary expenditures at the MCA level. The right hand side variable measures the presence of participatory budgeting in a given MCA across time. This would typically be a binary variable, indicating the use (or not) of participatory budgeting in the allocation of public resources. However, because some of the MCAs include more than one municipality, the right hand side variable is the proportion of the MCA total budgetary expenditure that belongs to municipalities using participatory budgeting (within the MCA). Thus, this variable can assume any value between 0 (for the years when participatory budgeting was not used anywhere in the MCA) and 1 (for any year when the whole MCA is using participatory budgeting). The left hand side variables are the different classes of expenditures from the public accounts.²⁵ More precisely, I measure the proportion of the total MCA budget that is allocated to each one of the categories. For brevity, I only include the most important in size, out of the existing 16 categories : “Administration and Planning”, “Health and Sanitation”, “Housing and Urbanism”, “Education and Culture” and “Legislative”. Other expenditure categories are grouped under “Other” which includes expenditures in “Social Assistance”, “External Relations”, “National Security”, “Judiciary”, “Labour”, “Communications”, “Energy”, “Transport”, “Agriculture”, “Industry” and “Services”. Table A2 in the Appendix provides a description of the type of expenditures considered under each of these categories.

The findings in Table 6 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 percentage points, between an MCA without participatory budgeting and an MCA that fully adopts participatory budgeting, on the budget share allocated to health and sanitation. This is consistent with evidence of investments in sanitation being a

²⁵In an alternative specification, and in order to simplify interpretation, the same regressions are also ran treating PB as a binary variable by setting a minimum share above which we consider $PB=1$ for the MCA (e.g.: if I observe that the percentage of the MCA aggregate budget that belongs to municipalities with PB is equal or above 50%, PB takes the value 1 in that particular period). Adopting this coding does not affect the results I observe in any significant way.

top priority outcome of the popular forums.

Interestingly, it seems that this incremental effect does not follow from a superior financial capacity of adopting MCAs. In Table 7 I run the same regressions as in Table 6 but where budgetary expenditures are expressed in per capita terms as opposed to budget shares²⁶. In column 1 of Table 7 we observe that participatory budgeting appears to be budget neutral as the coefficient associated with per capita total budgetary expenditures is not significant. The pattern of coefficients for the key heads of budgetary expenditure, in columns 2 to 7 of Table 7, is similar to that in Table 6.

3.3.2 Effects on Health Outcomes

Focusing on health outcomes, Table 8 looks at the link between the adoption of participatory budgeting and infant and child mortality. The participatory budgeting variable here measures the percentage of infants and children living in municipalities with participatory budgeting within the MCA. As before it is a continuous variable between 0 and 1.²⁷ On the left hand side, infant and child mortality rates at the MCA level 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 8, suggest the existence of a negative association between these two variables and the use of participatory budgeting. Moreover the magnitude of the estimated effects of participatory budgeting adoption on mortality reduction are considerable. They represent about 12% and 5% of the infant and child mortality sample means in 1991, respectively.

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 run the following regression that includes an interaction term between the expenditure share on health and sanitation and the adoption of participatory budgeting:

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

²⁶These regressions are for the period 1994-2004 only. Due to the absence of adequate deflators I opt for not comparing nominal figures before the introduction of the “Plano Real”, in 1994. Running the regressions for the 1990-2004 period using the available deflators produces an identical pattern of results.

²⁷I have rerun all the health outcome regressions using the participatory budgeting variable as it is defined for the public expenditure regressions and the same pattern of results are observed.

$$ExpShare(Health\&Sanitation)_{it} + \varepsilon_{it}$$

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 8 displays, not surprisingly, a negative association between having a greater proportion of the budget spent in health and sanitation and mortality rates. This estimated effect persists when I include a measure for the presence of participatory budgeting and its interaction with the health and sanitation budget share (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. That is the β_3 coefficient is negative and significant. This suggest that there is an efficiency gain from introducing participatory budgeting. Thus, 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.

3.3.3 Omitted Variables

The adoption of participatory budgeting and budgetary and health outcomes may be being driven by other variables which vary across time at the MCA level. Given that in the period under analysis approximately half of the municipalities using participatory budgeting were governed by Workers Party (“PT”) mayors, one could argue that the participatory budgeting variable is quite simply a proxy for the presence of the Workers Party and its particular model of government. To address this concern variables measuring the presence of different parties in the MCA are added to the baseline specification above:

$$y_{it} = \alpha_i + \gamma_t + \beta PB_{it} + \delta MP_{it}^p + \varepsilon_{it}$$

where MP_{it}^p stands for mayors party and is a vector of variables for the percentage of budget in MCA i which is under the control of mayor of party p in year t (or the percentage of of infants and children living in municipalities under the control of mayor of party p in year t within an MCA, in the mortality regressions).

Given that the Brazilian multiparty system implies that there is a (very) large number of political parties (many of which with a tiny representation at the polls), I have decided to focus on the 8 largest parties, as defined by the performance in the last decade’s municipal elections (the remaining parties are the omitted category). Therefore, $p = \{PMDB, PSDB, PFL, PL, PPB, PTB, PT, PDT\}$ where *PT* refers Partido dos Trabalhadores (i.e. Workers Party), *PPB* – Partido Popular Brasileiro, *PFL* – Partido da Frente Liberal, *PL* – Partido Liberal, *PTB* – Partido Trabalhista Brasileiro, *PMDB* – Partido do Movimento Democrático Brasileiro, *PSDB* – Partido da Social Democracia Brasileira and *PDT* – Partido Democrático Trabalhista.²⁸ In terms of political orientation *PDS*, *PFL*, *PL* and *PTB* are right wing, *PMDB* is centre right, *PSDB* is centre left and *PT* and *PDT* are left wing.

By including this full range of political controls in my regressions I am trying to ascertain whether participatory budgeting had any effect on public expenditures or health outcomes which is separate from that due to the political orientation of different mayors.

Tables 9 contains the results for public expenditures where I regress in columns 1 to 6 the main MCA budget shares on participatory budgeting and also include my political controls. The results look highly consistent with the results from columns 1 to 6 of Table 6 which only include the participatory budgeting variable. Health and sanitation remain the main beneficiary from an MCA adopting participatory budgeting. The findings in Table 9 increase my confidence that the relationship between participatory budgeting and public expenditures is not being driven by omitted variables.

In columns 1 and 2 of Table 10 for infant and child mortality respectively, we observe that the inclusion of the additional information on the mayor’s political party does not affect the relationship between participatory budgeting and these health outcomes. The results for columns 1 and 2 of Table 10 line up exactly with those in columns 1 and 2 of Table 8. In columns 1 and 2 of Table 10 we find that having greater control by Workers Party mayors (or by mayors from *PL*, *PTB*, *PMDB* or *PSDB*) within an MCA is associated with greater infant and child mortality. Despite these “party effects” the participatory budgeting effect remains robust and significant. This increases our confidence that changes in local government activity

²⁸Parties that merged or acted in coalition over the period are also taken into account. This means that PST and PGT results were coded as PL; PDS, PPR and PP as PPB; and PSD as PTB.

associated with adoption of participatory democracy (such as the prioritization of health and sanitation expenditures) resulted in improvements in health outcomes such as infant and child mortality.

