Improving Social Well-Being Through New Democratic Institutions

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Article

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Abstract

We evaluate the role of a new type of democratic institution, participatory budgeting (PB), for improving citizens' well-being. Participatory institutions are said to enhance governance, citizens' empowerment, and the quality of democracy, creating a virtuous cycle to improve the poor's well-being. Drawing from an original database of Brazil's largest cities over the last 20 years, we assess whether adopting PB programs influences several indicators of well-being inputs, processes, and outcomes. We find PB programs are strongly associated with increases in health care spending, increases in civil society organizations, and decreases in infant mortality rates. This connection strengthens dramatically as PB programs remain in place over longer time frames. Furthermore, PB's connection to well-being strengthens in the hand of mayors from the nationally powerful, ideologically and electorally motivated Workers' Party. Our argument directly addresses debates on democracy and well-being and has powerful implications for participation, governance, and economic development.

Keywords

participation, governance, democracy, poverty reduction, institutional reform, subnational

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Popular mobilization under authoritarian and democratic regimes reminds us that people across the world view democratization as a means to improve the quality of their lives. Democracy, it is often hoped, will produce improvements in state performance, alter government spending patterns to allocate resources more efficiently and more justly, and, finally, improve the quality of public life. Advocates often oversell the potential effects of democratization to induce ordinary citizens to struggle against authoritarian regimes. To sustain new democracies, advocates continue to promote the positive effects that are, surely, just around the corner.

Over the past 20 years, democratic reformers have taken advantage of political opportunities offered by new democratic regimes to create a series of new democratic institutions that directly incorporate citizens and public officials into incremental policy-making venues. These subnational policy innovations deserve our attention because local governments have engaged in extensive institutional experimentation in the hopes that local-level reforms would generate meaningful change. This article draws from a unique data set on one specific democratic institutional innovation, participatory budgeting (PB), to address the following question: Is the adoption of a new democratic institution associated with changes in government spending, the organization of civil society and well-being? The data set is drawn from Brazil, a middle-income developing country that returned to democratic rule in the mid-1980s.

Scholars have shown how variation in national-level rules and institutions of democratic regimes such as electoral systems, separate versus unitary powers, and federalism produces considerable variation in policy and political outcomes (Diamond, 1999; Karl & Schmitter, 1991; North, 1990). Based on this logic, one would expect that institutional innovations adopted by local governments in the "Third Wave" of democratization would also significantly affect change (Huntington, 1991). Riding the Third Wave, advocates of decentralization and participatory governance helped to launch a broad spectrum of political reforms—devolving authority to states, provinces, and municipalities; incorporating citizens directly into policy-making venues; and creating new oversight and transparency mechanisms (Campbell, 2003; de Sousa Santos, 2005; Eaton, 2004).

Institutional innovations notwithstanding, researchers stand on weaker empirical and theoretical grounds when we consider the extent to which subnational democratic institutions have been shown to produce significant social and political outcomes. Researchers have documented considerable subnational variation within democratic regimes and continue to debate the effects of culture, economics, state formation, and civil society (Cleary, 2010; Eaton, 2004; Key, 1964; Putnam, Leonardi, & Nanetti, 1993; Snyder, 2001).

Our purpose in this article is to assess how the adoption of a new democratic institution by some Brazilian municipalities might produce significantly different outcomes from municipalities that did not adopt a similar program.

Our article has four key findings. First, when municipal governments adopt PB, there is an associated increase in spending by the municipal government on health care and sanitation, two public goods desperately needed by poor Brazilians. Second, adopting PB is associated with an increase in the number of civil society organizations (CSOs). PB's rules create specific incentives for citizens to participate in ongoing policy-making processes and to mobilize themselves into associations. This finding taps into Putnam's "social capital," suggesting subnational democratic institutions can be used to reward the development of CSOs, which are a vital part of democratic practices (de Tocqueville, 1969; Putnam et al., 1993).

