

**The Diffusion of Participatory Governance Innovations: A Panel Data
Analysis of the Adoption and Survival of Participatory Budgeting in Brazil.**

Paolo Spada

December 2014

Abstract

The literature on policy diffusion centers on patterns of implementation of policy programs. However, identical implementation levels might be generated by very different combinations of adoption, abandonment and re-adoption mechanisms. This essay is a first attempt to go beyond patterns of implementation, by exploring the diffusion of a municipal governance innovation in Brazil that is frequently adopted and abandoned. Methodologically the paper shows that it is possible to adapt the research design employed by the literature on regime change to explore the diffusion of policy programs that present a rate of abandonment that is greater than zero. Using a novel dataset that maps all the Brazilian cities with a population larger than 50,000 inhabitants the papers tests quantitatively the correlates of adoption and survival of participatory budgeting identified by 25 years of case study literature. The results provide a more nuanced understanding of the effect of political competition, political vulnerability, proximity and availability of resources on the adoption and survival of participatory governance innovations.

Keywords: Policy Diffusion, Methods, Governance Innovations, Participatory Democracy.

1. Introduction

Democracy is evolving. Hundreds of thousands of new channels of citizens' engagement and participation have emerged in the last twenty years. These governance innovations vary significantly in form, but they all share the goal of increasing the ability of citizens to monitor, regulate, and, in some cases, directly affect political decision-making processes.

Scholars have labeled these processes "Democratic Innovations" due to the novelty of some of these political structures (e.g., National Citizens' Assemblies) and the explicit objective of deepening and retrofitting democracy (Fung and Wright 2003, Warren 2009, Smith 2010).

While there has been a growing attention to the specificity of the diffusion of state level governance innovations, less is known about the specific diffusion patterns of Democratic Innovations. What are the main drivers of this diffusion? What can explain the adoption and survival of these processes?

This essay centers on the diffusion pattern on one of the most successful and institutionalized democratic innovations, participatory budgeting. This participatory governance innovation introduced initially in a few Brazilian cities in 1989, is now adopted in more than 1500 cities in the world (Abers 2000, Avritzer 2009, Sintomer et al. 2013) and has recently been included in one of the priorities of the White House's Open Government National Plan of Action 2013.¹

Using an original dataset (the Brazilian participatory budgeting census), constructed on the basis of two large telephonic surveys conducted in 2008 and 2012, we explore the implementation of participatory budgeting (PB) among more than 400 medium and large

¹ <http://www.whitehouse.gov/blog/2013/12/06/united-states-releases-its-second-open-government-national-action-plan>

Brazilian cities from 1989 through 2012.² The Brazilian experience offers unique lessons for countries, such as the US, that have just started adopting this policy program.

Table 1: The implementation of participatory budgeting among the cities with more than 50,000 inhabitants

	1989– 1992	1993– 1996	1997– 2000	2001– 2004	2005– 2008	2009– 2012
Number of cities implementing PB	11	29	62	129	119	99
Cities that adopted PB	11	22	45	90	54	46
Cities that adopted PB for the first time	11	22	43	85	45	31
Cities that re- adopted PB			2	5	9	15
Cities that continued implementing PB after 4 years		7	11	25	37	19
Cities that continued implementing PB after 8 years			6	8	14	16
Cities that continued implementing PB after 12 years				4	6	6
Cities that continued implementing PB after 16 years					4	5
Cities that continued implementing PB after 20 years						4
Cities that abandoned PB		4	12	23	64	66
Cities that abandoned PB after 4 years		4	11	18	51	34
Cities that abandoned PB after 8 years			1	3	11	22
Cities that abandoned PB after 12 years				2	2	9
Cities that abandoned PB after 16 years					0	1
Cities that abandoned PB after 20 years						0
Cities with a population larger than 50,000 inhabitants in 1992 (excluding Brasilia)	464	468	468	468	468	468

The time periods reflect the years of implementation of PB. Municipal elections were held in 1988, 1992, 1996, 2000, 2004, 2008, and 2012. Participatory budgeting is initiated in January the year after the elections. The cities considered are those that have a population larger than 50,000 in 1992 excluding Brasilia, four cities became independent in 1992.

Sources: Participatory Budgeting Census, Regional Electoral Tribunals of Brazil and cities websites.

² Brazilian law defines a city as small when it has a population smaller than 50,000.

Differently from existing policy diffusion studies this essay moves beyond the concept of implementation to investigate separately adoption and survival. Table 1 shows the importance of understanding separately adoption, continuation, abandonment and re-adoption of Participatory budgeting. Identical implementation patterns might be generated by very different combinations of these mechanisms.

Participatory budgeting shows a fast-growing adoption rate – the number of adoptions per time period – which peaks between 2001 and 2004, and then sharply declines (Table 1). But at the same time it also shows a constantly increasing abandonment rate. The sum of the two processes is positive until 2004, and then becomes negative afterward.

What can explain the decline of implementation of participatory budgeting in Brazil while the process was booming globally? Is this a unique Brazilian phenomenon, or can we learn something applicable to the global diffusion of democratic innovations?

To foreshadow the key results of this analysis, this study finds that the rise and decline of the implementation of PB is mostly driven by a change in strategy of the Partido dos Trabalhadores. This party over-invested in the adoption of participatory budgeting in order to establish a track record of good governance and promote its chances to win the presidential elections. Following the victory of the party in the presidential election of 2002, the Partido dos Trabalhadores abandons the promotion of participatory budgeting.

By studying separately adoption and survival this essay offers a more nuanced investigation of the factors driving the implementation of these processes. Contrary to what most practitioners believe, the continuity of the city government does not help to explain the survival of the program. Continuity, instead, has a significant negative effect on adoption.

Similarly surprising, on the basis of the knowledge accumulated by case studies on participatory budgeting, is the fact that the availability of slack financial resources does not significantly affect adoption or survival.

Overall this paper offer a unique advancement in our understanding of some of the drivers of ‘political will’ and contributes to systematize our understanding of the impact of political vulnerability on the adoption and survival of democratic innovations.

Methodologically this paper shows that the research designs adopted by the comparative literature on regime change (Acemoglu et al. 2008) can be employed to gain novel insights on the diffusion of policy innovations by separating adoption and abandonment.

The body of the paper proceeds as follows: Section 2 introduces Brazilian participatory budgeting. Section 3 briefly presents the vast literature on diffusion of policy innovations, while section 4 describes the dataset and the dependent variable. Section 5 derives testable hypotheses, and section 6 presents the results of a statistical model of adoption and survival of participatory budgeting. Section 7 discusses what lessons can be learned and concludes with open questions for future research.

2. The advantages of investigating the diffusion of Brazilian participatory budgeting: one label for a family of many democratic innovations

Participedia,³ an internet crowd-sourcing project of democratic innovations’ case studies, identifies more than one hundred types of democratic innovations – and the number is

³ <http://www.participedia.net/>

continually increasing. From among this incredible array of governance innovations, focusing on participatory budgeting at the municipal level in Brazil offers unique advantages.

First, municipal participatory budgeting is a democratic innovation that alters one of the most important aspects of urban politics — the formulation of city budgets. Participatory budgeting at the municipal level is an invited space based on repeated negotiations between the city government and the participants, combining elements of deliberative, participatory, and representative democracy.

In order to give a more precise operational definition of this democratic innovation Sintomer et al. (2008) include five additional criteria that distinguish participatory budgeting from other similar programs: (1) the financial and/or budgetary dimension must be discussed; (2) the city level must be involved, or a (decentralized) district with an elected body and some power over administration; (3) it has to be a repeated process (one meeting or one referendum on financial issues are not examples of participatory budgeting); (4) the program must include some form of public deliberation within the framework of specific meetings/forums (the opening of administrative meetings or classical representative instances to “normal” citizens are not participatory budgeting); (5) some accountability on the output is required.

Second, among recent democratic innovations, participatory budgeting is one of the most successful in terms of global diffusion (Sintomer et al. 2013). Participatory budgeting was first introduced in 1989 by thirteen cities⁴ in Brazil, the majority of which were controlled by the Partido dos Trabalhadores. Participatory budgeting quickly expanded throughout Latin America

⁴ Eleven of these cities had a population greater than 50,000 inhabitants in 1992 and are included in this study.

during the nineties, and in the first ten years of the new century, to the rest of the world.⁵ A broad and very diverse coalition of international actors (e.g.; World Bank, UN, Social Forum) is one of the major forces behind the global spread of the program (Goldfrank 2012, Porto De Olivera 2013). The U.S. is among the latest countries to adopt participatory budgeting, with ongoing pilots in New York City, Boston, Chicago, Vallejo and San Francisco. The recently released second U.S. Open Government National Action Plan includes a goal to encourage community-led participatory budgeting at the city level.⁶

Third, the diffusion of participatory budgeting in Brazil presents an exceptional opportunity to study the politics of the adoption/abandonment of municipal participatory governance innovations. In contrast to the majority of other examples of large-scale diffusion of these innovations — such as the state of Kerala in India (Heller 2012), more recent community-driven development projects funded by international organizations (Mansuri and Rao 2012), or participatory innovations adopted in Venezuela, Peru and the Dominican Republic (Goldfrank 2011, McNulty 2012, Allegretti et al. 2012) — participatory budgeting in Brazil was not imposed by the state, by national-level governments or funded by international donors, but was self-adopted at the city level using city resources. This provides the opportunity of studying a large number of independent adoptions and abandonments.

⁵ A precise census does not exist, but participatory budgeting programs are estimated between 1269 and 2788 and are being implemented in almost all the countries of the world, with a particular concentration in Latin America and Europe (see the map at page 9 of Sintomer et al. 2013).

⁶ Available online at

http://www.whitehouse.gov/sites/default/files/docs/us_national_action_plan_6p.pdf

3. Existing explanations of the diffusion of policy innovations at the sub-national level

A variety of disciplines have investigated the diffusion of innovations including communication theory, economics, business administration, public management, law, sociology, agricultural studies, geography, and political science. In the political science literature scholars in international relations and comparative politics have most often focused on cross-national adoption of norms and institutions, while scholars in American politics have concentrated on investigating sub-national adoption of innovations across the United States. The broader debate on cross-national policy transfer and policy convergence is beyond the scope of this paper.⁷

Jack L. Walker (1969) was one of the first to introduce diffusion theory in American politics, providing some of the key definitions that have shaped subsequent research. Walker distinguishes the invention of a new policy from its diffusion, and he defines a policy innovation as a program or policy which is new to the state adopting it, even if it is not a newly-invented program. Walker's identification of a series of correlates of adoption has become the basis of the subsequent empirical literature on the diffusion of policy innovations in the United States.

This literature identifies three families of factors that correlate with adoption: factors that are internal to the unit of adoption, factors that are external to the unit of adoption and factors that characterize the policy innovation itself.⁸

The first group contains all political, economic, institutional and social characteristic of the unit of adoption (e.g., Berry and Berry, 1990; Gianakis and McCue 1997; Karch 2007). The second group of drivers of adoption centers on characteristics of the larger polity that contains

⁷ For a recent prospective on the relationship between these different approaches to the diffusion of policies, see Gilardi (2012) and Graham et al. (2013).

⁸ See Boushey 2010 for a comprehensive review.

the units of adoption (e.g., states, cities, districts, schools) and describes horizontal and vertical influence mechanisms. Collier and Messick (1975) are among the first to highlight the importance of correlation among the units of adoption when investigating policy diffusion. Horizontal mechanisms describe how units of adoption might influence each other through geographic proximity, peer proximity and the presence of networks that connect different units of adoption (e.g., Mintrom & Vergari 1998, Volden 2006; Hartley and Benington 2006).

Vertical mechanisms illustrate how institutions and organizations might impose or promote the adoption of an innovation across many units of adoption using a variety of monetary and non-monetary incentives (e.g., Welch and Thompson 1980, Mooney and Lee 1999, Allen et al. 2004).

Lastly, the third group of factors deals with intrinsic characteristics of the policy innovations themselves and how these characteristics affect diffusion patterns. The most typical pattern of diffusion over time assumes the shape of an S, with few pioneers that start the adoption process, a moment of subsequent fast adoption, and finally a slow convergence to 100% adoption. This pattern is typical of technology adoption and regulatory policies (Rogers 1962, Gray 1973). A second pattern of diffusion, commonly associated with morality policies and cultural shift, presents a faster concave cumulative adoption curve sometimes described as an r-curve (Mooney and Lee 1999, Henrich 2001). Boushey (2012) identifies these two patterns as ideal extremes that represent diffusion processes driven by horizontal mechanisms (S-curve) or vertical mechanism (r-curve). While there is an abundance of analyses of the state policy adoption process, the process that leads to the adoption of local government policy innovations is less studied (Gianakis and McCue 1997, Walker et al. 2011). The majority of this body of research highlights

how drivers of diffusion generate positive feedback mechanisms that accelerate the process itself in a self-reinforcing mechanism (Baumgartner and Jones 2009; Boushey 2010).

But what about processes in which the rate of abandonment is not zero or does not converge to zero? What about positive feedback mechanisms that accelerate abandonment? Do they exist?

The literature on policy diffusion by definition does not focus on these processes. A number of insights can be found in parallel literatures. The literature on policy change offers a few empirical examples of policy collapse (e.g., demise of the Urban Initiative, decline of civilian nuclear power, Baumgartner and Jones 2009), and more recently of policy bubbles that are assumed to be driven by positive feedback mechanisms that accelerate both the diffusion and abandonment phase (Maor 2014, Jones et al. 2014).

Jones et al. (2014) describe the occurrence of a policy bubble “when government overinvests in a policy instrument beyond its instrumental value in achieving a policy goal, and that overinvestment is sustained over a relatively long period of time.” Where a policy instrument is a means controlled by government, a policy’s instrumental value is its ability to affect policy goals, less the cost of the instrument, and overinvestment occurs when the expected benefits from a policy exceed its costs. Bubbles are characterized by positive feedback mechanisms that accelerate both the expansionary phase and the contractionary phase.