To test further for the existence of an independent participatory budgeting effect separate from a possible “Workers Party model” effect. I exclude from the sample all MCAs with any occurrence of Workers Party mayors and re-run my regressions. This is possible given that participatory budgeting has also been adopted by rival parties to the Workers Party. The results are presented in Table 11 where columns 1 to 6 present the results for public expenditures and columns 7 and 8 present the results for infant and child mortality. The basic pattern of results observed in Tables 9 and 10 hold. The share of MCA budgets dedicated to health and sanitation increases whereas administration and planning, housing and urbanism, education and culture and legislative shares decline. As these effects are being identified by non-Workers Party mayors which adopted participatory budgeting they strongly suggest that adoption of this system of local government produces effects on public expenditures and health outcomes which are independent of the political orientation of a given political party.

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 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.

3.4 Matching Specification

A separate concern from the omitted variables one, is that adopters and non-adopters are not comparable. 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. For example, based on data from the Brazilian Census, I observe 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.²⁹

To mitigate this concern, I match adopting MCAs (MCAs with some occurrence of participatory budgeting) with non-adopting MCAs (MCAs with no experience of participatory budgeting) at the beginning of my sample period. I match on two 1991 indicators – the MCA average per capita household income level and the MCA average education level among adults over 25 years old. These are likely to affect the propensity for an MCA to adopt participatory budgeting and are also likely to be instrumental in affecting public expenditures and health outcomes. Separate matching exercises are carried out for each one of these indicators.

In these matching exercises I rank all 3,650 MCAs based on the level of these two 1991 indicators, and for each adopting MCA I select its closest non-adopting MCA. In cases where more than one non-adopting MCA was available for matching, I select the non-adopting MCA which is geographically most proximate to my adopting MCA. This procedure substantially reduces the size of the sample available for econometric analysis, but increases my confidence on that I am effectively tracking MCAs across time that are more comparable in aspects that are relevant for the effects I want to estimate.

Table 12 contains the results for the matching exercise based on the MCA average per capita household income level in 1991, where columns 1 to 6 present the results for public expenditures and columns 7 and 8 the results for infant and child mortality. The pattern of results for the key heads of budgetary expenditure, in columns 1 to 6 of Table 12, are similar to that in Table 6 for the full sample. As before the use of participatory budgeting is associated with a larger allocation of expenditures to the

²⁹MCA level data on these variables is not available on a yearly basis which constrains my ability to include them in the panel data regressions reported above. The Brazilian Population Census, which produces socioeconomic data for all the municipalities in the country, is only available every 10 years.

health and sanitation sector (column 2 in Table 12) at the expense of housing and urbanism (column 3) and education and culture (column 4). The use of participatory budgeting in this sub-sample of MCAs remains negatively associated with the allocation of administration and planning and legislative expenditures, although this link is no longer statistically significant (columns 1 and 5). The estimated results on infant and child mortality (columns 7 and 8), are similar to the ones estimated for the full sample in columns 1 and 2 of Table 8.

In Table 13 I adopt a similar matching procedure to Table 12 but where the matching between adopting and non-adopting MCAs is based on the MCA average education level among adults over 25 years old as of 1991, as opposed to average per capita household income level. This difference in the matching criterion – average education levels instead of per capita household income – results in different samples of MCAs being available for the econometric analysis. The estimates for public expenditures, in columns 1 to 6 of Table 13, are similar to the ones found in Table 12 and line up with the results found for the full sample in columns 1 to 6 of Table 6. Adoption of participatory budgeting results in a significant increase in the share of MCA budgets allocated to health and sanitation and a significant decrease in the share of MCA budgets allocated to housing and urbanism. Administration and planning, education and culture and legislative shares are negatively associated with the introduction of participatory budgeting but this association is no longer significant in this sub-sample. The results for infant and child mortality, in columns 7 and 8 of Table 13, are identical to the ones found in columns 7 and 8 of Table 12 and are entirely consistent with the ones found for the full sample in columns 1 and 2 of Table 8. The similarity between the estimates found throughout Tables 12 and 13 and their overall consistency with the results obtained using the full sample of MCAs in Tables 6 and 8 increases my confidence that adoption of participatory budgeting both skews municipal expenditures towards health and sanitation and is associated with a fall in infant and child mortality.

3.5 Adopters Only Specification

The matching procedure above does not completely eliminate concerns about the existence of unobservable factors that might systematically affect the likelihood of adopting participatory budgeting and also affect the outcome variables of interest. It

is possible, for instance, that adopting MCAs could have developed different preferences for improving health and sanitation and for reducing infant mortality relative to non-adopting MCAs. These preferences might have led them to both use participatory budgeting and to take actions to reduce infant and child mortality. The positive correlation between adoption of participatory budgeting and spending on health and sanitation and the negative correlation between adoption of participatory budgeting and infant and child mortality observed in the full sample may be wrongly interpreted as capturing the causal impact of participatory budgeting on these outcomes. If this is case the group of non-adopting MCAs in the full sample no longer serve as a valid comparison group to adopting MCAs. To address this concern I restrict the sample available for analysis to the group of MCAs that at some point during the 1990 to 2004 period adopted participatory budgeting. This exercise is possible given that there is substantial variation in the timing and the duration of participatory budgeting adoption across MCAs (see Table 2). As a result, I am able to identify the participatory budgeting effects on public expenditures and on health outcomes by exploiting the time-variation in the time of adoption within the group of adopting MCAs across my sample period. The rationale behind this identification strategy is that by restricting the sample to the group of adopting MCAs I am able to “control” for all specific and non-observable factors shared by adopting MCAs that may have both influenced their decision to adopt participatory budgeting and to change the allocation of public expenditures and reduce infant and child mortality³⁰. This allows me to more cleanly estimate the effects associated with the adoption of participatory budgeting.

Columns 1 to 6 of Table 14 provide the estimated effects of participatory budgeting on public expenditures after imposing this sample restriction. Again, they confirm the main results that we obtained for the full sample in Table 6. As we can see in column 2 (Table 14), the use of participatory budgeting is associated with a significantly larger allocation of public expenditures to the health and sanitation sector. The estimated coefficient in column 2 suggests an average increase of about 1.2 percentage points in the budget share allocated to health and sanitation once the MCA adopts participatory budgeting. At same time, the use of participatory budgeting significantly reduces the share of the public budget directed to housing

³⁰This is true provided that these specific factors or preferences that characterize the adopting MCAs are not varying across time.

and urbanism (column 3) expenditures.

Columns 7 and 8 of Table 14 look at the link between the adoption of participatory budgeting and infant and child mortality rates within the sample of adopting MCAs. The estimated results for this restricted sample suggest the existence of a negative association between these variables and the use of participatory budgeting, in line with the full sample results found in columns 1 and 2 of Table 8. Within the sample of adopters, the use of participatory budgeting appears to be associated with an average reduction in infant mortality of approximately 1 infant for every 1,000 residents up to 1 year old (which is about 10% of this sub-sample average infant mortality rate in 2004).