Third, we find a reduction in infant mortality in municipalities that adopt PB. Again, this is a public health problem that more dramatically affects the poor than middle- and upper-income groups. This finding is linked to the first because increases in spending on health programs and sanitation are associated with decreases in infant mortality, thus improving well-being. Finally, an increase in the number of years that PB operates and the political party in charge of the municipal government produce more robust results. This implies that PB is associated with a broader, structural set of changes; new patterns of governance, state–society relations, and empowerment are initiated, thus producing more durable change. Having PB by itself generates improvements over those municipalities without PB. However, having a mayor from the political party most closely associated with PB *and* PB generates even stronger outcomes.

We argue there are three facets of PB programs that are likely to induce governments to spend more on social goods, enhance civil society mobilization, and generate improvements in well-being. Some municipalities may use all three pathways, while others just one. We do not have the evidence to establish the pathways for each case and likely additional pathways not covered in the data would also contribute to improving well-being. However, we identify the three most important aspects of PB that influence well-being.

First, governments adopting PB produce new forms of governance, which are based on the direct incorporation of citizens and CSOs into incremental policy-making processes. This requires reforming how the local state (municipality) is organized internally as well as broadening the surface area of the state through an increase in public venues and access points (Heller & Evans, 2010). This eases the burden of sharing information and also allows CSO leaders and citizens to send signals (policy preferences) to public officials. Some of these signals are sent directly through citizens' vote but other signals

are derived from deliberation, mobilization, and informal conversations. The evidence presented in this article shows that the adoption of these institutions produces short-term change but, importantly, the effect becomes stronger over time, which indicates the institutionalization of new forms of governance.

Second, PB programs are designed to allocate greater levels of resources to poor, underserviced neighborhoods as well as to increase spending on social services aimed at the poor. PB programs often include a preferential bias for the poor to overcome the bias of representative democracy in favor of middle- and upper-class groups (Schattschneider, 1960; Schlozman, Verba, & Brady, 2012). Beyond the rules that promote a preferential bias for the poor, elected governments adopting PB often come to power by constructing a broader political alliance in support of changing basic policy and political interests (Baiocchi, Heller, & Silva, 2011; Heller, 2012; Pateman, 2012).

Finally, the direct incorporation of citizens into PB is designed to empower participants to make public goods decisions and to engage in oversight of state services (PB as "school of democracy"; see Baiocchi, 2005). More robust participation is designed to produce more engaged and knowledgeable citizens who are better able to hold public servants accountable. Citizens and CSOs thus gain the technical skills and political knowledge that allows them to be engaged at multiple stages of the policy and budgetary processes; these groups can more actively formulate policy and oversee politics.

Theoretical Discussion

In "Is Democracy Good for the Poor?" Michael Ross (2006) argues, "Social scientists know surprisingly little about what types of government tend to improve the welfare of the poor . . . Where poverty is truly severe—in the developing world—our understanding of government's role is much weaker" (p. 871). Furthermore, Ross (2006) argues democracy produces "few if any improvements" in material well-being for impoverished people (p. 872). Ross (2006) also argues middle-class groups benefit more under democratic regimes:

> If democracies spend more money on social services generally, and health care particularly, why does this have so little effect on infant and child mortality rates? A simple model suggests governments can only lower infant mortality rates when they target low-income households. (p. 868)

Ross identifies a key problem plaguing representative democracy: Poor citizens face relatively greater organizational hurdles and can call on fewer political networks to secure public goods than rich citizens.

We agree with Ross's (and Schattschneider's) basic premise that representative democracy can have a middle- and upper-class bias but the drawback to Ross's argument is that his explanatory variable is rather blunt: Democracy or no Democracy. This approach misses the development of democratic practices under authoritarian regimes while also ignoring the great internal variation of democratic regimes and their adoption of participatory institutions in the third wave (Dagnino, Olivera, & Panfichi, 2006; de Sousa Santos, 2005; Elkins, 2000). It also omits the wide variety of democratic approaches to improving citizens' welfare (Castles, 2009; Esping-Andersen, 1990; Huber & Stephens, 2001; Huber, Stephens, & Mustillo, 2008; Jensen, 2009).