Regarding the specific policy we consider — participatory budgeting — most of the literature analyzes theoretical reasons behind the global diffusion of the program (Goldfrank 2012, Ganuza and Baiocchi 2012 and Sintomer et al. 2013), while there are very few empirical studies that attempt to analyze its diffusion using the models developed by the literature on policy diffusion. Wampler (2008) is the first to analyze the adoption of participatory budgeting among Brazilian municipalities with a statistical analysis. Wampler focuses on the 225 Brazilian

cities with more than 100,000 inhabitants. He proposes two cross-sectional logit models to investigate separately the adoption program in the period 1997 to 2000 and in the period 2001 to 2004⁹. The analysis focuses on four factors: partisan affiliation of the mayor, policy networks, internal determinants, and regional determinants. While Wampler's path-breaking study is the first to analyze the adoption of participatory budgeting at the municipal level in Brazil, the study has significant methodological limitations imposed by the size of the dataset. Most importantly, Wampler's study centers only on adoption, does not control for the effect of proximity and does not discuss abandonment.

Finally, even if the widespread consensus among scholars is that electoral losses are the key drivers of abandonment of PB only a few case studies actually investigate the issue in detail (Nylen 2003, Souza 2011, Lopes-Alves and Allegretti 2013) finding mixed results. In the Spanish case, for example, change in government do not appear to affect the survival of the process significantly (Lopes-Alves and Allegretti 2013).

4. The dataset

One of the main contributions of this research is the Brazilian Participatory Budgeting Census (Author 2012). This novel dataset identifies instances of participatory budgeting from 1989 to 2012 in medium to large Brazilian cities, is geo-located and can easily integrate a number of existing datasets that contain detailed information on economic, social, political and

⁹ Detailed data on the elections before 1996 is available only for some states. Existing datasets contain only partial information about the party of the mayor and its votes.

demographic variables for every municipality in Brazil.¹⁰ The dataset is based on two separate data collection efforts conducted in 2008 and 2012 that combine an online pre-screening of city websites with a telephonic survey. First research assistants scraped the internet for any available document and webpage about participatory budgeting in the target sample of cities. Then the potential candidates were surveyed telephonically. A city is coded as having adopted participatory budgeting only if the process respects the five criteria identified by Sintomer et al. (2008). The dataset builds upon previous data collection efforts by Torres Ribeiro and de Grazia (2003) and Wampler and Avritzer (2006). Currently this is the largest existing dataset on a municipal democratic innovation and offers the almost unique opportunity to investigate quantitatively the diffusion of a democratic innovation for more than twenty years (from 1989 to 2012).

This essay integrates the Participatory Budgeting Census with information gathered from the Instituto de Pesquisa Econômica Aplicada (IPEA) and from various state level electoral tribunals (Tribunal Regional Eleitoral — TRE) that possess information on executive elections held before 1996. Unfortunately no reliable data could be found with regard city council elections before 1996.

¹⁰ There are three main reasons to limit the study to medium to large cities. First, the qualitative literature (Texeira 2002) indicates that the institutional variance of PB is smaller for medium and large cities. Second, small cities (defined by the Brazilian law as cities with fewer than 50,000 inhabitants) obey different rules in regard to the transparency of balance sheets in the time period considered (art. 63 Lei Complementar 101 2000). This contributes to a continued lower quality in the public finance data available for these cities. Third, a larger number of small cities emerge during the considered time period. The census contains the sample constituted by the union of municipalities that achieved a population larger than 50,000 in 1992, 1997, 2000, 2004 and 2007. A total of 495 cities are present in the current census, this is just a minority of the ~5500 Brazilian municipalities, but it accounts for more than 60% of the Brazilian population. This paper presents tables and results using the most conservative subsample, the one comprised of only the 468 cities that had more than 50,000 inhabitants in 1992. The results shown in this study become even stronger with larger unbalanced samples. These results are available upon request.

Brazilian elections at the municipal level are held every four years, with the first municipal elections after a 20 year long dictatorship taking place in 1988. The qualitative literature shows that participatory budgeting is a fairly stable process within each electoral period; there are no case studies describing adoption that does not occur in the first year of the mandate, and it is rare that the process is abandoned before four years of implementation. In two of the case studies (Hortolândia (SP) and Itaúna (MG)) we visited in 2009 during our preparatory field work the process had lasted three years (2004-2007) then was simplified (2008) and subsequently was abandoned at the beginning of the new electoral term. This is a common pattern for citywide PB processes, confirmed also by the literature of PB processes outside of Brazil (Lopes-Alves and Allegretti 2012). Thus the dataset contains six time periods: 1989 to 1992, 1993 to 1996, 1997 to 2000, 2001 to 2004, 2005 to 2008 and 2009 to 2012. The statistical analysis, instead, focuses on the implementation of participatory budgeting in the last four. The analysis employs lagged explanatory variables, thus utilizes information on the elections in 1996 and other explanatory variables created using data on the period 1993-1996 to explain adoption in the period 1997-2000, and so on and so forth.

The sample of cities investigated is composed of all the cities with a population of more than 50,000 inhabitants. The initial sample generated in 2008 cross-checked the previous data collection efforts conducted during the period 1989 to 2004 by other authors. The second census conducted in 2012 instead focused only on the period 2009 to 2012 and on new cities that had achieved 50,000 inhabitants and had not been investigated before. In 2008 568 cities were investigated, in 2012 the sample was expanded to 595.

This essay employs in its main statistical analysis only the subset of 468 cities that achieved 50,000 inhabitants in 1992 because this set of cities is stable, there are no cities created

or merged within the time period analyzed with statistical methods. The results described by this analysis become even stronger and more significant when the full sample of 495 cities is employed (results available upon request). The total number of Brazilian cities is approximately 5,500; but more than 65% of the total population lives in 468 cities we consider.

5. Testing the hypotheses generated by the qualitative literature using the Brazilian Participatory Budgeting census

The qualitative literature on democratic innovations emphasizes the ‘political will’ of local government as one of the conditions necessary for determining the adoption of these policies. But what exactly is political will? Is there a way to measure it? Can we identify conditions that foster such will? Or is it an idiosyncratic virtue?

The qualitative literature describes political will as affected by an ideological commitment to participation, and by opportunistic reasons. In Brazil PB is often adopted by innovative city governments, affiliated with the Partido dos Trabalhadores (PT),¹¹ captained by mayors with strong ties to civil society organizations that believe in a new form of empowered citizens’ engagement. At the same time this literature claims that PB is often introduced by weak city governments in an attempt to bypass the city council, or to expand political support among the poor strata of the population (Abers 2000, Wampler 2007). Goldfrank and Schneider (2006) define this process of attempting to gain political advantages via the design of democratic innovations “competitive institution building.”

Some scholars also argue that the diffusion of PB was promoted by the national leadership of the Partido dos Trabalhadores as a component of a complex strategy of party repositioning that

¹¹ The PT, Workers’ Party, was among the first parties to introduce participatory budgeting.

led to the victory in the presidential election of 2002. This strategy was intended to expand the party support to broader strata of the population in a variety of ways, one of which was establishing a track record of good governance at the local level. Overall, the party moved toward the center, became more pragmatic and eliminated the language of socialism, in favor of the language of democratic deepening (Samuels 2004). Democratic innovations that promoted political participation were a key element of this strategy and rhetoric (Hunter 2010).

While some of the factors affecting political will are extremely difficult to measure, party affiliation and political vulnerability are a function of electoral results. Using Brazilian elections data this essay constructs proxy measures of party affiliation and political vulnerability of city governments and tests their effect on the adoption and abandonment of PB together with a variety of alternative hypotheses derived from the literature on policy diffusion and policy abandonment.

Table 2 explores the relationship between PB and the electoral successes of the Partidos do Trabalhadores. In the online appendix, figures 1 to 6, present maps that illustrate the spatial distribution of adoption and abandonment. Table 2 shows that the PT is the main promoter of the program in 1989, but many cities with mayors not belonging to the party begin to implement the program starting in 1993 (row B). However the PT is consistently the largest adopter, with an adoption rate that is five to six times that of the second largest adopter among the other parties (row D). There is clearly a systematic strategy of adoption that makes the PT different from all other political forces.

Table 2: The influence of the Partido dos Trabalhadores (PT) on the adoption of participatory budgeting (PB)

	1989– 1992	1993– 1996	1997– 2000	2001– 2004	2005– 2008	2009– 2012
[A] Ratio of PT mayors implementing PB over total cities implementing PB	9/11 81.8%	13/29 44.8%	26/62 41.9%	51/129 39.5%	48/119 40.3%	51/99 51.5%
[B] Ratio of mayors not belonging to the PT implementing PB over total cities implementing PB	2/11 18.2%	16/29 55.2%	36/62 58.1%	78/129 60.5%	71/119 59.7%	48/99 48.5%
[C] Ratio of PT mayors implementing PB over total cities with PT mayors	9/16 56.2%	13/18 72.2%	26/27 96.3%	51/57 89.5%	48/72 66.6%	51/87 58.6%
[D] Ratio of second largest PB-adopter party mayors implementing PB over total cities with second largest PB-adopter party mayors	1/11 9% (PSDB)	5/43 11.6% (PSDB)	13/94 13.8% (PSDB)	15/81 18.5% (PSDB)	14/86 16.3% (PSDB)	14/97 14.4% (PMDB)
[E] Ratio of mayors not belonging to the PT implementing PB to total cities with mayors not belonging to the PT	2/448 0.4%	16/450 3.6%	36/441 8.2%	78/411 19%	71/396 17.9%	48/381 12.6%
[F] Ratio of cities implementing PB to total cities with more than 50,000 inhabitants in 1992	11/464 2.3%	29/468 6.2%	62/468 13.2%	129/468 27.6%	119/468 25.4%	99/468 21.1%

The time periods reflect the years of implementation of PB. Municipal elections were held in 1988, 1992, 1996, 2000, 2004, 2008, and 2012. Participatory budgeting is initiated in January the year after the elections. The cities considered are those that have a population larger than 50,000 in 1992 excluding Brasilia, four cities became independent in 1992.

Sources: Participatory Budgeting Census, Regional Electoral Tribunals of Brazil and cities websites.

When we look at parties' support for participatory budgeting, we observe that all parties adopt less PB after the period 2001-2004 (rows C and E). Interestingly, there is a larger percentage point decrease in the adoption among the cities controlled by the PT (-30.9 percentage points, row C), than among the cities controlled by other parties (-6.4 percentage points, row D). This effect is generated by the expansion of the Workers' Party that wins in more cities that do not adopt PB (denominator of row C).

The pattern of implementation is geographically concentrated in the center-south of Brasil, with the majority of cases implemented in the state of São Paulo (See maps 1 to 6 in the online appendix).¹² The pattern develops first along the coast and then moves toward the interior

¹² Note that these tables and maps display only the subsample of cities with a population larger than 50,000 inhabitants in 1992, the data that will be used in the statistical analysis, but the census contains additional cities. The choice of restricting the attention to these cities is driven

states. This geographical clustering seems to point in the direction of potential horizontal proximity effects at play in both the expansionary and contractionary phase.

Thus the rise and decline of Brazilian participatory budgeting is potentially driven by the sharp decrease in adoption of the cities influenced by the Partidos dos Trabalhadores and is visually compatible with the presence of horizontal positive feedback mechanisms that amplify and transmit such effect to nearby cities. The overall process appears to have at least some of the visual characteristics of a policy bubble (Maor 2014, Jones et al. 2014). But what explains the behavior of the PT? Why should the party have overinvested in PB in the nineties? Why did the party begin disinvesting of PB after 2004?

The most notable event occurring in the period 2001 to 2004 is the victory of the PT in the presidential elections in 2002 after three unsuccessful attempts (1989, 1994 and 1998). As mentioned before, Hunter (2010) using party's internal documents and speeches shows that the PT faction controlled by the future president, Luiz Inácio Lula da Silva, promoted governance innovations at the municipal level during the nineties as a way to establish the party's track record of good governance. This vertical influence mechanism is abandoned when Lula wins the presidential elections and the party consolidates its track record (Hunter 2010).

In depth electoral data for Brazilian cities is available only for the periods 1996, 2000, 2004, 2008 and 2012. Thus the statistical analysis of this essay centers on isolating the triggers for the systemic decline in implementation of PB occurring after 2004, and foregoes the analysis of the trigger of the expansionary phase that occurred in 1996.

by the statistical advantages of working with a balanced sample in dynamic panel data analysis (see online appendix). When considering the entire sample available in the census two cities with less than 50,000 inhabitants in 1992 have implemented PB in Tocantins, Palmas (2009-2012) and Cachoerinha (2001-2008). Using the full unbalanced dataset strengthens the results presented in the paper (analysis available upon request).

This strategy generates a first testable hypothesis that can explain the systemic decline of PB: the more the PT consolidates its track record, the less it promotes the implementation of PB. More specifically:

H1: The victory in the mayoral elections of the Partidos dos Trabalhadores is positively correlated with the adoption and survival of PB, but this effect declines after the victory of the party in the presidential elections in 2002 (change in vertical influence mechanisms of diffusion).

Given that Brazilian presidential elections and local elections are staggered every two years, this hypothesis can be tested by investigating whether the effect of the victory of the PT in the mayoral elections of 2004 and 2008 is systematical different from the effect of the victory in 2000 and 1996. If correct, hypothesis one will explain the patterns in the cities controlled by the PT, but how can we explain the behavior of cities controlled by other parties?

The presence of horizontal influence mechanism could generate the diffusion of PB in such cities. The exact mechanism driving this horizontal influence might be due to many factors and beliefs of non-PT mayors and city governments, from trying to eliminate preemptively one of the advertised reasons why voters should vote for the PT; to increased availability of information about the program, peer-pressure, learning, and other network-based explanations that are well described by the diffusion literature (e.g., Mintrom and Vergari 1998, Gilardi 2010, Boushey 2012).

For example the systemic decline of PB displayed in Table 1 might be driven by learning. If the diffusion of PB was based on a false assumption that the program could provide an

increase of the mayor's party support, horizontal mechanisms that promote the sharing of information about the impact of PB would lead overtime to a decrease in adoption.

We cannot test the type of mechanism, but we can control for the presence of geographic proximity and peer proximity effects that are correlated with such mechanisms, and we can also test if such effects changes over time.

The presence of proximity effects can reinforce the effect of hypothesis one. For example, if cities not controlled by the PT are adopting participatory budgeting to compete with close by PT controlled cities, this proximity effect will transmit a decline in the percentage of cities controlled by the PT adopting participatory budgeting to the entire Brazil. In this scenario PT controlled cities are a model for surrounding cities.