Overall, the results estimated within the sample of adopting MCAs for the 1990-2004 period strongly suggest that adoption of participatory budgeting by MCAs results in a change in the allocation of public expenditures which is in line with popular demands as expressed in participatory forums. The results from the matched sub-samples reinforce this view. Adoption of participatory budgeting across a range of specification is associated with an increase the share of the MCA budget allocated to health and sanitation. Moreover, the changes in the infant and child mortality rates associated with adoption of participatory budgeting strongly suggest that the expansion in health and sanitation spending within adopting MCAs results in significant and substantial improvements infant and child mortality. Again these results linking adoption of participatory budgeting to key health outcomes are robust across a whole range of specifications.

These health improvements are likely to have come about because participatory budgeting let to more attention being paid to health and sanitation in the overall allocation of public expenditures. Further, in MCAs that adopted participatory budgeting each Real on health and sanitation expenditure had a large impact on infant and child mortality relative to that in non-adopting MCAs. This efficiency gain in public money allocation associated with the use of participatory budget is possible not only because participatory budgeting narrows down the information asymmetries between the elected politicians and the citizens, but also because it promotes a greater monitoring, by the citizens, on the projects that integrate the public budget. Thus, results from this paper importantly suggest that adoption of participatory budgeting can have important impacts both because it allows citizens' views to be better represented in the policy making process but also because it

provides a means for citizens to monitor the actions of elected politicians.

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. In Brazil, the Workers Party, the political party responsible for its development and initial implementation, came to national power on the back of this reform, which has since been emulated by other parties.

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 awarded 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 unique 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.

Although general welfare conclusions cannot be drawn, it is clear from my results that the direction of changes in the allocation of resources across budgetary heads do seem to match with what we know from the citizens' expenditure preferences. In particular 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) leading to these services occupying 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. In this sense the reform appears to have brought government functioning closer to citizens' preferences and to have resulted in improvements in living standards along this key dimension.

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Figure 1. Participatory Budgeting – Yearly Cycle

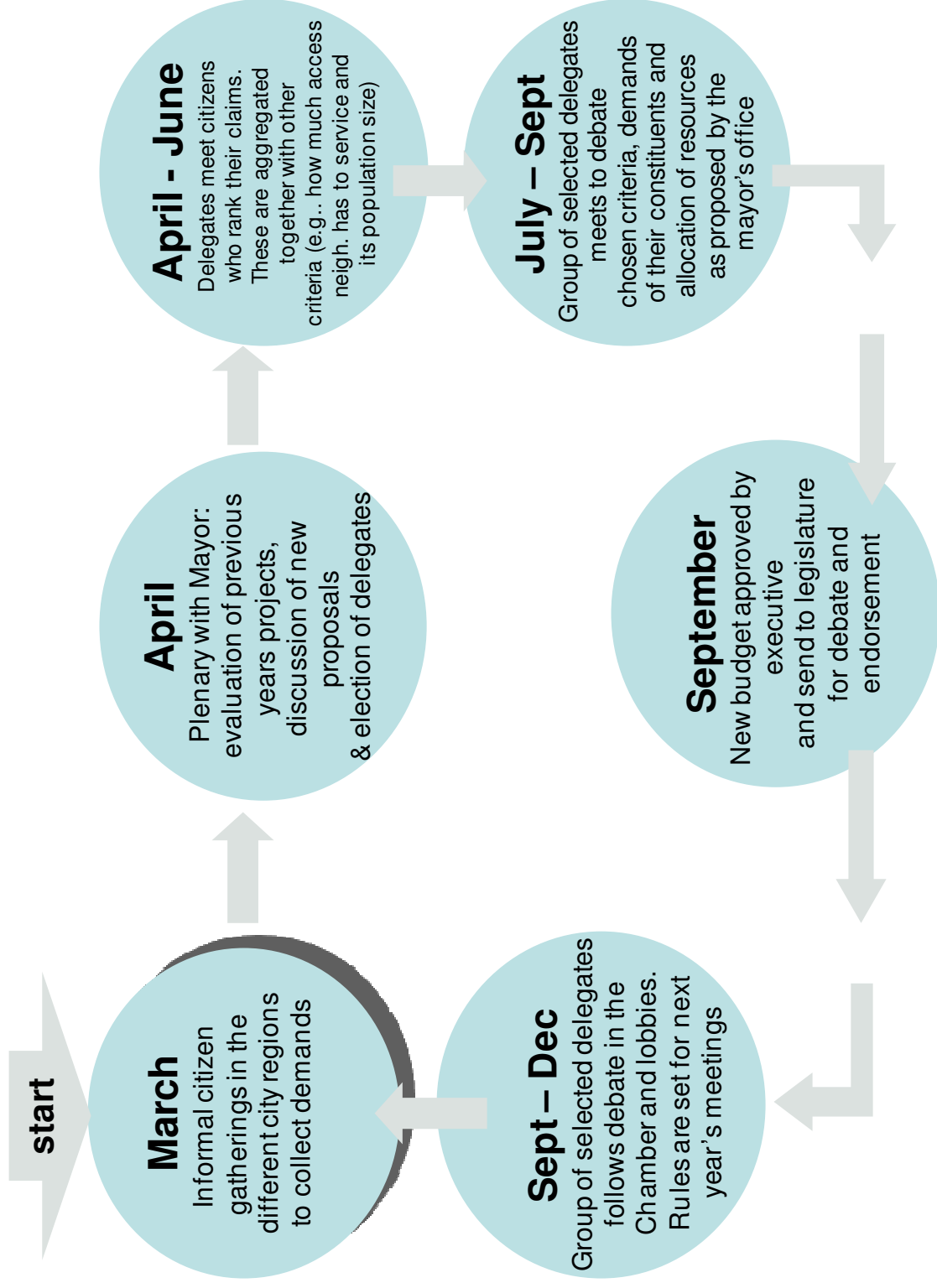
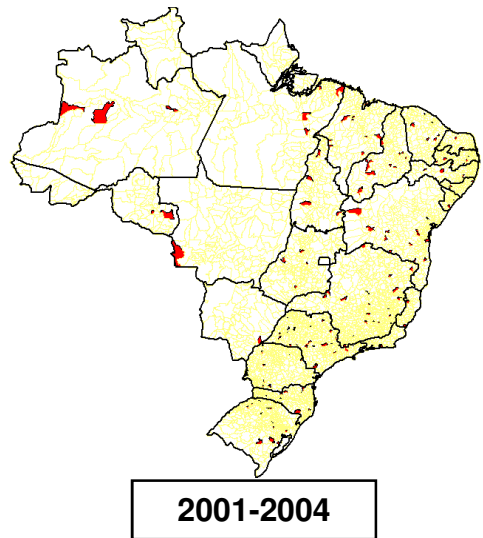
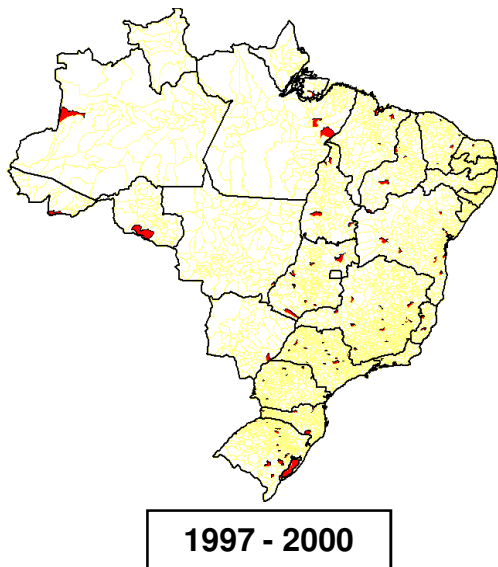
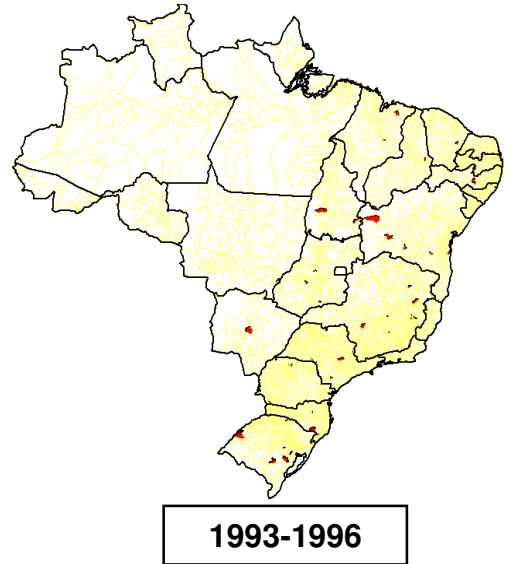
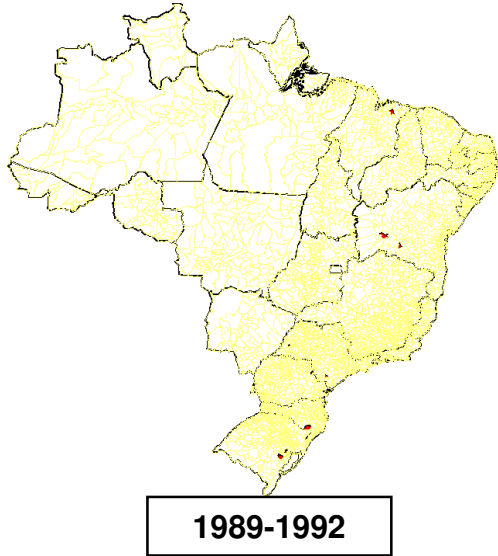