Nobel Laureate economist Amartya Sen argues expanding human capabilities offers the greatest promise for producing broad social development. Sen recognizes that human capabilities can develop under authoritarian regimes, but that new democratic institutions provide a broader number of opportunities to improve human capabilities and produce broad social development. At the broadest level, we argue the adoption of new subnational democratic institutions, which are explicitly designed to overcome the middle- and upper-class bias of representative democracy, help to increase human capabilities, and mitigate representative democracy's pro-wealthy bias. By enhancing human capabilities, there is the potential to generate a virtuous cycle that allows citizens to pressure public officials to use public resources more efficiently and justly.

PB: A New Democratic Institution

Brazil's experience with PB, starting with the now famous case of Porto Alegre, is frequently put forth as a model for participatory governance (Abers, 2000; Avritzer, 2002; Baiocchi, 2005). PB is an institution that emerged from direct negotiations between government officials and civil society leaders, as they sought to produce practical solutions to pressing needs (Avritzer, 2002). CSOs and politicians focused extensive attention on municipal budgets because Brazil's federal system provides municipalities with nearly 15% of all public spending (Montero & Samuels, 2004). Brazilian mayors in turn have the autonomy to initiate new programs with minimal interference from municipal legislatures (Wampler, 2007). These programs then complement existing legal and political responsibilities of mayors and municipal legislators.

Several interwoven threads of analysis explain why an elected mayor in Brazil would delegate authority to citizens. First, the popular Workers' Party (PT), founded in 1980 during a slow transition to democratic rule, was built on increased union and social movement mobilization (Keck, 1992; Samuels,

2004). When the PT elected mayors in major cities in 1988, they sought the "inversion of priorities," and the "democratization of democracy." From an electoral standpoint, they adopted PB as a means to (a) incorporate the existing political base into policy making, (b) expand the electoral base of the party by incorporating the poor (the PT base was initially in middle class, unionized sectors, and organized civil society and did not include the poor), and (c) brand the party as "participatory, inclusive, and pro-poor" (Wampler, 2007). Thus, mayors willing to adopt an experimental democratic institution were political and policy entrepreneurs seeking to upend the status quo.

PB in Brazil is a yearlong decision-making process through which citizens exercise *voice* and *vote*—They negotiate among themselves and with government officials in annual or bi-annual meetings over the allocation of new capital investment spending on public work projects, such as health care clinics, schools, and street paving. These capital spending projects range from 10% to 100% of all capital spending and upward of 15% of the overall budget (Wampler, 2007; Wampler & Avritzer, 2005). The presence of voice in PB is similar to democratic consultations that have been long used by local governments. The presence of vote is an important innovation because it helps citizens overcome the collective action problem—Citizens are mobilized to vote for specific projects, which then induces them to maintain pressure on government officials. This, in turn, increases the likelihood of government action to implement citizen-participants' policy selections.

Many PB programs adopt a "quality of life index," which allocates greater resources on a per capita basis to poorer neighborhoods (Wampler, 2007, 2012). This creates a preferential bias in favor of the poor, thereby encouraging poor citizens to participate. It is also designed to encourage greater spending on the types of policy problems that most strongly affect poor neighborhoods (e.g., access to public health care and public housing, building basic infrastructure). Research on PB in Brazil has demonstrated that broad majorities of participants and elected PB delegates have low income, low levels of education, and are often women (Abers, 2000; Avritzer, 2009; Baiocchi, 2005; Nylen, 2003; Wampler, 2007), thus confirming that PB rules have successfully expanded public venues to include poor and traditionally excluded sectors.

At the broadest level, Avritzer (2002, 2009) argues PB helps to expand the public sphere as the deliberative forums enable new actors to place a broader range of issues on the public agenda. Evidence from Porto Alegre indicates that PB can help to serve as "schools of democracy" (Baiocchi, 2005), thereby empowering citizens. Marquetti's research in Porto Alegre's PB program and Wampler's (2012) research on Belo Horizonte's PB program found that both programs spent a greater level of resources in poor communities than they

spent in middle- and upper-income communities. Goldfrank (2011) found that PB generates significant administrative reforms, thus allowing the government to better share power with the newly incorporated citizens. Finally, Baiocchi et al. (2011) use a paired case comparison showing that cities with PB produce more significant social change than those without PB.