But a change in the sign of proximity effects can also lead to an alternative hypothesis that could explain the systematic decline of PB after 2004 without requiring a change in the strategy of the Partidos dos Trabalhadores. The dynamic displayed in Table 2 could be explained by a reversal in proximity effects occurring after 2004. Such reversal would lead proximity to reduce adoption and promote abandonment. In this scenario all cities adopting PB are a model for surrounding cities, and some shock occurring during the period 2001-2004 alters the effect of this model on adoption and survival. Pre 2001 this model promotes PB, post 2004 this model discourage the adoption and survival of PB.

H2: Proximity effects promote adoption and survival before 2004. After 2004 these effects switch sign (reversal in horizontal mechanisms of diffusion).

Hypothesis two is designed to capture the radical reversal described by the policy bubble literature after bubbles burst (Maor 2014, Jones et al. 2014). It describes a situation in which the positive feedback mechanisms that were supporting the adoption of a policy program disappear, and new positive feedback mechanisms supporting the abandonment of the policy program emerge. In this new scenario being close to a city adopting PB reduces the probability of adoption and continuation of the process. This is an extreme first exploratory hypothesis. The analysis by controlling for proximity effects both in the adoption and survival models allows to explore a variety of combination of these forces that could lead to the dynamic described in Table 1 without requiring a change in the strategy of the Partidos dos Trabalhadores. For example the proximity effect on adoption could remain constant, while the proximity effect on survival could reverse sign and increase in magnitude.

To test this hypothesis we use both measures of geographical and peer proximity. We measure geographical proximity as the Euclidean distance¹³ to the closest city implementing participatory budgeting in the previous time period, and peer proximity as a party-network effect.¹⁴

The qualitative literature also attributes to the density of civil society important idiosyncratic effect on the probability of adoption and survival of participatory budgeting (Abers 2000, Wampler 2007, Avritzer 2009). This hypothesis cannot be directly tested due to the lack of

¹³ This is a rough proxy that does not compensate for the curvature of the earth. One unit of this measure corresponds approximately to 111 km (i.e., earth radius in km multiplied by $\pi/180$).

¹⁴ Gilardi (2010) shows, among other things, that cross-national adoption processes are mediated by ideology. Applying his logic at the sub-national level we employ two alternative measures of party peer effect that combine ideology and imitation. In the first one a city is considered to have a peer that has adopted PB if a city controlled by the same party adopted PB in the previous time period. In the second one a weight equal to the number of cities adopting PB by each party is applied to the previous dummy variable.

historical data at the municipal level. However, in Brazil, the wealth of the city is a rough first approximation of the civil society density that combined with a correct treatment of city level heterogeneity (i.e., city level fixed effects) should limit omitted variable bias. This generates a third hypothesis:

H3: The availability of resources and the city's wealth are positively correlated with the adoption and survival of PB.

We operationalize hypothesis 3 by investigating the effect of the city's fiscal autonomy (tax share of revenues), and the effect of the city's financial viability (ratio of expenditures and revenues).¹⁵

Political will, as mentioned before, is also often connected with political vulnerability of the local government controlling the city. Some authors describe PB as a form of engagement finalized to expand the city government support among specific strata of the population and as a way to overcome the city council. This generates the last testable hypothesis:

H4: The Political vulnerability of the city government is positively correlated with the adoption and survival of PB.

¹⁵ We prefer these indicators of city's wealth to per capita GDP because per capita GDP is constructed via a complex geographical imputation. The tax share of revenues is instead generated at the local level using simple algebra. The result shown in the next section are robust to the introduction of city level per capita GDP, these results are available upon request.

Operationally we test hypothesis 4 by investigating multiple measures of city government's vulnerability: 1) the mayor's party vulnerability (ratio of runner-up votes over mayor's party votes), 2) the mayor's party control over the city council (mayor's party shares of seats in the chamber and a dummy that identifies if the party of the mayor holds the majority of seats), and 3) continuity of the city government. We measure the continuity of the city government, by investigating the continuity of the party that wins mayoral elections in two consecutive time periods¹⁶. This measure underestimates the city government continuity because in some cases incumbent mayors change party and win elections. A better measure would be an index of continuity that combines the continuity of the mayor and the coalition.

6. Model specification and results

In this section we investigate separately the mechanisms of adoption and survival of participatory budgeting. In the online appendix, instead, we present a unified model that jointly investigates adoption and survival using interactions.

Table 3 presents a linear probability model with fixed effects and a Chamberlain logit model with random effects.¹⁷ Each model is estimated adjusting the error for clustering at the state level, and includes time effects. The two model specifications can be represented by the following equations that describe adoption and survival respectively:

¹⁶ Parties change name, split and merge, so this measure is based on a standardized measure of Brazilian parties. The coding is available in the replication material.

¹⁷ Unfortunately we still do not have an ideal methodology to investigate discrete panel data. While a non-linear model offers a more nuanced analysis of the effect of regressors, it imposes more complex assumptions that are more easily violated. A misspecified non-linear model might generate a less accurate approximation than the best linear approximation that requires fewer assumptions and allows a more general treatment of unit heterogeneity (see Wooldridge 2010 chapter 15.2).

$$f\{E(PB_t = 1|PB_{t-1} = 0)\} = \alpha_i + POL_{i;t-1}\beta + ECON_{i;t-1}\gamma + \delta PROX_{i;t-1} + PERIOD_t \varepsilon$$

$$f\{E(PB_t = 1|PB_{t-1} = 1)\} = \alpha_i + POL_{i;t-1}\beta + ECON_{i;t-1}\gamma + \delta PROX_{i;t-1} + PERIOD_t \varepsilon$$

where POL is a matrix containing the four political variables described in the previous section measuring vulnerability and continuity of the city government, ECON is a matrix containing the two economic variables measuring fiscal autonomy and financial viability, PROX is a vector measuring geographic proximity, PERIOD is a matrix containing three period dummies, α_i is a fixed effect capturing city level heterogeneity¹⁸ and f is a linear or logistic link function depending on the model specification. Following the hypotheses of the previous section the model also introduces an interaction that measures the change in effect of the victory of the PT and geographic proximity in the two time periods after 2002.

Table 3 present the results. All model specifications supports hypothesis 1, identifying a strong effect of the victory of PT mayors on adoption that declines significantly after 2004. This effect remains significant in the GMM specification (see online appendix). The analysis, instead, does not supports alternative hypothesis 2.¹⁹

Table 3: Estimating adoption and abandonment separately – period 1997-2012

Dependent variable	Probability of Adoption		Probability of Survival	
	LPM, FE	Chamberlain Logit, RE	LPM, FE	Chamberlain Logit, RE

¹⁸ In the case of the Chamberlain model this effect is captured by the average of all regressors by city. This is a less general specification than the one used in the linear probability model that avoids the incidental parameter problem. For a similar application and a discussion see Acemoglou et al. 2008. The Chamberlain model also includes a city level random effect.

¹⁹ H2: After 2004 the effect of proximity on the probability of adoption of PB decreases, and the effect of proximity on the probability of abandonment of PB increases.

Intercept	0.18 (0.15)	NA	-0.06 (0.12)	NA
Victory of the PT before 2002 (discrete)	0.77*** (0.05)	0.83*** (0.03)	0.38*** (0.11)	0.61*** (0.08)
Change in effect after 2002 (discrete)	-0.24*** (0.07)	-0.10*** (0.02)	-0.16 (0.15)	-0.26*** (0.06)
Minimum Distance	-0.02*** (0.01)	-0.03*** (0.01)	0.07 (0.10)	0.05 (0.09)
Change in effect after 2002	-0.03** (0.01)	-0.02 (0.01)	-0.01 (0.08)	-0.01 (0.08)
Tax share of revenues	-0.02 (0.41)	0.08 (0.33)	0.86 (0.66)	2.02* (1.10)
Financial viability index	-0.16 (0.11)	-0.35** (0.14)	0.01 (0.53)	-0.76 (0.51)
City government continuity (discrete)	-0.07*** (0.02)	-0.03** (0.01)	-0.04 (0.12)	-0.02 (0.11)
Mayor's vulnerability	0.10* (0.06)	0.07 (0.06)	0.34* (0.17)	0.44** (0.18)
Mayor controls the council (discrete)	-0.003 (0.02)	-0.01 (0.02)	0.11 (0.09)	0.11 (0.08)
Mayor's share of council seats	-0.005 (0.12)	-0.05 (0.12)	0.67** (0.31)	1.01*** (0.34)
Period 3 (1996-2000)	baseline	Baseline	Baseline	Baseline
Period4 (2001-2004)	0.10*** (0.02)	0.04* (0.02)	0.06 (0.07)	-0.04 (0.12)
Period5 (2005-2008)	0.09* (0.04)	-0.04 (0.05)	0.02 (0.24)	-0.15 (0.22)
Period 6 (2009-2012)	0.08** (0.03)	-0.02 (0.02)	-0.33*** (0.12)	-0.23 (0.15)
N	1498	1498	336	336
Groups	458	458	204	204
R-squared	0.24		0.05	
R-squared within	0.31		0.37	
R-squared between	0.17		0.01	
Corr(observed;predicted)^2		0.30		0.30

Notes: the sample spans 5 time periods 1993-1996, 1997-2000, 2001-2004, 2005-2008, 2009-2012 and contains 468 cities with a population larger than 50,000 (base year 1992). All the explanatory variables are lagged, thus the sample explains adoption starting in 1997. Each model includes time effects for period 4, 5 and 6. All models are estimated assuming clustering at the state level (26 states). In the Chamberlain Logit model the average marginal effect of the coefficients are estimated assuming that the random effect is equal to zero. Discrete variables' coefficients represent the effect of a discrete change from zero to one. Standard errors are in parentheses. *, ** and *** denote significance at the 1%, 5% and 10%-level, respectively.

The models identify significant effects of proximity on adoption, the larger the distance from a city adopting PB the lower the chance to adopt the program (-2%; -3%).

This effect increases even further in the two time periods after 2002 (-5%; -5%) disproving the first part of hypothesis 2 that was assuming a smaller effect of proximity on adoption after 2002. Thus after 2002 cities are mimicking even more their neighbors.

This effect remains significant in the GMM specification (see online appendix).

To get a sense of the magnitude of these effects consider that the unit of measure of the proximity variable is approximately 100 kilometers. Thus if the distance from city A and the closest city that implemented PB in the previous period declines/increases by 500 kms, the probability that city A adopts PB increases/decreases on average by 10% (15% in the non-linear estimate) before 2002, while after 2002 it increases/decreases by 25%. The graph of the predicted probabilities of the Chamberlain specification shows that this effect disappears for distances greater than 1000 kms (Figure 1).

The effects of proximity on survival, instead, are not significantly different from zero. Including the two measures of peer proximity that we have described in the previous section does not alter these conclusions.²⁰ Thus the systemic decline of participatory budgeting cannot be attributed exclusively to a reversal of the horizontal diffusion mechanisms. Instead this decline is explained by a change in the vertical influence of the Workers' party after the victory in the federal elections combined with an increase in proximity effects on adoption. After 2004 the number of cities implementing PB controlled by the PT declines, and nearby cities are mimicking each other more than before. The resulting effect reduces adoption in the entire Brazil.

When investigating the effect of the availability of resources (**H3**), quite surprisingly, Table 3 does not show significant effects of fiscal autonomy on adoption of participatory budgeting. The

²⁰ The models are available upon request.

linear model also does not detect effects on survival, while the Chamberlain model identifies a large, but weakly significant average effect. Looking at Fig. 5 we see that the effect of fiscal autonomy decreases after the ratio of tax share of revenues becomes larger than 50%. This non-linear effect is not captured by the average treatment effect shown in Table 3 and might explain why such results are not significant.

The financial viability index (rate of expenses over revenues) has a negative effect on adoption that is significant only in the non-linear model. Figure 7 in the online appendix shows that the probability of adoption of PB quickly declines when the index approaches 100% and then continues to decline at a slower rate. As for the case of fiscal autonomy this non-linearity explains why the results of the linear model in Table 3 are not significant.

When we look at hypothesis 4, Table 3 shows that city government's vulnerability affects significantly the adoption and survival of PB.²¹ Mayors that are more vulnerable in terms of their own votes are more likely to adopt and continue the program (Figure 9 and Figure 10), however mayors that are less vulnerable in term of city council seats have a higher chance to continue the program (Figure 12).

This difference suggests an effect of the direct elections of the mayors on the political will to continue the program, mediated by the effect of the size of the opposition in the city council, and contributes to our understanding of the formation of political will in Brazilian cities, and more generally how political will supporting democratic innovations is mediated by existing institutions. When the mayor has sufficient control of the city council he has the clout to

²¹ H4: The Political vulnerability of the city government is positively correlated with the adoption and survival of PB.

continue the program, but opportunistic mayors might have less incentive to adopt or maintain PB if their position is not vulnerable in direct elections.

Contrary to what most practitioners believe the continuity of the city government does not help to explain the survival of the program. The estimated coefficient is not significantly different from zero, and is negative in both specifications. Continuity, instead, has a significant negative effect on adoption (-7%; -3%) and this effect is robust to the GMM specification (see online appendix). Incumbent governments have a lower propensity to adopt PB. Overall the evidence supports hypothesis 4, more fragile city government adopt more often PB.

7. Discussion

This essay introduces a more refined approach to the study of policy diffusion that moves beyond the concept of implementation of policy innovations, to analyze separately adoption and abandonment of policy innovations. The analysis investigates the adoption, abandonment and re-adoption of Brazilian Participatory Budgeting (Table 1) one of the oldest and most widely spread participatory governance innovations.

This paper presents evidence that the national party championing the adoption of participatory budgeting in Brazil (Partidos dos Trabalhadores) exerted influence on its mayors to adopt the process in order to establish a track record of good governance in a bid to win the federal elections.

While the qualitative literature had described before such strategy using official documents and speeches (Hunter 2010), what this paper offers is a first empirical test of the impact of these changes on subnational policies. Systematic electoral data for Brazilian cities is available only

for the periods 1996, 2000, 2004, 2008 and 2012. Thus the statistical analysis centers on isolating the triggers for the systemic decline in implementation of PB occurring after 2004.

Both a static and a dynamic model of diffusion identify a significant positive effect of the victory of the PT on adoption of participatory budgeting that declines after 2004 (Table 3 and online appendix).

The analysis also shows that such strategy influences nearby cities not controlled by the PT via proximity effect. The combination of these two mechanisms explains the peak in implementation in *all* Brazilian cities that we observe in 1997 and 2001 (Table 1). The alternative hypothesis (H2) that such systematic change is purely driven by a reversal of horizontal influence mechanisms is rejected by the statistical analysis.