Figure 2. Geographic Evolution of PB



Note: Adopting municipalities in red

Figure 3: Evolution of Expenditure Share in Health and Sanitation. Adopters versus Non-Adopters.

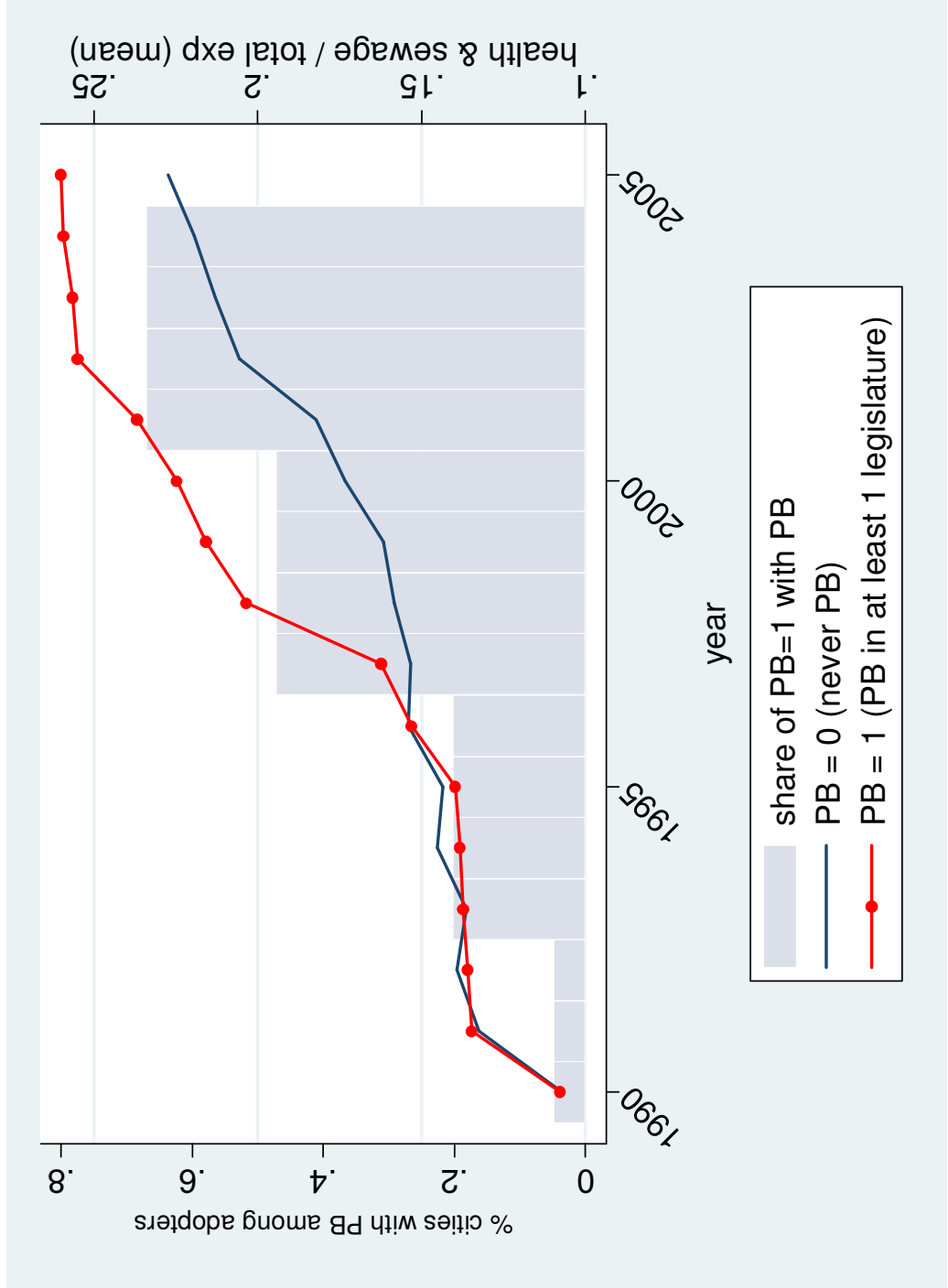


Table 1: Municipalities with Participatory Budgeting across time

No. of municipalities	1986-1988	% pop	1989-1992	% pop	1993-1996	% pop	1997-2000	% pop	2001-2004	% pop
with PB	1	0.18%	12	9.31%	51	11.67%	119	15.62%	169	27.04%
with Workers' Party	2	0.22%	37	10.44%	55	5.54%	115	5.04%	186	17.56%
Workers' Party & 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

Note: 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.