An Ideal Scenario: Using PB to Reduce Infant Morality

The following represents an ideal pathway of how PB might improve one aspect of well-being, infant mortality. First, a reform-minded government is elected to the mayor's office with the intent of allocating increased resources to poor, underserviced communities. The base of the new governing coalition often includes a broad collection of social movements, community-based movements, unions, university students, and the progressive middle classes (Heller, 2012). Second, the newly elected government and its civil society allies initiate a PB program that allows citizens to rank order their general policy priorities and also select specific policy projects. A community might organize itself around health care, seeking funding for a local health care center, or reform/updating of existing facilities. Within the municipal administration, government officials would use public resources and state authority to implement different types of projects (or in underserviced neighborhoods), reorganize the administrative structure of the local state, and retrain public health personnel who work closely with the citizens as they assess the validity of health care–related projects.

Thus, there are a series of mechanisms allowing the government and participants to exchange information and signals. Citizens and CSO leaders negotiate with each other and with public officials regarding what types of projects should be implemented; citizens become invested in the process as well as the specific policy outcomes. When communities "win" a health care clinic or new sanitation project, they become heavily invested in monitoring the drafting of the plans, the timing and location of the project, the resources to spend on it, and, importantly, its implementation. The direct participation and the close interactions among citizens, CSO leaders, and government officials then creates a virtuous circle of additional spending, improved service delivery, and better outcomes in the next funding cycle.

The scholarship on PB allows us to develop several hypotheses surrounding its connections with well-being. Our null hypothesis is PB has no impact on well-being in any area. Our first alternate hypothesis is PB has a positive influence on well-being. Our second alternate hypothesis is PB strengthens

its positive influence as it becomes established in a municipality over a longer period of time. Finally, our third alternate hypothesis is PB has a strong positive influence on well-being if it is a favored policy of the mayor's party in a municipality. A discussion of how we operationalize our variables and construct models to test our hypotheses follows below.

Data and Analysis

Single-case studies or small-*N* comparative analyses of Brazil comprise the vast majority of research on PB programs (Abers, 2000; Avritzer, 2002, 2009; Wampler, 2007). PB is spreading around the world at a rapid pace, but it was created in Brazil and Brazilian municipalities, thus feature the longest running programs. Furthermore, Brazil is where PB programs potentially impact the greatest number of people—hundreds of municipalities ranging in size from São Paulo, with 10 million people, to municipalities with only a few thousand inhabitants experimented with some form of PB over the last 20 years (Wampler & Avritzer, 2004, 2005).[1] The maturation of the field has recently seen the production of new research approaches that have expanded our knowledge. For example, Maureen Donaghy (2011) uses data drawn from a different type of participatory institution in Brazil, municipal housing councils. She finds municipalities that voluntarily adopt a housing council are more likely to also adopt federally supported programs to provide housing to the poor. The implication of her study is that the presence of these federal policy programs will produce improvements in social well-being because more individuals will have access to decent housing. However, Donaghy does not provide the necessary data that would allow her to show this link definitively because she is unable to draw upon data that measure improvements in social well-being.

Boulding and Wampler (2010) used a research methodology similar to the current case. They argue, "Our empirical tests demonstrate participatory budgeting programs have not produced dramatic improvements in social well-being anticipated by their founders or current advocates, although small gains in combating the worst poverty are associated with PB" (Boulding & Wampler, 2010, p. 9). Boulding and Wampler's drew from a database that covered the 1991-2000 period. The research methodology in this current article moves beyond some of the limitations of the Boulding and Wampler piece by constructing an original database of all Brazilian municipalities with at least 100,000 residents ($N = 253$) from 1989 to 2008 to evaluate the effects of PB programs on spending priorities, civil society, and indicators of well-being.

We select municipalities with 100,000+ residents because they are representative of the average Brazilian citizen's experience with governance. By 2010, 85% of Brazil's population lived in urban areas and with most of this 85% also living in cities with more than 100,000 residents (United Nations [UN], 2011). Furthermore, the large urban municipalities we study in Brazil are increasingly representative of cities in other developing countries due to continued increases in global urbanization rates (UN, 2011). We acknowledge the distinct possibility the 253 most populous, urbanized municipalities are not representative of the remaining 5,250 Brazilian municipalities. However, these omitted municipalities are physically large and sparsely populated in most cases. They do not represent the average Brazilian's experience and are therefore of less interest for our purposes.