Using the language of the recent policy bubble literature, the combination of a vertical influence mechanism and proximity effects leads to overinvestment in the adoption of participatory budgeting in 1997 and 2001 (Maor 2014, Jones et al. 2014).

Interestingly, some of the idiosyncratic mechanisms uncovered by the statistical analysis work differently from what the academic qualitative literature theorizes. For example, the mayor's party vulnerability in the city council is negatively correlated with participatory budgeting's survival, but has no impact on adoption. Thus the model supports case studies that show that opposition in the city council leads to abandonment of the program (Dias 2002), but does not support one of the major theoretical critiques to participatory budgeting, i.e., that the program is introduced to bypass the city council. This result suggests that electoral rules might moderate the propensity of municipalities to innovate, and opens up a series of questions regarding comparative institutional design. For example, in countries where the mayor is not

elected directly and is chosen, instead, by the city council, the propensity to innovate might be lower, but the survival rate of innovations might be higher.

Contrary to widespread practitioners' wisdom, a change in the city government on average does not lead to a significant change in the probability of abandoning the program, confirming the results of recent set of case studies on the survival of PB in Spain (Lopes-Alves and Allegretti 2012). The survival of participatory budgeting, according to the statistical model, is mostly explained by the mayor's party seat share in the city council and by the vulnerability of the mayor. Vulnerability of the Partido dos Trabalhadores, and vulnerability of local government, are the most important factors explaining the dynamic of adoption and abandonment described by the data.

Similarly surprising, on the basis of the knowledge accumulated by case studies on participatory budgeting, is the fact that the availability of slack financial resources does not significantly affect adoption or survival.

Overall this paper offer a unique advancement in our understanding of some of the drivers of 'political will' and contributes to systematize our understanding of the impact of political vulnerability on the adoption and survival of democratic innovations.

Beyond the specific importance of explaining in detail the mechanisms driving the adoption and abandonment of democratic innovation in Brazil, this paper suggests that there might be different types of policy diffusion processes that cannot be detected without moving beyond implementation rates, and analyzing separately adoption, abandonment and re-adoption rates (Table 2). Disentangling these three "engines" of the policy diffusion process might provide a more nuanced understanding of the variety of these processes. In particular it might be fruitful

to analyze contested policies such as regulation on abortion, same-sex marriage, and governance innovations that alter political competition.

Fig. 1: estimated probability of adoption of PB as a function of geographical proximity.

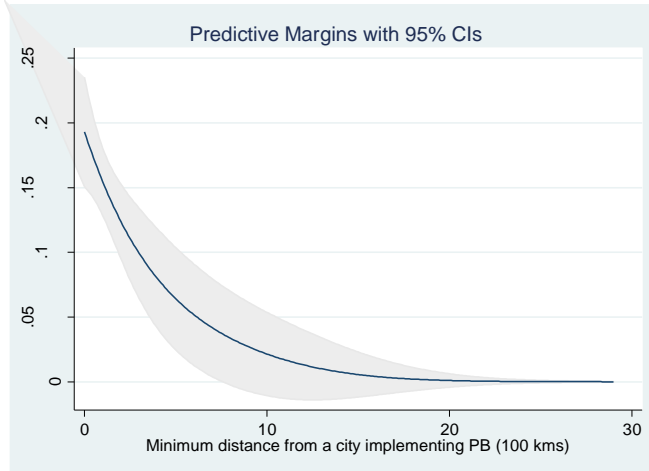


Fig. 2: change in estimated probability of adoption of PB after 2002 as a function of geographical proximity.

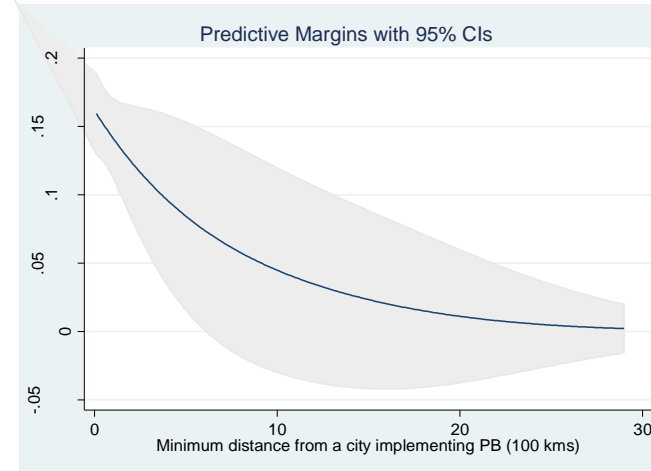


Fig. 3: estimated probability of survival of PB as a function of geographical proximity.

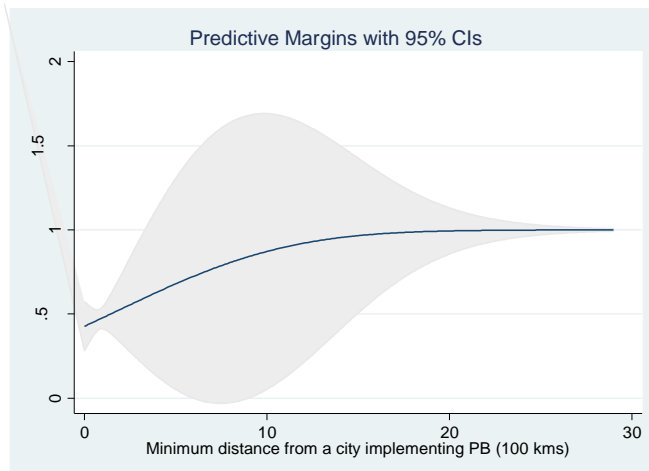
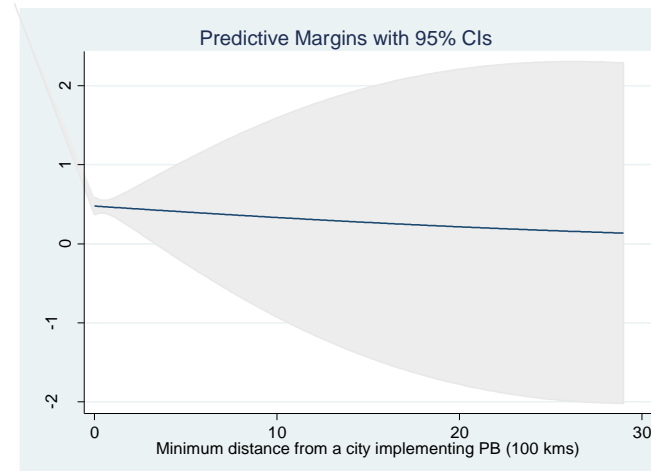


Fig. 4: change of estimated probability of survival of PB after 2002 as a function of geographical proximity.



Note: the estimated predicted probability assumes that the random effect in the Chamberlain Logit model is equal to zero.

Fig. 5: estimated probability of adoption of PB as a function of the tax share of revenues (tax revenues/total revenues)

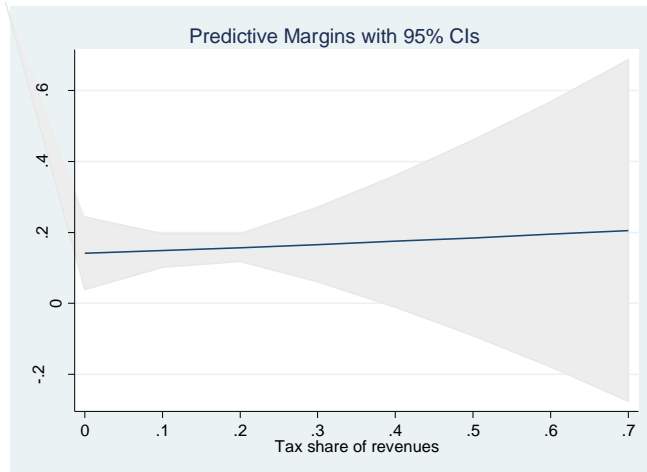


Fig. 6: estimated probability of survival of PB as a function of the tax share of revenues (tax revenues/total revenues)

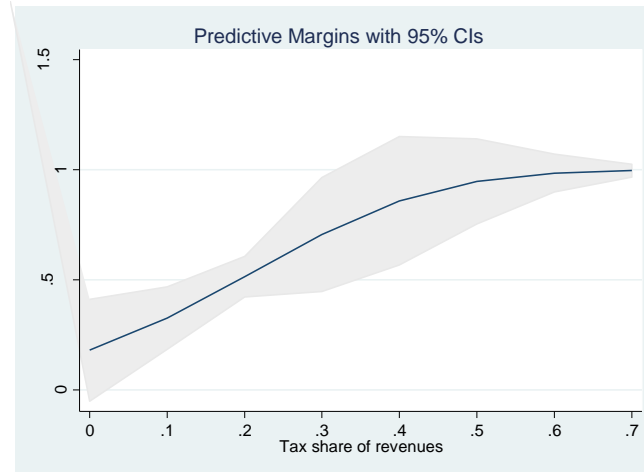


Fig. 7: estimated probability of adoption of PB as a function of the financial viability index (expenditures/revenues).

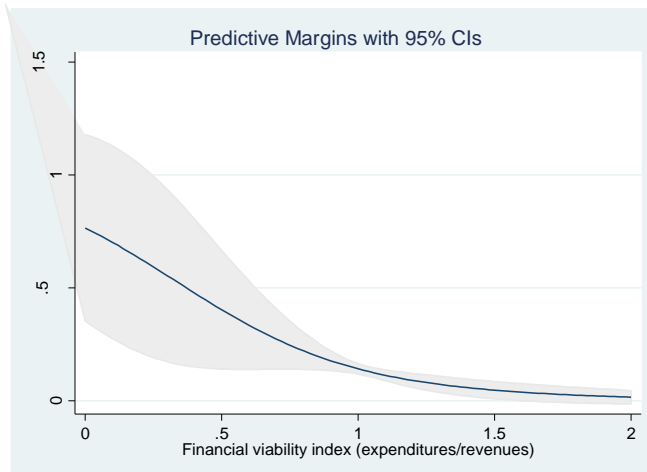
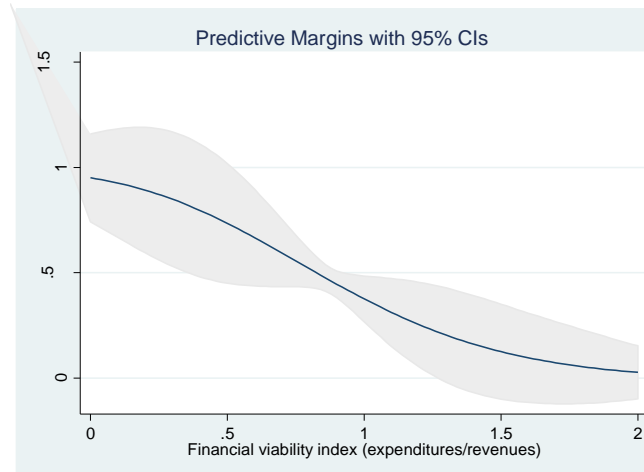


Fig. 8: estimated probability of survival of PB as a function of the financial viability index (expenditures/revenues).



Note: the estimated predicted probability assumes that the random effect in the Chamberlain Logit model is equal to zero.

Fig. 9: estimated probability of adoption of PB as a function of mayor's vulnerability.

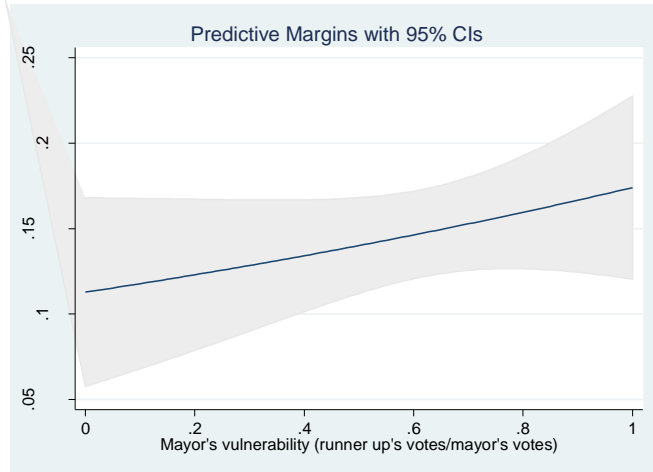


Fig. 10: estimated probability of survival of PB as a function of mayor's vulnerability.

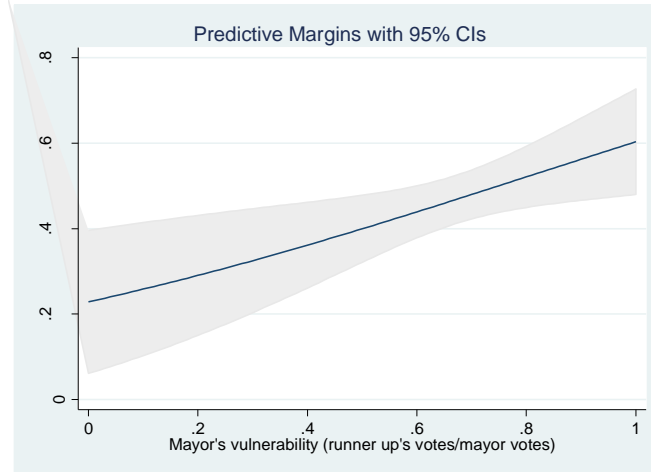


Fig. 11: estimated probability of adoption of PB as a function of mayor's share of city council seats

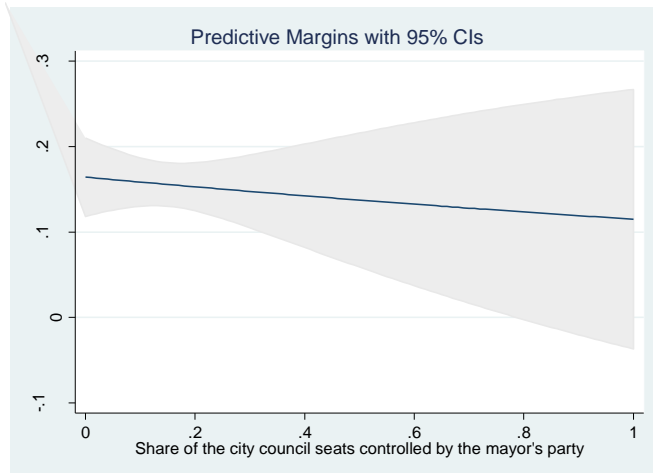
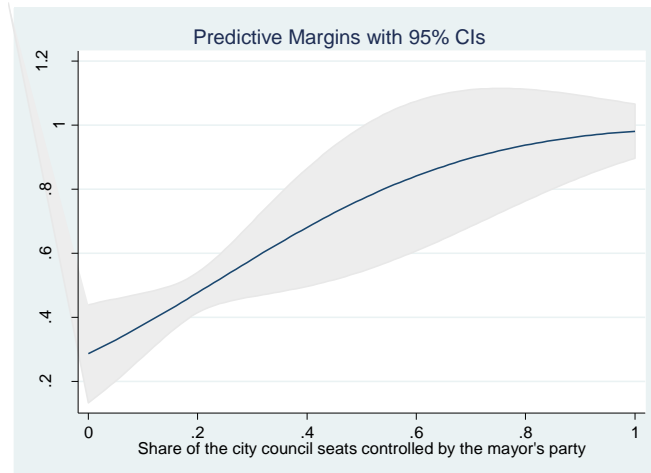


Fig. 12: estimated probability of survival of PB as a function of mayor's share of city council seats



Note: the estimated predicted probability assumes that the random effect in the Chamberlain Logit model is equal to zero.