Table 2: MCA's with Participatory Budgeting across time

No. of MCA's	1986-1988	1989-1992	1993-1996	1997-2000	2001-2004
with PB	1	12	50	108	157
with Workers' Party mayors	2	37	52	100	158
Workers' Party & PB	1	10	20	51	73
Total no. MCA's	3,652	3,652	3,652	3,652	3,652

Note: 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.

Table 3: Priorities Voted in PB Forums in Porto Alegre

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 Reg
1995	Paving	Land Use Reg	Basic Sanitation
1994	Land Use Reg	Paving	Basic Sanitation
1993	Basic Sanitation	Paving	Land Use Reg
1992	Basic Sanitation	Education	Paving

Source: Municipality of Porto Alegre

Table 4: Descriptive Statistics as of 1991

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>Census Data</i>					
area (Km2)	3,650	2,336	14,320	3.7	361,329
resident population	3,650	40,204	212,487	751	9,646,285
urban population (%)	3,650	54.9	22.8	2.2	100
people in houses with garbage collection (%)	3,650	56.4	30.6	0	100
people in subnormal housing (%)	3,650	0.6	2.9	0.0	65.9
houses w/ electricity connection (%)	3,650	73.4	22.2	3	100
houses w/ water connection public network (%)	3,650	42.2	23.9	0	96.9
houses w/ sewage connection public network (%)	3,650	18	26.6	0	95.7
avg yrs education >25 yrs old	3,650	3.1	1.2	0.4	8.8
enrolment rate 7-14 year olds (%)	3,650	72.7	14.1	9.2	99
illiterate population > 15 yrs old (%)	3,650	30.1	16.4	1.8	1.4
per capita monthly hh income (R\$ 2000)	3,650	0.7	0.4	0.1	3.5
theil index	3,650	0.5	0.1	0.2	1.4
resident doctors per 1,000 inhabitants	3,650	0.3	0.5	0.0	6.9
graduate nurses over total residents (%)	3,650	0.1	0.1	0.0	0.6
life expectancy	3,650	62.8	3.8	50.4	73.8
infant mortality (UNDP) ¹	3,650	49.7	24.5	11.1	125.2
<i>Ministry of Health Data</i>					
infant mortality (<1 yr old) ²	2,691	0.03	0.03	0	0.26
child mortality (<4 yr old ²)	2,691	0.006	0.006	0.000	0.055
<i>Treasury Data</i>					
total per capita budgetary expenditure (1991)	2,691	0.02	0.01	0.00	0.17
% spending administration & planning	2,691	0.19	0.08	0.00	0.77
% spending housing & urbanism	2,691	0.16	0.09	0.00	0.54
% spending health & sanitation	2,691	0.13	0.07	0.00	0.45
% spending education & culture	2,691	0.27	0.06	0.00	0.64
% spending legislative	2,691	0.06	0.04	0.00	0.34
% spending new investment	2,691	0.19	0.11	0.00	0.78

Note: based on minimal comparable areas (MCA's)

¹ Infant mortality rate as defined by the UN - number of deaths per 1,000 live births.

² Mortality rate calculated as the ratio of number of deaths by the number of residents.

Table 5: Descriptive Statistics - whole sample (1991-2004)

Variable		Mean	Std. Dev.	Observation
% spending admin. & planning	overall	0.180	0.089	N = 47684
	<i>between</i>		<i>0.047</i>	<i>n = 3650</i>
	<i>within</i>		<i>0.076</i>	
% spending housing & urbanism	overall	0.120	0.078	N = 47684
	<i>between</i>		<i>0.050</i>	<i>n = 3650</i>
	<i>within</i>		<i>0.061</i>	
% spending health & sanitation	overall	0.167	0.076	N = 47684
	<i>between</i>		<i>0.046</i>	<i>n = 3650</i>
	<i>within</i>		<i>0.061</i>	
% spending education & culture	overall	0.290	0.073	N = 47684
	<i>between</i>		<i>0.042</i>	<i>n = 3650</i>
	<i>within</i>		<i>0.060</i>	
% MCA budget spent using PB	overall	0.022	0.141	N = 47684
	<i>between</i>		<i>0.092</i>	<i>n = 3650</i>
	<i>within</i>		<i>0.103</i>	
infant mortality (<1 yr old)	overall	0.020	0.019	N = 44401
	<i>between</i>		<i>0.012</i>	<i>n = 3650</i>
	<i>within</i>		<i>0.014</i>	
child mortality (<4 yr old)	overall	0.005	0.004	N = 47679
	<i>between</i>		<i>0.003</i>	<i>n = 3650</i>
	<i>within</i>		<i>0.003</i>	

Note: based on 3,650 minimal comparable areas (MCA's)

Table 6: The effect of PB on budget allocations

OLS - FE	Administration & Planning / BME	Health & Sanitation / BME	Housing & Urbanism / BME	Education & Culture / BME	Legislative / BME	Others / BME
	(1)	(2)	(3)	(4)	(5)	(6)
PB ¹	-0.011** [0.005]	0.034*** [0.005]	-0.015*** [0.004]	-0.014*** [0.004]	-0.002 [0.002]	0.008* [0.004]
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
Nr categories (MCA's)	3,650	3,650	3,650	3,650	3,650	3,650
R-squared	0.42	0.48	0.44	0.46	0.26	0.49

NOTES: Robust s.e. in brackets, clustered at "MCA" level. * significant at 10%, ** significant at 5%, *** significant at 1%

¹ For the budgetary allocations PB represents the % of budget within the MCA decided in municipalities with participatory budgeting; for the mortality regressions it is the % of residents in the MCA, by age group, living in municipalities with PB.

Table 7: The effect of PB on per capita expenditures

OLS - FE	Total budgetary expenditure pc	Exp on Administration & Planning pc	Exp on Health & Sanitation	Exp on Housing & Urbanism pc	Exp on Education & Culture pc	Exp on Legislative pc	Other Exp pc
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PB ¹	-7.27 [5.098]	-3.65** [1.449]	5.58*** [1.846]	-5.31*** [1.369]	-3.70** [1.671]	-0.93* [0.530]	-4.21 [4.91]
year effects	yes	yes	yes	yes	yes	yes	yes
MCA effects	yes	yes	yes	yes	yes	yes	yes
Observations	34,781	34,781	34,781	34,781	34,781	34,781	34,781
Nr categories (MCA's)	3,650	3,650	3,650	3,650	3,650	3,650	3,650
R-squared	0.84	0.73	0.68	0.65	0.81	0.53	0.48

NOTES: Robust s.e. in brackets, clustered at "MCA" level. * significant at 10%; ** significant at 5%; *** significant at 1%
Per capita expenditures, at constant prices, for the period 1994-2004 (after Real).

¹ PB represents the % of people within the MCA living in municipalities with participatory budgeting

Table 8: The effect of PB and health expenditures on mortality

OLS - FE	infant mortality (1)	child mortality (2)	infant mortality (3)	infant mortality (4)	child mortality (5)	child mortality (6)
PB	-0.003*** [0.0006]	-0.001*** [0.0001]		-0.000 [0.0001]		-0.000 [0.000]
Exp on Health & Sanitation / BME			-0.003* [0.002]	-0.002 [0.001]	-0.001* [0.0004]	-0.0004 [0.0004]
(Exp on Health & Sanitation / BME) * PB				-0.014*** [0.003]		-0.003*** [0.0006]
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
Nr categories (MCA's)	3,650	3,650	3,650	3,650	3,650	3,650
R-squared	0.41	0.44	0.41	0.41	0.44	0.44

NOTES: Robust s.e. in brackets, clustered at "MCA" level. ** significant at 5%; *** significant at 1%

Table 9: The effect of PB and mayor's party on budget allocation

OLS - FE	Administration & Planning / BME	Health & Sanitation / BME	Housing & Urbanism / BME	Education & Culture / BME	Legislative / BME	Others / BME
	(1)	(2)	(3)	(4)	(5)	(6)
PB ¹	-0.011** [0.005]	0.030*** [0.005]	-0.014*** [0.005]	-0.012*** [0.004]	-0.003* [0.002]	0.009* [0.005]
PT ²	0.004 [0.005]	0.009 [0.006]	-0.001 [0.005]	-0.006 [0.004]	0.003* [0.002]	-0.010** [0.005]
PPB ²	0.002 [0.003]	-0.000 [0.003]	-0.000 [0.005]	-0.001 [0.003]	-0.001 [0.001]	0.000 [0.003]
PFL ²	-0.000 [0.003]	0.000 [0.003]	0.005** [0.002]	-0.004 [0.002]	0.001 [0.001]	-0.002 [0.003]
PL ²	-0.002 [0.003]	0.003 [0.003]	0.001 [0.003]	0.001 [0.003]	0.004*** [0.001]	-0.006 [0.004]
PTB ²	0.001 [0.003]	-0.001 [0.003]	0.002 [0.003]	-0.002 [0.003]	0.001 [0.001]	-0.000 [0.003]
PMDB ²	0.003 [0.003]	-0.001 [0.003]	0.004 [0.002]	-0.002 [0.003]	-0.001 [0.001]	-0.001 [0.003]
PSDB ²	-0.003 [0.003]	-0.003 [0.003]	0.007*** [0.002]	0.002 [0.002]	-0.001 [0.001]	-0.001 [0.003]
PDT ²	0.004 [0.004]	-0.006* [0.003]	0.003 [0.003]	-0.002 [0.003]	-0.000 [0.001]	0.003 [0.004]
other parties	yes	yes	yes	yes	yes	yes
year effects	yes	yes	yes	yes	yes	yes
MCA effects	yes	yes	yes	yes	yes	yes
Observations	43,680	43,680	43,680	43,680	43,680	43,680
Nr categories (MCA's)	3,650	3,650	3,650	3,650	3,650	3,650
R-squared	0.42	0.49	0.49	0.47	0.26	0.61

NOTES: Robust s.e. in brackets, clustered at "MCA" level. * significant at 10%; ** significant at 5%; *** significant at 1%

¹ For the budgetary allocations PB represents the % of budget within the MCA decided in municipalities with participatory

² % of budget in the MCA under a mayor from this party AND % of residents, by age group, living in municipalities with a mayor from this party (for the mortality regression).

Political orientation: Right wing - PPB, PFL, PL, PTB; Centre-right: PMDB; Centre-left: PSDB; Left wing: PT, PDT

Table 10: The effect of PB and mayor's party on mortality

OLS - FE	infant mortality	child mortality
	(1)	(2)
PB ¹	-0.004*** [0.001]	-0.001*** [0.0002]
PT ²	0.003*** [0.001]	0.001*** [0.0001]
PPB ²	0.002*** [0.001]	0.0004*** [0.0002]
PFL ²	0.001* [0.001]	0.0002 [0.0002]
PL ²	0.002*** [0.001]	0.001*** [0.0002]
PTB ²	0.002*** [0.001]	0.001*** [0.0002]
PMDB ²	0.002** [0.001]	0.0004** [0.0002]
PSDB ²	0.001* [0.001]	0.0003* [0.0002]
PDT ²	0.001 [0.001]	0.0003 [0.0002]
other parties	yes	yes
year effects	yes	yes
MCA effects	yes	yes
Observations	43,680	43,680
Nr categories (MCA's)	3,650	3,650
R-squared	0.39	0.42

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

* significant at 10%; ** significant at 5%; *** significant at 1%

^{1,2} see notes in Table 9

Table 11: The effect of PB on budget allocation and mortality (non-PT municipalities only)

OLS - FE	Administration & Planning / BME	Health & Sanitation / BME	Housing & Urbanism / BME	Education & Culture / BME	Legislative / BME	Others / BME	infant mortality	child mortality
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PB ¹	-0.009 [0.006]	0.036*** [0.008]	-0.013** [0.006]	-0.011** [0.005]	-0.007** [0.003]	0.005 [0.006]	-0.004*** [0.001]	-0.001*** [0.0002]
year effects	yes	yes	yes	yes	yes	yes	yes	yes
MCA effects	yes	yes	yes	yes	yes	yes	yes	yes
Observations	40,504	40,504	40,504	40,504	40,504	40,504	40,504	40,504
Nr of categories (MCA's)	3,412	3,412	3,412	3,412	3,412	3,412	3,412	3,412
R-squared	0.42	0.48	0.44	0.47	0.25	0.49	0.40	0.42

NOTES: Robust s.e. in brackets, clustered at MCA level. * significant at 10%; ** significant at 5%; *** significant at 1%

¹ For the budgetary allocations PB represents the % of budget within the MCA decided in municipalities with participatory budgeting; for the mortality regressions it is the % of residents in the MCA, by age group, living in municipalities with PB.