REFERENCES

Abers, R. N. 2000. *Inventing Local Democracy: Grassroots Politics in Brazil*. Boulder, CO, and London: Lynne Rienner.

Acemoglu, D., Johnson, S., Robinson, J. A. and Yared, P. 2008. "Income and Democracy." *American Economic Review*, 98(3):808–842.

Allegretti, G. 2013. "Os orçamentos participativos sabem escutar? Reflexões para reforçar a sustentabilidade dos orçamentos participativos", in Lima, K., Boson, C. *Orçamento Participativo Olhares e Perspectivas*, Livraria Paulo Freire Ed.

Allegretti, G., V., Barragán, D. Chavez, P. García-Leiva, V. Gutiérrez-Barbarrusa, J. Navascués, P. Paño Yáñez, R. Romero and J. M. Sanz. 2012. "Estudio comparativo de los presupuestos participativos en República Dominicana, España y Uruguay". Malaga: CEDMA.

Allen, M. D., C. Pettus, and D. P. Haider-Markel. 2004. "Making the National Local: Specifying the Conditions for National Government Influence on State Policymaking." *State Politics and Policy Quarterly* 4 (3):318–344.

Avritzer, L. 2009. *Participatory Institutions in Democratic Brazil*. John Hopkins University Press, Baltimore.

Baumgartner, F. and Jones, B. D. 2009 (1993). *Agendas and instability in American politics*. Chicago, IL: University of Chicago Press.

Berry, F. S. and W. D. Berry. 1990. "State Lottery Adoptions as Policy Innovations: An Event History Analysis." *American Political Science Review* 84:395–415.

Boushey, G. 2010. *Policy Diffusion Dynamics in America*. Cambridge: Cambridge University Press.

Boushey, G. 2012. "Punctuated Equilibrium Theory and the Diffusion of Innovations" *Policy Studies Journal*, 40(1), 127–146.

Collier, D., & Messick, R. 1975. "Prerequisites versus diffusion." *American Political Science Review*, 69(4), 1299-1315.

Dias, M. R. 2002. *Sob o signo da vontade popular: o orçamento participativo e o dilema da Câmara Municipal de Porto Alegre*. Belo Horizonte: UFMG.

Fung, A., and Wright, E. 2003. *Deepening Democracy: Experiments in Empowered Participatory Governance*. Princeton. Princeton University Press.

Ganuzza, E. and Baiocchi, G. 2012. "The Power of Ambiguity: How Participatory Budgeting Travels the Globe," *Journal of Public Deliberation*: Vol. 8: Iss. 2, Article 8.

Gianakis, G. A. and . P. McCue. 1997. "Administrative Innovation among Ohio Local Government Finance Officers." *The American Review of Public Administration* September, 27(3): 270-286.

Gilardi, F. 2010. "Who Learns from What in Policy Diffusion Processes?" *American Journal of Political Science*. Vol. 54 (3): 650-666.

Gilardi, F. 2012. "Transnational Diffusion: Norms, Ideas, and Policies." In *Handbook of International Relations*, ed. Walter Carlsnaes, Thomas Risse and Beth Simmons. Second ed. SAGE Publications.

Goldfrank, B. and A. Schneider. 2006 "Competitive Institution Building: The PT and Participatory Budgeting in Rio Grande do Sul," *Latin American Politics and Society*, 48:3.

Goldfrank, B. 2011. *Deepening Local Democracy in Latin America: Participation, Decentralization and the Left*. University Park, PA: Pennsylvania State University Press.

Goldfrank, B. 2012. "The World Bank and the Globalization of Participatory Budgeting," *Journal of Public Deliberation*: Vol. 8: Iss. 2, Article 7.

Gray, V. 1973. "Innovation in the States: A Diffusion Study." *The American Political Science Review*. Vol. 67 (4):1174–1185.

Graham, E. R., Shipan, C. R. and Volden C. 2013. "The Diffusion of Policy Diffusion Research in Political Science." *British Journal of Political Science* 43(3): 673-701.

Hartley J.F. and Benington J. 2006. "Knowledge sharing through inter-organizational networks." *Public Money and Management* 26:101–108.

Heller, P. 2012. "Democracy, participatory politics and development: Some comparative lessons from Brazil, India and South Africa." *Polity*, 44, 642-665.

Henrich, J. 2001. "Cultural transmission and the diffusion of innovations: Adoption dynamics indicate that biased cultural transmission is the predominate force in behavioral change and much of sociocultural evolution." *American Anthropologist*, 103 , 992-1013.

Hunter, W. 2010. *The Transformation of the Workers' Party in Brazil, 1989-2009*. New York: Cambridge University Press.

Jones, B. D., Herschel F. T. III and M. Wolfe. 2014. "Policy Bubbles". *Policy Studies Journal*, forthcoming.

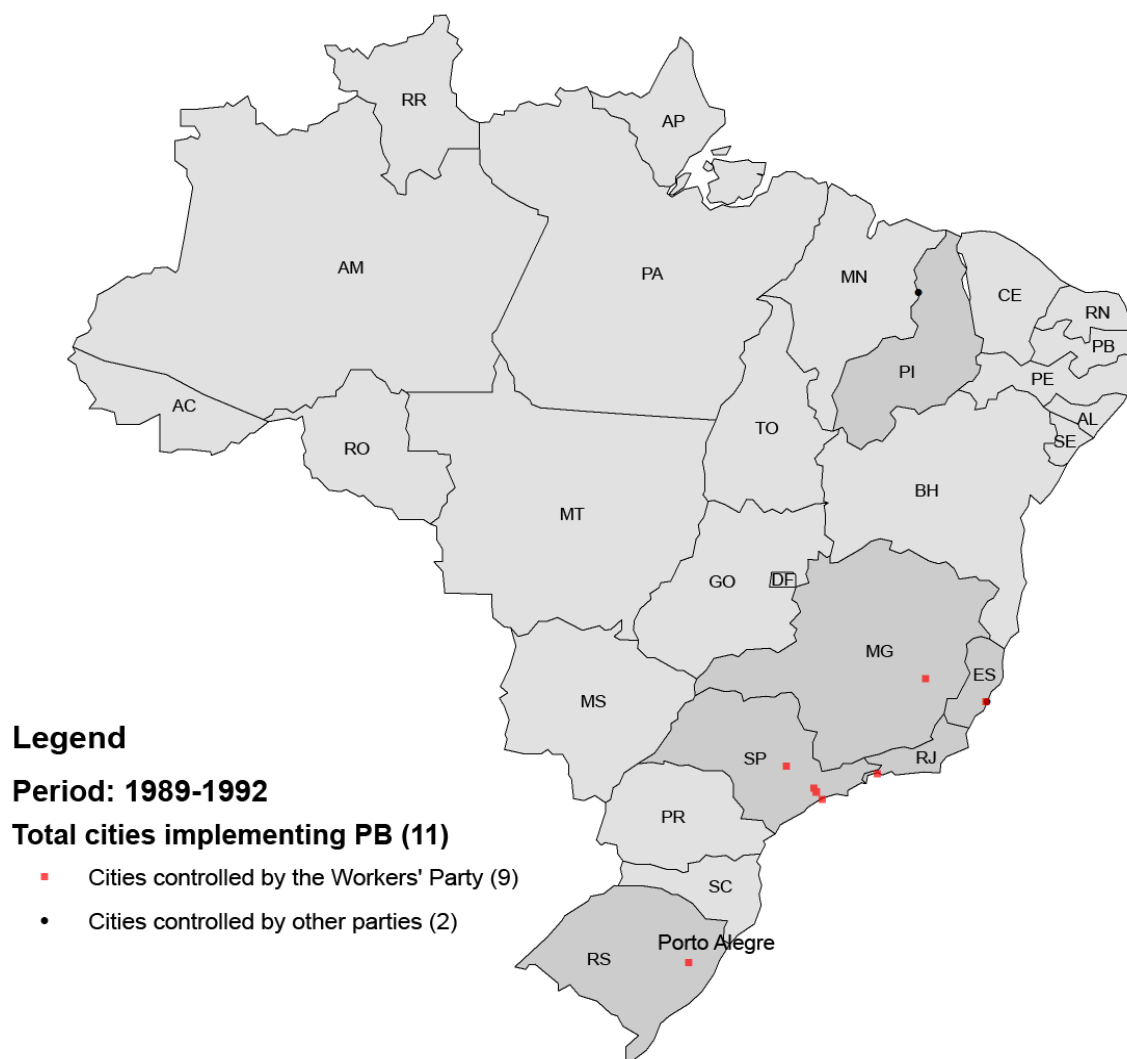
Karch, A. 2007. *Democratic Laboratories: Policy Diffusion among the American States*. Ann Arbor, MI: University of Michigan Press.

- Lopes-Alves, M. And G. Allegretti. 2012. “(In)stability, a key element to understand participatory budgeting: Discussing Portuguese cases.” *Journal of Public Deliberation*: Vol. 8: Iss. 2, Article 3.
- Mansuri, G. and V. Rao. 2012. *Localizing Development: Does Participation Work?* WorldBank.
- Maor, M. 2014. “Policy Bubbles: Policy Overreaction and Positive Feedback” *Governance* Volume 27, Issue 3, pages 469–487.
- McNulty, S. 2012. "An Unlikely Success: Peru's Top-Down Participatory Budgeting Experience," *Journal of Public Deliberation*: Vol. 8: Iss. 2, Article 4.
- Mintrom, M. and S. Vergari. 1998. “Policy Networks and Innovation Diffusion: The Case of State Education Reforms.” *The Journal of Politics*. Vol. 60 (1):126–148.
- Mooney, C. Z. and Lee, M. 1999. “The Temporal Diffusion of Morality Policy: The Case of Death Penalty Legislation in the American States.” *Policy Studies Journal*, 27(4): 766-780.
- Nylen, W. R. (2003) “An Enduring Legacy: Popular Participation in the Aftermath of the Participatory Budgets of João Monlevade and Betim.” in Baiocchi, G. (Ed.), *Radicals in Power: The Workers' Party (PT) and experiments in urban democracy in Brazil*, Lond: Zed Books Ltd.
- Porto De Olivera, O. 2013. “Embaixadores da participação: a difusão internacional do Orçamento Participativo a partir do Brasil.” Dissertation manuscript, São Paulo.
- Rogers, E. M. 1995 (1962). *Diffusion of Innovations*. New York: The Free Press. Fourth Edition.
- Samuels D. 2004.” From socialism to social democracy: Party organization and the transformation of the workers' party in Brazil.” *Comparative Political Studies*, 37, 999-1024.
- Sintomer, Y., Herzberg, C. and Röcke, A. 2008. “Participatory Budgeting in Europe: Potentials and Challenges,” *International Journal of Urban and Regional Research* 32, no. 1: 164-178.
- Sintomer, Y., Allegretti, G., Herzberg, C. and Röcke, A. 2013. “Participatory Budgeting Worldwide –Updated Version.” Service Agency Communities, Bonn GIZ.
- Smith, G. 2010. *Democratic Innovations: Designing Institutions for Citizen Participation Theories of Institutional Design*. Cambridge University Press.
- Souza, L. A. M. de. 2011 “Orçamento Participativo e as Novas Dinâmicas Políticas Locais.” *Lua Nova* 84:245-285.
- Torres Ribeiro, A. C. and G. de Grazia 2003. “Experiências de Orçamento Participativo no Brasil. Período de 1997 a 2000” Petrópolis/ RJ: Vozes.

- Walker, J. L. 1969. "The Diffusion of Innovations among the American States." *American Political Science Review* 63 (3):880–899.
- Volden, C. 2006. "States as Policy Laboratories: Emulating Success in the Children's Health Insurance Program." *American Journal of Political Science* 50(2):294–312.
- Walker, R. M., C. Avellaneda and F. Stokes Berry. 2011. "Explaining the diffusion of innovation types amongst high and low innovative localities: a test of the Berry and Berry model." *Public Management Review* 13(1):95–125.
- Wampler, B. and L. Avritzer. 2006. "The spread of Participatory Democracy in Brazil: From Radical Democracy to Participatory Good Government." *Journal of Latin American Urban Studies*. 7: 37-52.
- Wampler, B. 2007. *Participatory Budgeting in Brazil: Contestation, Cooperation, and Accountability*. University Park; The Pennsylvania State University Press.
- _____. 2008 "A difusão do Orçamento Participativo brasileiro: 'boas práticas devem ser promovidas?'" *Opinião Pública* 14(1):65–95.
- Warren, M. 2009 "Citizen Participation and Democratic Deficits: Considerations from the Perspective of Democratic Theory." In *Activating the Citizen; Dilemmas of Participation in Europe and Canada*. Edited by Joan DeBardeleben and Jon Pammett. Palgrave MacMillan: 17-40.
- Welch, S. and K. Thompson. 1980. "The Impact of Federal Incentives on State Policy Innovation." *American Journal of Political Science* 24:715–29.
- Wooldridge, J. M. 2010. "Econometric Analysis of Cross Section and Panel Data." MIT press, Cambridge.
- Zucco, C. 2013. "When Pay Outs Pay Off: Conditional Cash-Transfers and Voting Behavior in Brazil 2002-2010" *American Journal of Political Science* 47(3):810-822.
- Zucco, C. and T. Power. 2013. "Bolsa Família and the Shift in Lula's Electoral Base, 2002-2006" *Latin American Research Review* 48(2):3-24.