Table 12: Nearest neighbour based on household pc income

OLS - FE	Administration & Planning / BME	Health & Sanitation / BME	Housing & Urbanism / BME	Education & Culture / BME	Legislative / BME	Others / BME	infant mortality	child mortality
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PB	-0.004 [0.005]	0.019*** [0.005]	-0.015*** [0.004]	-0.006* [0.004]	-0.001 [0.003]	0.006 [0.005]	-0.002*** [0.001]	-0.0004*** [0.00001]
year effects	yes	yes	yes	yes	yes	yes	yes	yes
MCA effects	yes	yes	yes	yes	yes	yes	yes	yes
Observations	5,875	5,875	5,875	5,875	5,875	5,875	5,875	5,875
Nr of categories (MCA's)	455	455	455	455	455	455	455	455
R-squared	0.64	0.58	0.53	0.48	0.47	0.65	0.45	0.48

NOTES: Robust s.e. in brackets, clustered at MCA level. * significant at 10%; ** significant at 5%; *** significant at 1%
Sample restricted to 228 adopting MCA's and their nearest control neighbours based on hh pc income levels in 1991

Table 13: Nearest neighbour based on average education level

OLS - FE	Administration & Planning / BME	Health & Sanitation / BME	Housing & Urbanism / BME	Education & Culture / BME	Legislative / BME	Others / BME	infant mortality	child mortality
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PB ¹	-0.004 [0.004]	0.017*** [0.005]	-0.015*** [0.004]	-0.004 [0.004]	-0.002 [0.004]	0.006 [0.005]	-0.002*** [0.001]	-0.0004*** [0.00001]
year effects	yes	yes	yes	yes	yes	yes	yes	yes
MCA effects	yes	yes	yes	yes	yes	yes	yes	yes
Observations	5,628	5,628	5,628	5,628	5,628	5,628	5,628	5,628
Nr of categories (MCA's)	436	436	436	436	436	436	436	436
R-squared	0.62	0.56	0.54	0.49	0.40	0.59	0.47	0.49

NOTES: Robust s.e. in brackets, clustered at MCA level. * significant at 10%; ** significant at 5%; *** significant at 1%
Sample restricted to 228 adopting MCA's and their nearest control neighbours based on avg number of years of education in 1991

Table 14: The effect of PB on budget allocation and mortality (PB adopters only)

OLS - FE	Administration & Planning / BME	Health & Sanitation / BME	Housing & Urbanism / BME	Education & Culture / BME	Legislative / BME	Others / BME	infant mortality	child mortality
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PB ¹	-0.000 [0.005]	0.012*** [0.005]	-0.015*** [0.004]	-0.002 [0.004]	-0.003 [0.002]	0.007 [0.005]	-0.001** [0.001]	-0.0002* [0.0001]
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
Nr of categories (MCA's)	228	228	228	228	228	228	228	228
R-squared	0.50	0.61	0.57	0.48	0.43	0.55	0.53	0.54

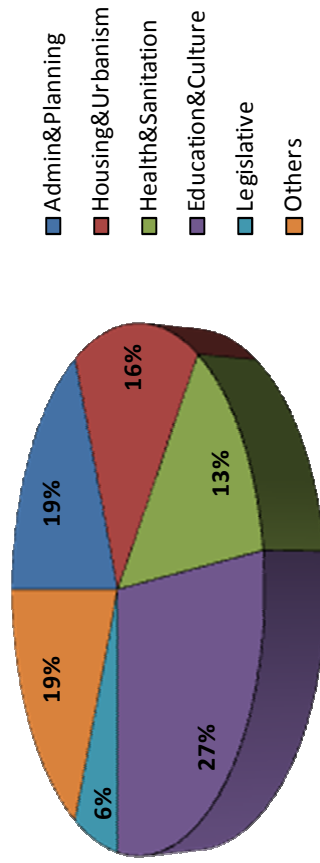
NOTES: Robust s.e. in brackets, clustered at MCA level. * significant at 10%; ** significant at 5%; *** significant at 1%

¹ For the budgetary allocations PB represents the % of budget within the MCA decided in municipalities with participatory budgeting; for the mortality regressions it is the % of residents in the MCA, by age group, living in municipalities with PB.

Appendix

Figure A1: Municipal Expenditures by Categories

municipal expenditures 1990



municipal expenditures 2004

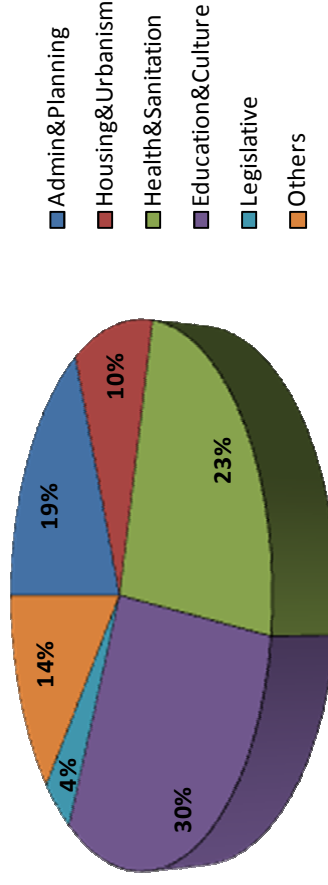


Figure A2a: Infant Mortality by Municipality (1991)

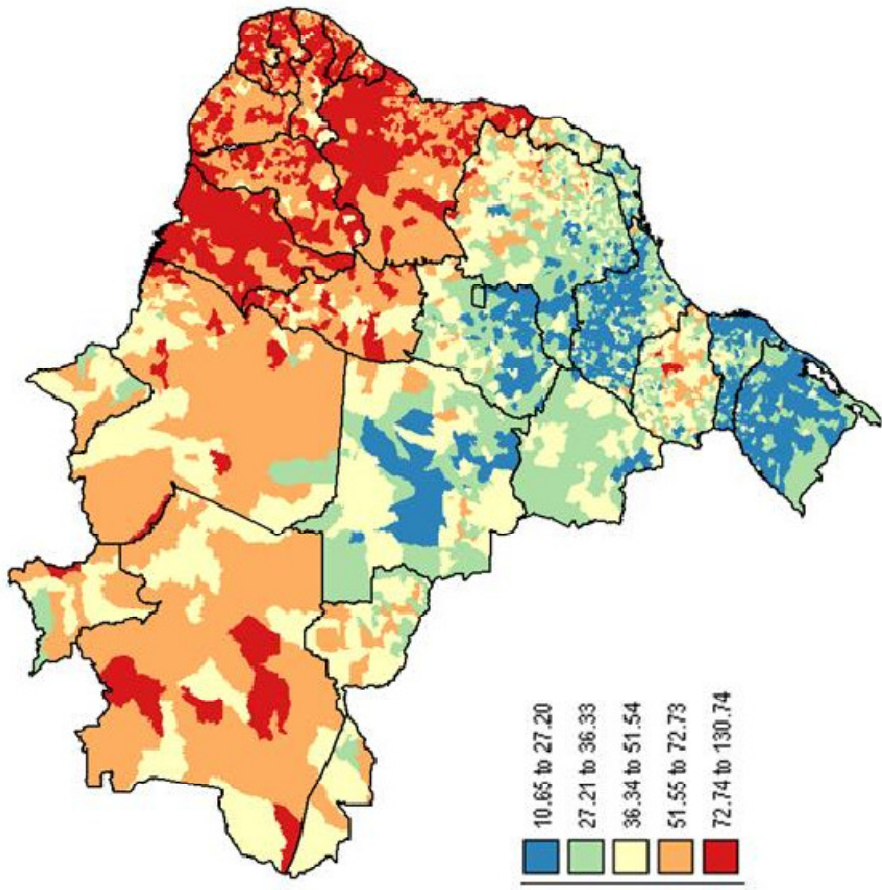
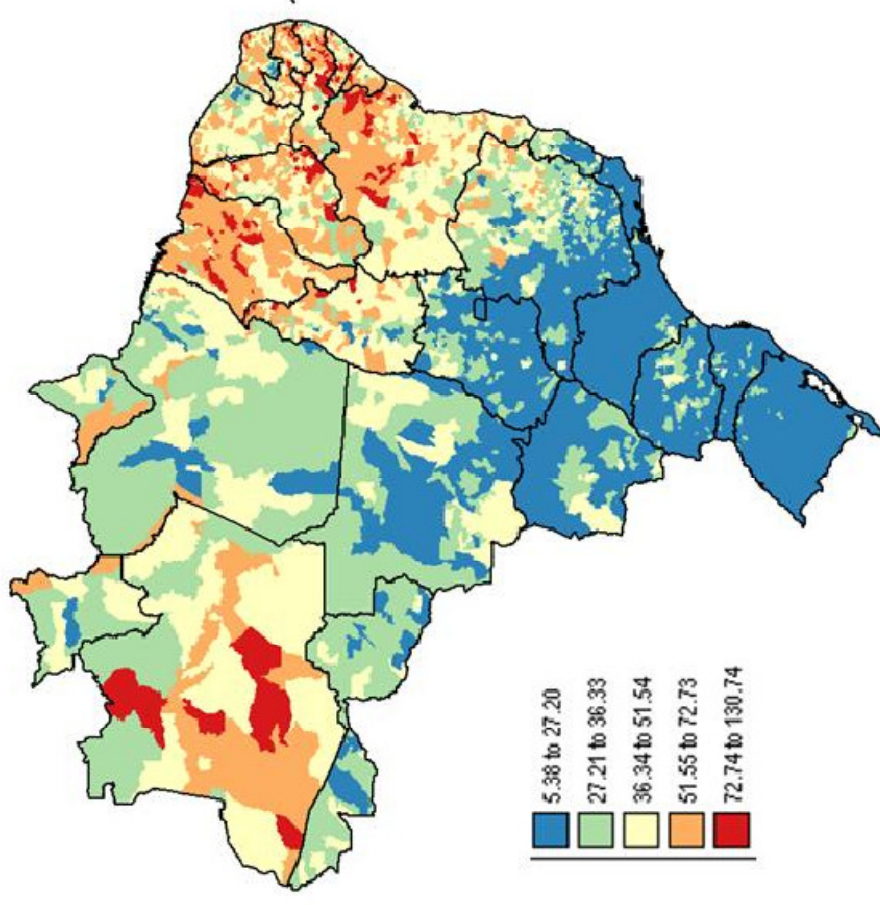


Figure A2b: Infant Mortality by Municipality (2000)



Source: Atlas do Desenvolvimento Humano, UNDP

Table A1 - Municipal Accounts (Basic Structure)

I. Total Revenue
I.1. Current Revenues
I.1.1. Fiscal Revenue
I.1.1.1. Taxes
I.1.1.2. Fees
I.1.2. Intergovernmental Transfers
I.1.3. Other Current Revenues
I.1.3.1 Patrimonial
I.1.3.2 Contributions for Municipal Improvements
I.1.3.3 Municipal Services
I.2. Capital Revenues
I.2.1. Credit Operations
I.2.2. Assets Sold
I.2.3. Capital Transfers
I.2.4 Others
II. Total Budgetary Expenditure
II.1. Current Expenditures
II.1.1. Operating Costs
II. 1.1.1. Personnel
II.1.1.2. Others
II.1.2. Current Transfers
II.1.3. Other Current Expenditures
II.2. Capital Expenditures
II.2.1. Investments
II.2.2. Financial Investments
II.2.3. Capital Transfers

Source: IPEA

Table A2 - Categories of Governmental Expenditures

Category	Sub-category
1. Legislative	legislative action external control
2. Judiciary	judiciary action defense of public interest in judiciary process
3. Essential to Justice	defense of juridical order judicial and extra-judicial representation
4. Administration	planning and budgeting general administration financial administration internal control supervision and inspection information technologies territorial planning human resources training revenue administration concessions administration mass media
5. National Defense	air security maritime security terrestrial security
6. Public Security	police civil protection information and intelligence
7. External Relation	diplomatic relations international cooperation
8. Social Assistance	assistance for the elderly assistance for the disabled assistance for children and teenagers communitary assistance
9. Social Provident Care	basic providence estatutory providence additional providence special providence
10. Health	basic care hospital and ambulatory care therapeutic and prophylactic care sanitary surveillance epidemiologic surveillance food and nutrition
11. Labour	workers' protection and benefits working relations employability programs
12. Education	fundamental education secondary education professional education pre-school education adult education special education programs
13. Culture	historical and artistic heritage cultural diffusion
14. Citizen Rights	social rehabilitation individual and collective rights assistance to indigenous groups

Table A2 - Categories of Governmental Expenditures (cont.)

Category	Sub-category
15. Urbanism	urban infrastructure urban services urban collective transports
16. Housing	rural housing urban housing
17. Sanitation	rural basic sanitation urban basic sanitation
18. Environmental Policy	environmental preservation environmental control rehabilitation of degraded areas water resources management meteorology
19. Science and Technology	scientific development technology and engineering scientific and technological diffusion
20. Agriculture	vegetal production promotion animal production promotion vegetal sanitary care animal sanitary care supply rural expansion irrigation
21. Agrarian Organization	agrarian reform colonization
22. Industry	industrial promotion industrial production mining industrial property inspection and quality
23. Trade and Services	trade promotion marketing external trade financial services tourism
24. Communications	mail telecommunications
25. Energy	maintenance electrical energy oil alcohol
26. Transports	air transport terrestrial transport railroad transport water transport special transport
27. Sports and Leisure	competitive sport community sports leisure
28. Special Duties	refinancing internal debt refinancing external debt internal debt service external debt service transfers others

Source: Decree no. 42/1999; Ministry of Planning

Table A3 - Categories of Governmental Expenditures

category until 2002:	after 2002 splits into:
- Administration and Planning	4. Administration 19. Science and Technology 28. Special Duties
- Education and Culture	12. Education 13. Culture 27. Sports and Leisure
- Health and Sanitation	10. Health 17. Sanitation 18. Environmental Policy
- Assistance and Social Care	8. Social Assistance 9. Social Provident Care
- Public Security	5. National Defense 6. Public Security
- Judiciary	2. Judiciary 3. Essential to Justice

Source: Decree no. 42/1999; Ministry of Planning; Treasury

Table A4: Infant Mortality Rates by Region

	1991	2000	% var.
North	44.0	33.0	-25
Northeast	72.9	52.3	-28
Southeast	33.6	24.1	-28
South	28.7	20.3	-29
Centre-West	33.3	24.0	-28
Brazil	48.4	33.6	-30.6

Source: IBGE and Simoes (2002)