Online appendix 1: maps

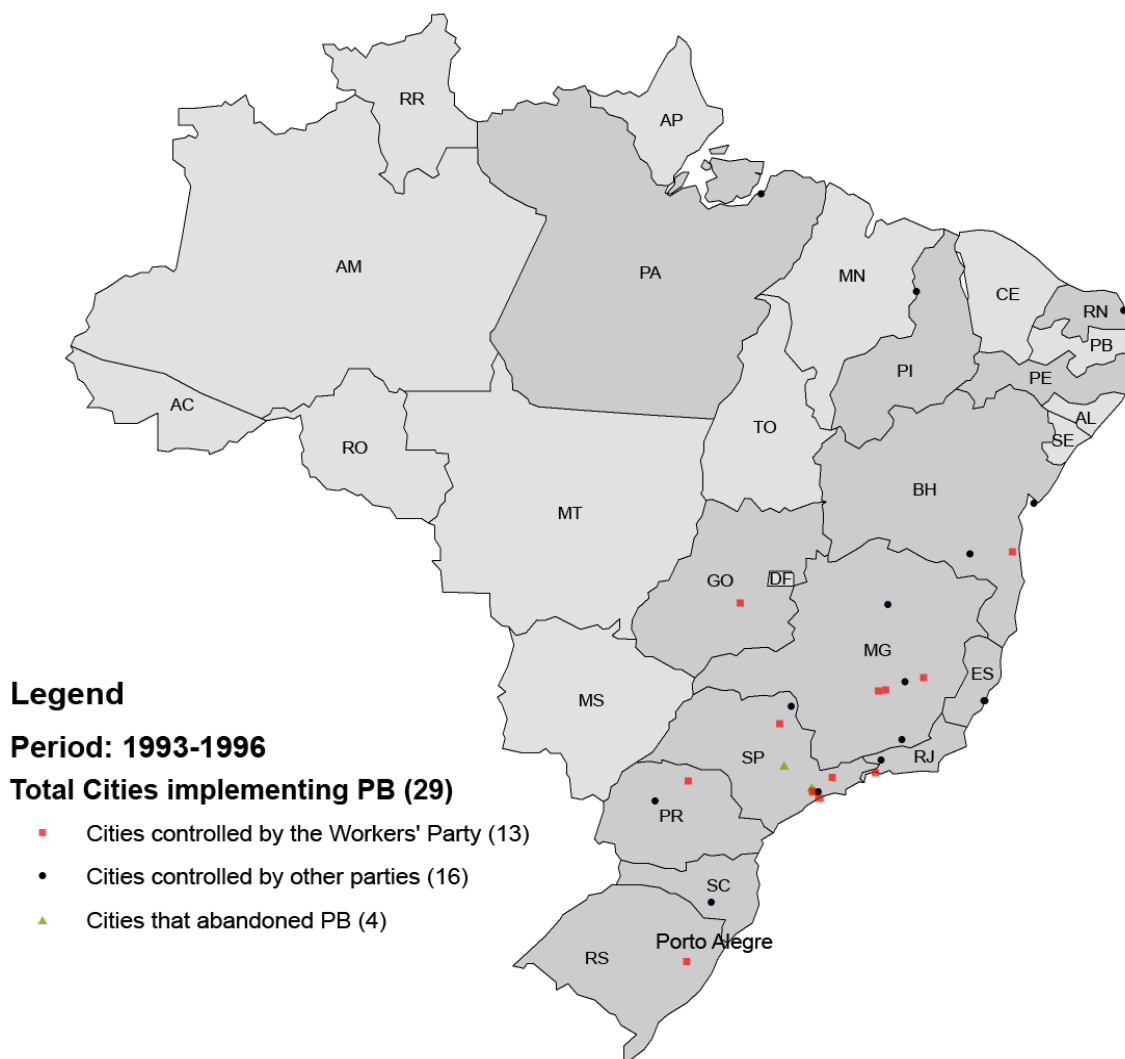
Fig: 1 Brazilian cities implementing participatory budgeting (1989-1992)



Sample: Cities with more than 50000 inhabitants in 1992 excluding Brasilia

Source: Brazilian Participatory Budgeting Census (Author 2012)

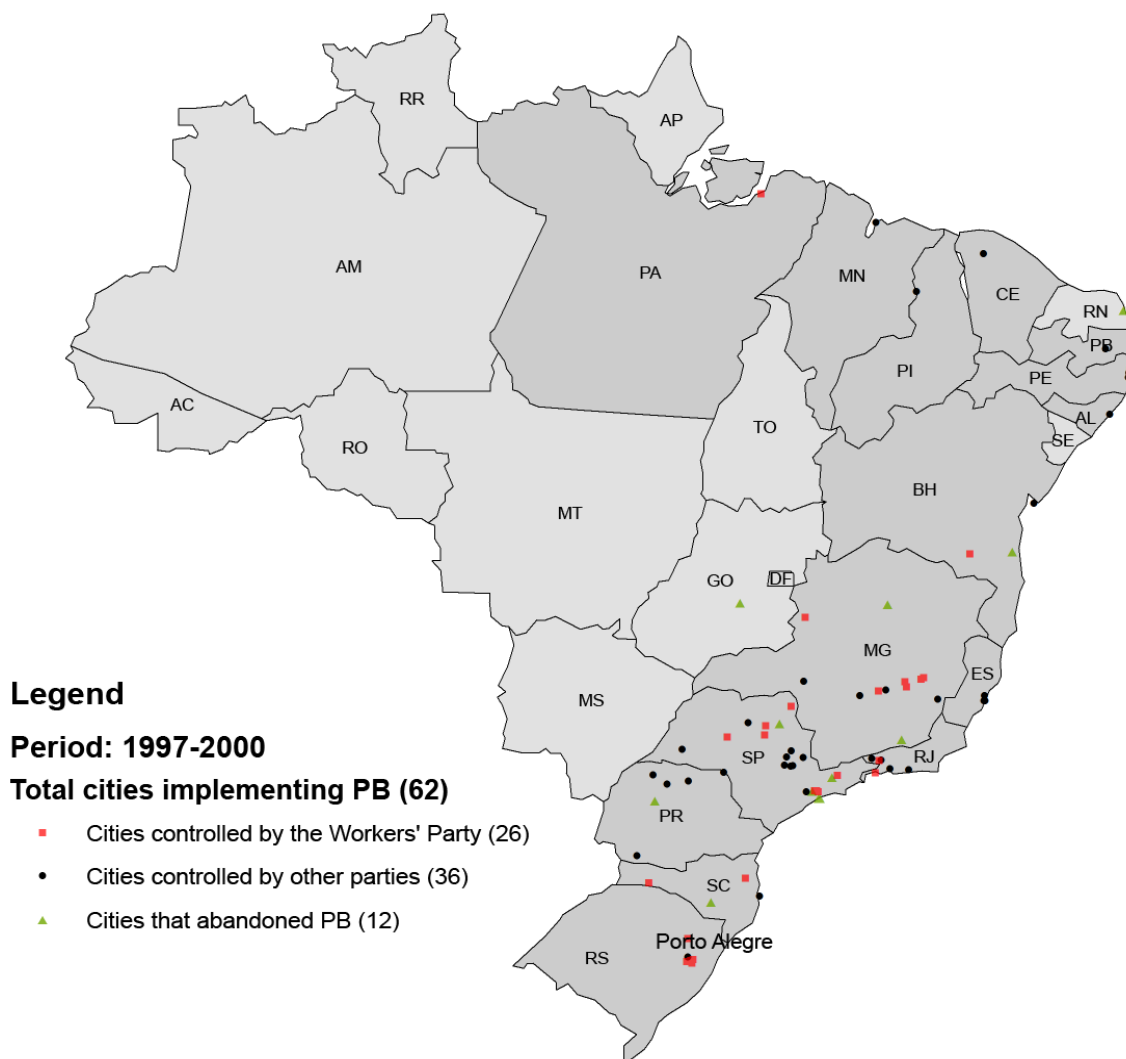
Fig: 2 Brazilian cities implementing participatory budgeting (1993-1996)



Sample: Cities with more than 50000 inhabitants in 1992 excluding Brasilia

Source: Brazilian Participatory Budgeting Census (Author 2012)

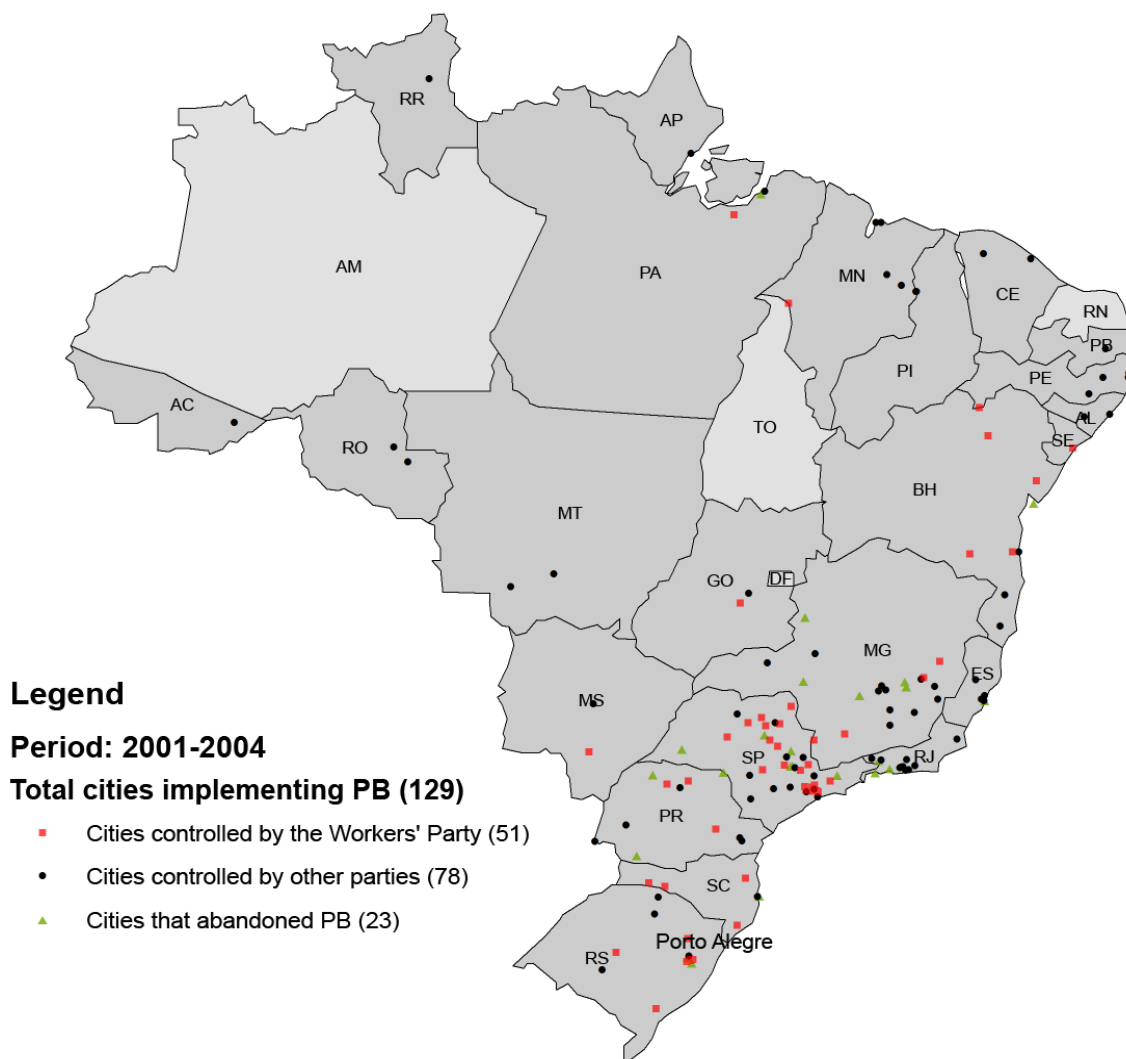
Fig: 3 Brazilian cities implementing participatory budgeting (1997-2000)



Sample: Cities with more than 50000 inhabitants in 1992 excluding Brasilia

Source: Brazilian Participatory Budgeting Census (Author 2012)

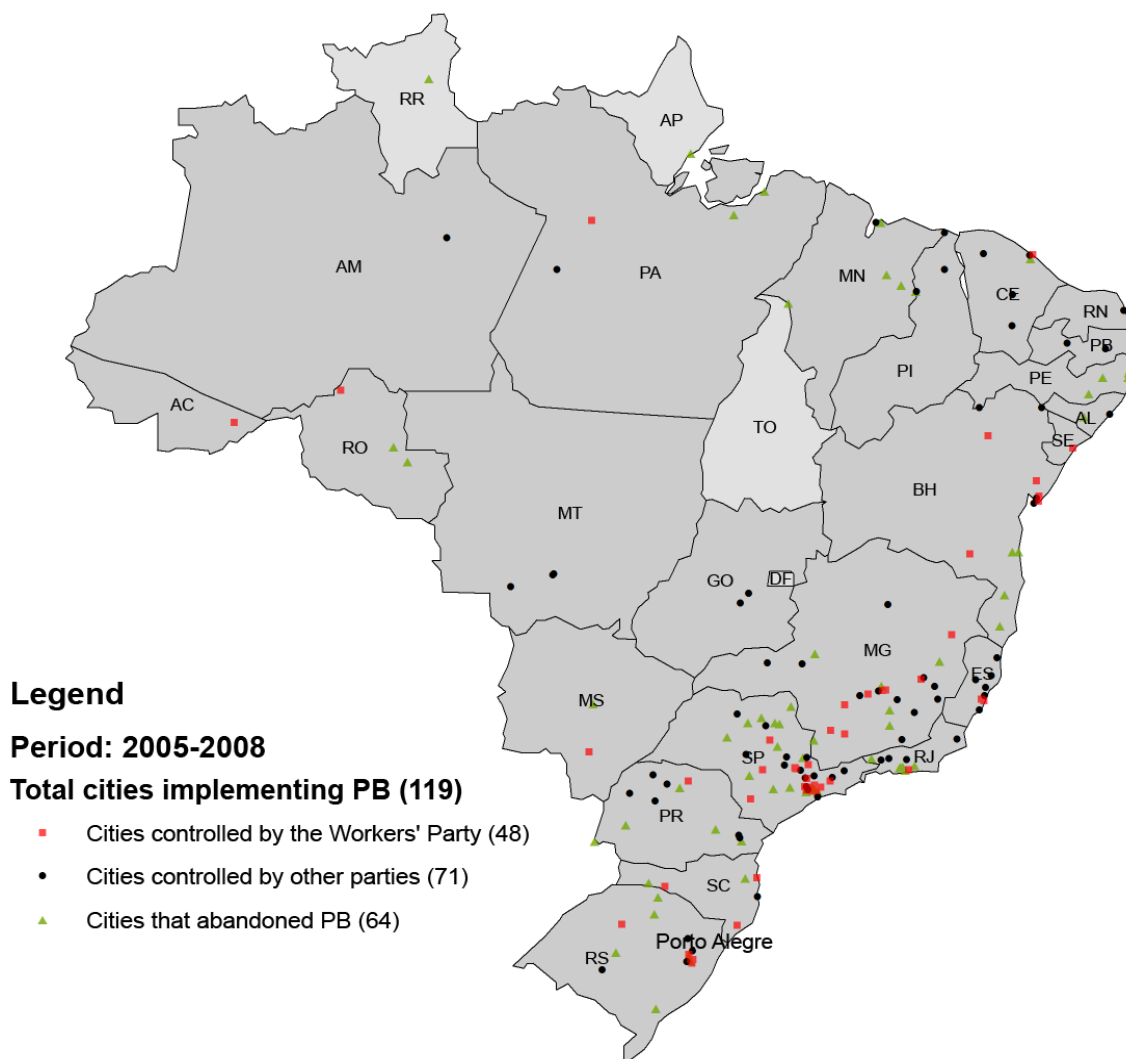
Fig: 4 Brazilian cities implementing participatory budgeting (2001-2004)



Sample: Cities with more than 50000 inhabitants in 1992 excluding Brasilia

Source: Brazilian Participatory Budgeting Census (Author 2012)

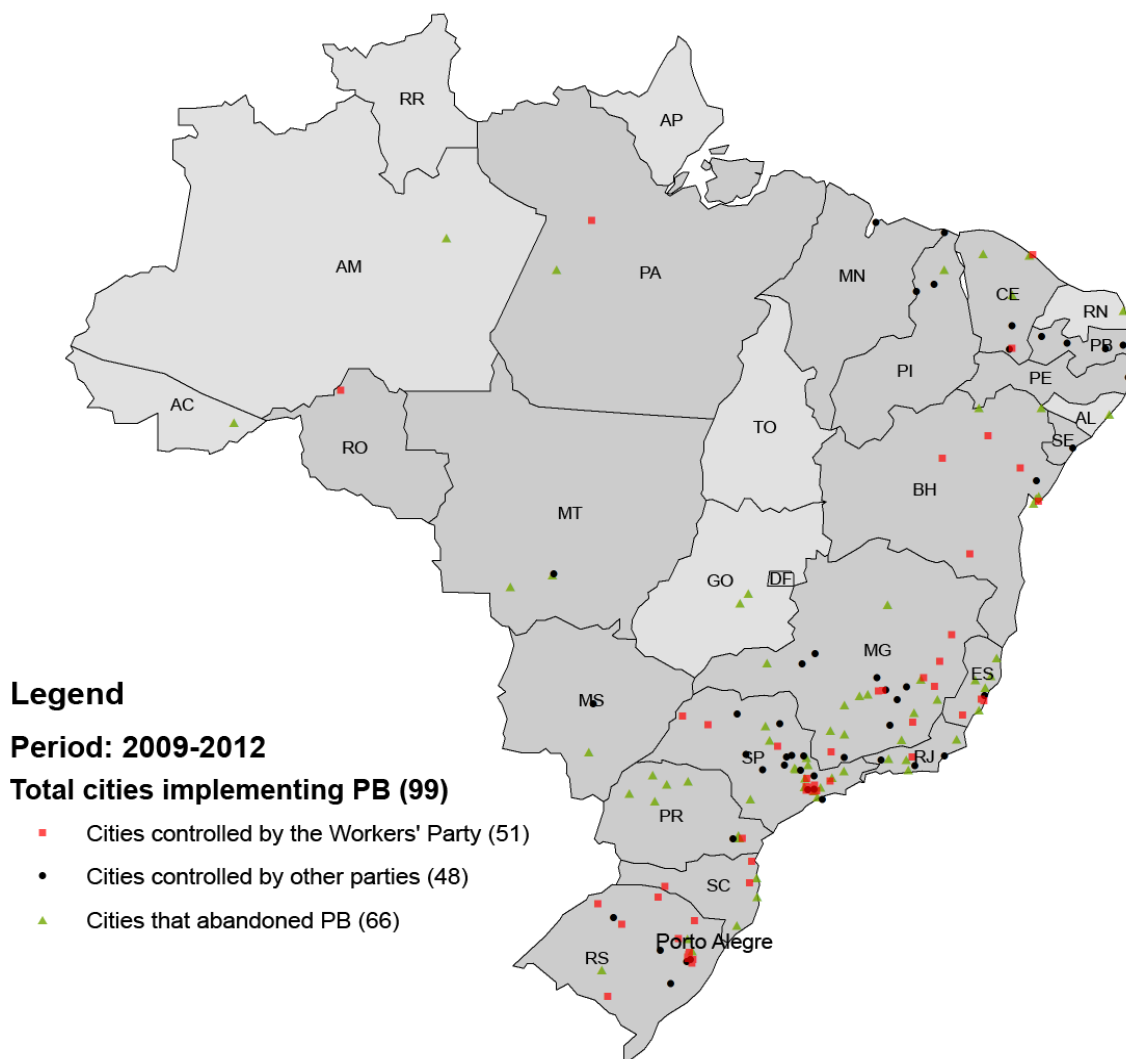
Fig: 5 Brazilian cities implementing participatory budgeting (2005-2008)



Sample: Cities with more than 50000 inhabitants in 1992 excluding Brasilia

Source: Brazilian Participatory Budgeting Census (Author 2012)

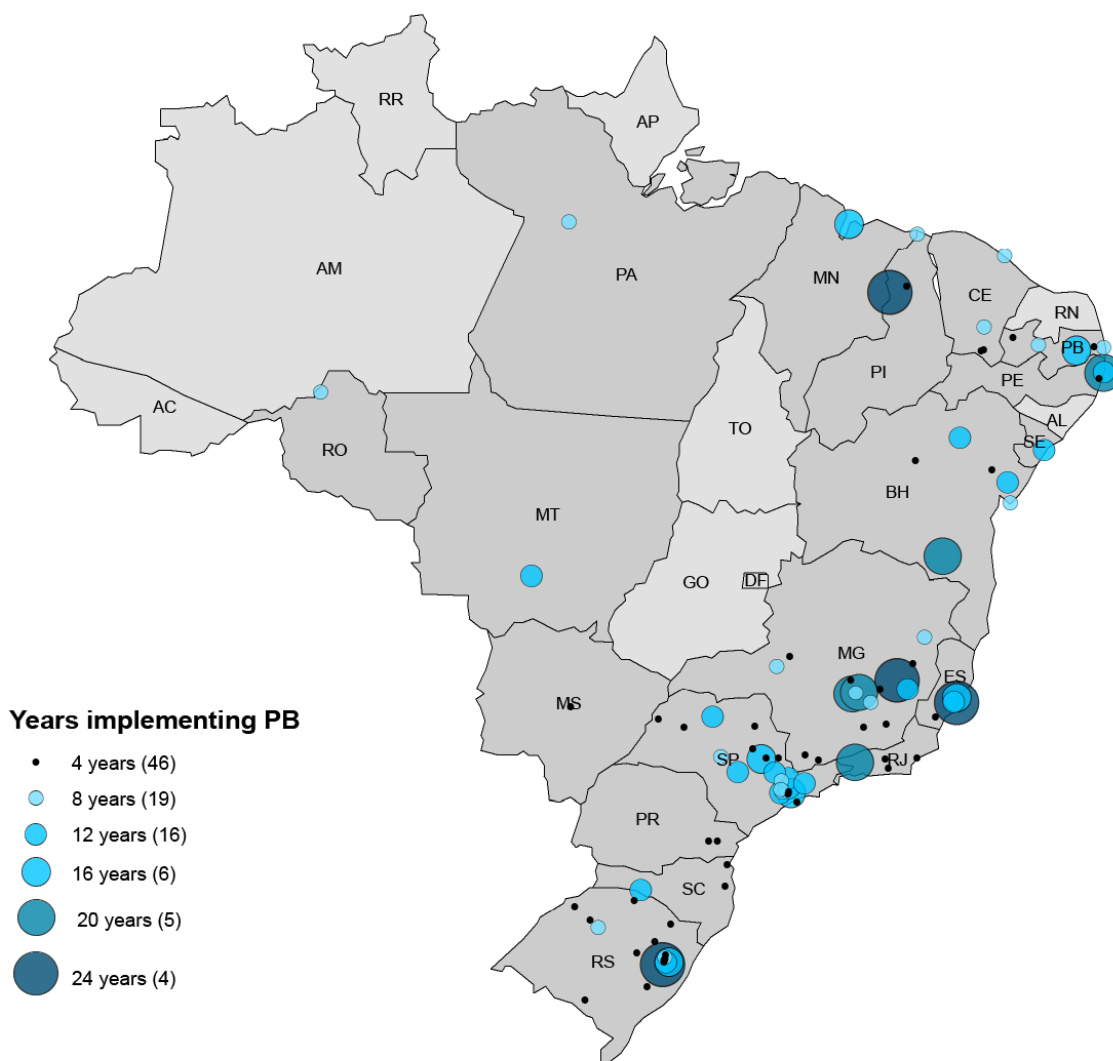
Fig: 6 Brazilian cities implementing participatory budgeting (2009-2012)



Sample: Cities with more than 50000 inhabitants in 1992 excluding Brasilia

Source: Brazilian Participatory Budgeting Census (Author 2012)

Figure 7: Age of participatory budgeting processes active in 2012



Sample: cities with more than 50000 inhabitants in 1992, excluding Brasilia.

Source: Brazilian Participatory Budgeting Census 2012 (Author 2012)

Online appendix 2: System GMM

Following the method employed by Acemoglu et al. (2008) I compare a pooled linear probability model (LPM), a fixed effect linear probability model (FE), a pooled logit (LOGIT), a Chamberlain random effect logit (CHAMBERLAIN), and a linear system GMM model (GMM). These are autoregressive models that employ a system of interactions to estimate adoption and abandonment in one equation. Another set of interactions is included to isolate pre- and post-2002 effects.²²

All models maintain the assumption that the mechanisms that drive the adoption and survival of PB are affected directly only by the previous time period. Thus the models do not consider the age of the process, nor do they differentiate between first adoption and re-adoption of a failed process. All models assume that the effect of time on adoption and continuation is identical.²³ All models include time dummies and estimate the errors adjusting for clustering at the city level.²⁴

LPM and FE models are included because they overestimate and underestimate the linear effect of the lagged dependent variable and thus they offer an important metric to gauge the specification of the GMM model (Bond 2002). If the GMM estimate of the lagged dependent variable is outside the boundaries of the OLS and FE models, the GMM model is misspecified. The non-linear models are included as robustness checks.

²² I apply these interactions only to those explanatory variables that capture the victory of the Workers' Party in the mayoral elections and to those that measure proximity. There are no theoretical reasons to assume the presence of structural breaks in the other variables and testing for the presence of a structural break in 2002 in the other explanatory variables does not detect any. These results are available upon request.

²³ Estimating two separate models, one focusing on adoption and one focusing on survival does not change the results. See online appendix.

²⁴ Introducing clustering at the state level, due to the low number of states (27), makes the Jensen statistics of the GMM estimations unreliable. However the results for the OLS, FE and Logit model are unchanged. Results are available in the replication material.

The only model that takes into account reverse causation and endogeneity effects is the system GMM model. Thus if participatory budgeting is effective in securing the vulnerability of the mayor only the GMM model is correctly specified. The GMM model assumes that all the explanatory variables in the continuation model are endogenous. The other models do not. Thus when investigating the effect of explanatory variables on continuation of the process the other models might capture the effects of PB on the explanatory variables in the previous time period.

In the Participatory Budgeting Census there are a total of six time periods (1989-1992, 1993-1996, 1997-2000, 2001-2004, 2005-2008, 2009-2012), however due to the lack of data on city council elections in 1988 and 1992 the statistical analysis does not include the first time period. Brazilian municipal elections occur in the last year of each period. Each model investigates the probability of adoption and abandonment of PB in period T as a function of variables in period T-1. The following is the linear fixed effect specification:

$$E(PB_{i;t}) = \alpha_i + \beta PB_{i;t-1} + PBN_{i;t-1} [POL_{i;t-1} \gamma + ECON_{i;t-1} \delta + \varepsilon PROX_{i;t-1}] \\ + PB_{i;t-1} [POL_{i;t-1} \zeta + ECON_{i;t-1} \eta + \theta PROX_{i;t-1}] + \iota PERIOD_t$$

where PB and PBN are dummy variables that assume value 1 if the city is implementing participatory budgeting, or not implementing it respectively. POL is a matrix containing the four political variables described in section 5 of the paper measuring vulnerability, ECON a matrix containing the two economic variables measuring availability of resources, PROX is a vector measuring geographic proximity and PERIOD is a matrix containing period dummies that capture the effect of time and α_i are city level fixed effects. The LPM model has an identical specification, but without different intercepts for each city. The logit model applies a logistic link

function to the LPM specification. The Chamberlain logit model introduces random effects, and averages of all explanatory variables as additional controls. These averages constitute a subset of all potential fixed effects. Introducing general fixed effects in non-linear dynamic panel data models results in the incidental parameter problem. For a discussion see Acemoglu et al. (2008) and Wooldridge (2010).

Following the first two hypotheses described in the paper each model also introduces a structural break that distinguishes the effects of the victory of the Partidos dos Trabalhadores and geographic proximity in the periods before and after 2002.

To facilitate the exposition of the results I begin by presenting the estimates that investigate H1 and H2 (Table 4a and 4b),²⁵ then present the estimates that investigate H3 and H4 (table 5),²⁶ and then present the remaining estimates and diagnostics (table 6). Note that table 4, 5 and 6 are all part of a single estimation procedure that includes all the explanatory variables described in the three tables.

The results shown in table 4a are very similar to the ones shown by the separate estimation methods in table 3 and support hypothesis 1. The large effect of the victory of the Workers' Party on adoption of PB declines after 2002. The amount of the decline is larger in linear specifications.

Less clear are the effect on survival, the GMM model that assumes that the adoption of PB might affect the victory of the Workers' Party shows a negative non significant effect, while all

²⁵ H1: The probability that a city government controlled by the Partidos dos Trabalhadores adopts PB should decline after the victory of the party in the presidential elections (2002). H2: After 2004 the effect of proximity on the probability of adoption of PB decreases, and the effect of proximity on the probability of abandonment of PB increases.

²⁶ H3: The availability of resources and the city's wealth are positively correlated with the adoption and survival of PB. H4: The Political vulnerability of the city government is positively correlated with the adoption and survival of PB.

the other models show large and positive effects. Similarly the results regarding the change in the effect on continuation are unclear.

Table 4b investigates the effect of geographical proximity (**H2**). The table shows negative effects of geographical proximity on adoption, both pre- and post-2002, while a positive effect on survival that becomes negative after 2002. Note that the sign of the effect has a counterintuitive meaning as explained in the paper. A negative coefficient implies that the smaller the distance from a city adopting PB — what the proximity variable measures — the higher the change of adopting, a positive coefficient the opposite. The effect on adoption is significant in the linear specifications, but not significant in the non linear ones. Almost all effect on continuation are not significant.

To get a sense of the magnitude of these effect consider that the unit of measure is approximately 100 kilometers. Thus if the distance from city A and the closest city that implemented PB declines by 500 kms, the probability that city A adopts PB increases by 3% before 2002, while after 2002 it increases by 15%²⁷. This might be a uniqueness of the Brazilian case, but certainly shows how important it is to analyze separately adoption and survival to fully understand what drives phenomena that look like policy bubbles. With regard peer-proximity no effect is detected²⁸.

Table 6 investigates H3, the effect of availability of resources and H4, the effect of political vulnerability. With respect the effect of vulnerability and resources the table shows results that are not robust to model specification. While the estimates of the effects on adoption correspond

²⁷ The magnitude of the effect increases by 2% after 2002, thus the total effect becomes 5% per each 100 km.

²⁸ Using peer-proximity (dummy=1 if a city controlled by the same party adopted PB in the previous time period) or weighted peer-proximity (dummy=number of cities controlled by the same party implementing PB in the previous time period) instead of geographic proximity does not find any significant results. Results available upon request.

to the hypotheses we postulated, the estimates of the effect on the probability of survival have ambiguous results.

With regard the effect of a change in the city government the table shows that continuity (i.e. no change in government) has a negative effect on adoption (-5%). Note that the continuity of a city government partially captures its vulnerability. Incumbent governments on average might be less vulnerable than challengers. With regard the effect of continuity on survival of PB the table identifies a positive effect that is significant in all models apart the GMM. Note that the latter model is the only one that accounts for reverse causation and isolates only the effect of continuity on PB.

Overall it is quite surprising that measures of vulnerability in the city council have no significant influence on adoption or survival of the process. While there is no evidence that city governments adopt PB to bypass the city council, there is evidence that significant opposition to the process within the city council was present in some municipalities that abandoned the process (e.g. São Paulo, Wampler 2008). There is also evidence that city council members react to the presence of PB in Porto Alegre proposing more amendments to the budget in an attempt to regain control over the resources spent in PB (Dias 2002). It is also surprising that the presence of slack resources has unclear effects on adoption or continuation.

Concluding this section table 6 presents the estimation of the intercept, lagged dependent variable, time effects and diagnostics. The Arellano-Bond test rejects the hypothesis of no first order serial correlation in the residuals of the GMM model, and accepts the hypothesis of no second order serial correlation. The Sargan and Hansen tests accept the null hypotheses. The estimate of the coefficient of the lagged dependent variable of the GMM model lies in between the estimate of the LPM and the FE models. Thus the GMM model is correctly specified. Varying the lag

structure generates different results most of which fail the Sargan and Hansen tests or present an estimate of the lagged dependent variable that is outside the bounds of the LPM and the FE models estimates.

As expected, the time effect on the period 2001-2004 is positive and strongly significant in all specifications. The other time effects are smaller and not significant. The intercept is positive in the linear models, but not significant.

All models have a low fit that suggests caution in interpreting the results in a causal manner. The larger fit of the Chamberlain model should be judged cautiously because this model has twice the number of regressors of the other specifications by construction.

Overall these robustness check confirm H1 and show that the results on vulnerability of the mayor, on Mayor's share of council seats and the result on tax share of revenues displayed by table 3 are potentially affected by endogenous relations and thus should be evaluated with extra care.

Table 4A: Testing the influence of the Workers' Party (H1)

Period 1997 to 2012					
	Pooled OLS	FE	Pooled Logit	Chamberlein Logit, RE	System GMM
Probability of Adoption					
Victory of the PT before 2002	0.73*** (0.04)	0.62*** (0.05)	0.66*** (0.05)	0.62*** (0.07)	0.72*** (0.05)
Change in effect after 2002	-0.29*** (0.07)	-0.10 (0.07)	-0.12*** (0.03)	-0.03 (0.05)	-0.23** (0.07)
Probability of Survival					
Victory of the PT	0.49*** (0.07)	0.54 (0.08)	0.52*** (0.14)	0.58*** (0.15)	-0.04 (0.25)
Change in effect after 2002	-0.21** (0.08)	-0.16 (0.11)	-0.13*** (0.04)	-0.12*** (0.04)	0.08 (0.22)

Table 4B: Testing the influence of geographical proximity (H2)

Probability of Adoption					
Proximity before 2002	-0.01* (0.004)	-0.02*** (0.01)	-0.02 (0.01)	-0.02 (0.01)	-0.01** (0.004)
Change in effect after 2002	-0.03** (0.01)	-0.03*** (0.01)	-0.02 (0.02)	-0.001 (0.02)	-0.02* (0.01)
Probability of Survival					
Minimum Distance	0.04 (0.04)	0.07 (0.05)	0.02 (0.03)	0.05 (0.03)	0.01 (0.12)
Change in effect after 2002	-0.06 (0.05)	-0.08 (0.05)	-0.03 (0.03)	-0.07** (0.03)	-0.01 (0.12)

Notes: the sample spans 5 time periods 1993-1996, 1997-2000, 2001-2004, 2005-2008, 2009-2012 and is comprised by 468 cities with a population larger than 50000 (base year 1992). This table presents a subset of the estimates, see table 6 and 7 for the rest. Brasilia is excluded. The table shows only a subset of coefficient estimates All the explanatory variables are lagged. Each model included time effects for periods 4, 5 and 6. The logit coefficients represent average marginal effects. In the Chamberlain Logit model the marginal effect of the coefficients are estimated assuming that the intercept is equal to zero. In the GMM model all adoption variables are considered as predetermined, all continuation variables as endogenous, time effects as exogenous. The GMM model employs a two-step procedure and an orthogonal transformation. All models present robust standard errors that are clustered at the city level. The GMM models utilizes Windmeijer (2005) finite sample correction for standard errors. Standard errors are in parentheses. *, ** and *** denote significance at the 10%-, 5%- and 1%-levels, respectively.

Table 5: Testing the effect of availability of resources (H3) and political vulnerability (H4)

Period 1996 to 2012					
Probability of Adoption	Pooled OLS	FE	Logit	Chamberlein Logit, RE	System GMM
Tax share of revenues	0.52*** (0.11)	0.08 (0.31)	0.49*** (0.10)	0.12 (0.23)	0.78** (0.20)
Financial viability index	-0.14 (0.09)	-0.16 (0.10)	-0.13 (0.10)	-0.05 (0.08)	-0.14 (0.16)
City government continuity	-0.05*** (0.02)	-0.07*** (0.02)	-0.05** (0.02)	-0.06*** (0.02)	-0.05** (0.02)
Mayor's vulnerability	0.05 (0.04)	0.11** (0.05)	0.05 (0.05)	0.09** (0.04)	0.06 (0.06)
Mayor controls the council	-0.01 (0.02)	-0.004 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.02 (0.03)
Mayor's share of council seats	-0.12 (0.07)	-0.01 (0.09)	-0.15 (0.09)	-0.002 (0.10)	-0.12 (0.13)
Probability of Survival					
Tax share of revenues	0.52 (0.32)	0.47 (0.45)	0.30 (0.19)	0.34 (0.31)	1.90*** (0.64)
Financial viability index	-0.31 (0.23)	-0.16 (0.24)	-0.16 (0.15)	0.04 (0.16)	-0.15 (0.41)
City government continuity	0.19*** (0.06)	0.14*** (0.07)	0.12** (0.05)	0.09* (0.05)	0.27 (0.17)
Mayor's vulnerability	-0.27** (0.12)	0.03 (0.13)	-0.15** (0.07)	-0.05 (0.08)	0.44 (0.34)
Mayor controls the city council	-0.01 (0.06)	-0.06 (0.06)	-0.002 (0.03)	-0.01 (0.04)	-0.29 (0.21)
Mayor's share of council seats	-0.31 (0.31)	-0.05 (0.34)	-0.18 (0.17)	-0.24 (0.21)	0.45 (0.96)

Notes: the sample spans 5 time periods 1993-1996, 1997-2000, 2001-2004, 2005-2008, 2009-2012 and is comprised by 468 cities with a population larger than 50000 (base year 1992). This table presents a subset of the estimates, see table 5 and 7 for the rest. Brasilia is excluded. The table shows only a subset of coefficient estimates All the explanatory variables are lagged. Each model included time effects for periods 4, 5 and 6. The logit coefficients represent average marginal effects. In the Chamberlain Logit model the marginal effect of the coefficients are estimated assuming that the intercept is equal to zero. In the GMM model all adoption variables are considered as predetermined, all continuation variables as endogenous, time effects as exogenous. The GMM model employs a two-step procedure and an orthogonal transformation. All models present robust standard errors that are clustered at the city level. The GMM models utilizes Windmeijer (2005) finite sample correction for standard errors. Standard errors are in parentheses. *, ** and *** denote significance at the 10%-, 5%- and 1%-levels, respectively.

Table 6: intercepts, lagged dependent variable, time effects and diagnostics

Period 1996-2012. Dep. var.: implementation of PB					
	Pooled OLS	FE	Logit	Chamberlain Logit, RE	System GMM
Intercept	0.17 (0.11)	0.24 (0.13)	NA	NA	0.12 (0.20)
lagged dependent variable	0.55** (0.24)	-0.25 (0.25)	0.43* (0.24)	-0.12 (0.09)	-0.13 (0.54)
Period 3 (1996-2000)	baseline	Baseline	baseline	Baseline	Baseline
Period4 (2001-2004)	0.07*** (0.02)	0.10*** (0.02)	0.09*** (0.03)	0.08** (0.03)	0.08*** (0.03)
Period5 (2005-2008)	0.03 (0.04)	0.09** (0.05)	0.04 (0.05)	0.09* (0.05)	0.04 (0.07)
Period 6 (2009-2012)	0.01 (0.03)	0.07** (0.03)	0.01 (0.04)	0.04 (0.04)	0.03 (0.04)
Number of observations	1834	1834	1834	1834	1834
Number of clusters	468	468	468	468	468
Missing values	38	38	38	38	38
R-squared	0.34	0.19			
Root MSE	0.34				
R-squared within		0.26			
R-squared between		0.11			
Pseudo R-squared			0.30		
Corr(observed;predicted)^2				0.52	0.26
Number of instruments					110
Arellano-Bond test for AR(1) in first differences <i>H0: There is no first-order serial correlation in residuals</i>					z = -8.81 Pr > z = 0.000
Arellano-Bond test for AR(2) in first differences <i>H0: There is no second-order serial correlation in residuals</i>					z = 0.75 Pr > z = 0.455
Sargan test of overidentifying restrictions <i>H0: Model specification is correct and all overidentifying restrictions are exogenous</i>					chi2(85) = 101.96 Prob > chi2 = 0.101
Hansen test of overidentifying restrictions <i>H0: Model specification is correct and all overidentifying restrictions are exogenous</i>					chi2(85) = 82.90 Prob > chi2 = 0.544
Hansen test excluding SGMM instruments (i.e. the differenced instruments) <i>H0: GMM differenced- instruments are exogenous</i>					chi2(43) = 31.48 Prob > chi2 = 0.903
Difference-in-Hansen tests of exogeneity of GMM instrument subsets: <i>H0: system-GMM instruments are exogenous and they increase Hansen J-test</i>					chi2(42) = 51.42 Prob > chi2 = 0.151
Difference-in-Hansen tests of exogeneity of IV instrument subsets: <i>H0: GMM instruments without IV instruments are exogenous</i>					chi2(82) = 80.30 Prob > chi2 = 0.533
Difference-in-Hansen tests of exogeneity of standard IV instrument subsets: <i>H0: IV instruments are exogenous</i>					chi2(3) = 2.61 Prob > chi2 = 0.456

Notes: the sample spans 5 time periods 1993-1996, 1997-2000, 2001-2004, 2005-2008, 2009-2012 and is comprised by 468 cities with a population larger than 50000 (base year 1992). This table presents a subset of the estimates, see table 5 and 6 for the rest. Brasilia is excluded. The table shows only a subset of coefficient estimates All the explanatory variables are lagged. Each model included time effects for periods 4, 5 and 6. The logit coefficients represent average marginal effects. In the Chamberlain Logit model the marginal effect of the coefficients are estimated assuming that the intercept is equal to zero. In the GMM model all adoption variables are considered as predetermined, all continuation variables as endogenous, time effects as exogenous. The GMM model employs a two-step procedure and an orthogonal transformation. All models present robust standard errors that are clustered at the city level. The GMM models utilizes Windmeijer (2005) finite sample correction for standard errors. Standard errors are in parentheses. *, ** and *** denote significance at the 10%-, 5%- and 1%-levels, respectively.