The Brazilian state's extensive data collection efforts at the local level now allow scholars to explore the potential impact PB programs have on a wide variety of areas that cannot be evaluated in other countries due to a lack of data. Brazilian cities were the first to use PB and its use is now widespread in the country. It renders Brazil the best case in which to evaluate whether PB has any impact on well-being both over time and across space—all while controlling for national-level differences such as regime type or political institutions. We construct a data set with 5,060 municipal-year observations: a considerable advance in coverage over previous studies (Boulding & Wampler, 2010, World Bank, 2008).

Second, we control for a number of other factors missing from the World Bank (2008) models, including size of the municipality, overall level of development, the municipality's region, and most importantly the influence of the PT on the Mayoral administration, which may determine which municipalities adopt PB in the first place. The result is a data set that provides the greatest coverage of PB in Brazil as well as a model that takes advantage of the rich variation in outcomes over time and across space. These advances in data collection move us beyond previous efforts to evaluate PB's potential connections to well-being in Brazil. We discuss our construction of models to test hypotheses surrounding PB and well-being below.

Our Methodological Strategy

We first evaluate the effect of adopting PB programs on social spending priorities such as health care, education, and public housing that might improve well-being. This assessment covers whether adopting PB alters municipal spending *inputs*. We believe increases in spending to be necessary, but not sufficient to improve well-being at the municipal level. We then explore the *process* by which PB might connect available resources from the local budget

to improved outcomes. Specifically, we test whether PB increases the number of CSOs present in a municipality. CSOs may be critical ligatures connecting state and society through participatory institutions.

Finally, we test whether PB alters *outcomes* associated with well-being (i.e., infant mortality rates). We choose to evaluate PB through the entire policy process in the context of health care. The health care issue area offers a fair test of hypotheses surrounding PB for several reasons. First, health care outcomes can change rapidly in the face of institutional arrangements and new resources. The 1988 Constitution formally established a universal health care system and decentralized it to the municipal level such that municipalities are responsible for the provision of basic health care services. We should note that all municipalities are required to incorporate citizens into public policy management councils (*conselhos*) that have policy formulation and oversight responsibilities. It would be ideal to establish a connection between the health care councils and health outcomes, but the paucity of data limits our ability to test this relationship. In contrast, infant mortality features a standardized measure and is available for all 253 municipalities in our data set for almost all of the last 20 years. We therefore select municipal infant mortality rates as our central indicator for well-being outcomes.

Second, we considered testing educational outcomes. However, most PB programs in our data set are less than 10 years old and many are less than 5. We believe there is very little chance PB or any other newly adopted program could generate a measurable impact on education or any other areas of well-being with long maturation periods given the relatively short temporal coverage of our data set. We believe infant mortality as an outcome is worth evaluating because we know health care is a priority for PB programs based on survey evidence.[2] We therefore use infant mortality because we want to know whether the programs have any impact on an intended, top-priority area. Similarly, decreasing infant mortality is a goal in and of itself. Test scores, attendance rates, schools built, and so on are all short-term education measures that can change rapidly and are likely to lead to improved learning outcomes sometime in the future. Yet, it will take significant time for these changes to show up as improved well-being. In contrast, infant mortality is a measure of well-being in the present and can change rapidly given new resources devoted to pre-natal and neo-natal doctor visits, nutrition, and targeted education for mothers (Aquino, De Oliviera, & Bareto, 2009). We therefore believe it provides a more appropriate test of our hypotheses than other possible indicators.

We follow the suggestions of Ho, Imai, King, and Stuart (2007) and use propensity-score matching to preprocess our data prior to analysis. Matching is an attempt to resolve the endogeneity problem associated with estimating

PB's impact: namely, municipalities that adopt PB may be predisposed to spend more on social services, pursue pro-poor outcomes, and employ inclusive community practices relative to those that do not adopt PB. Any results attributing higher social spending or lower infant mortality to PB might therefore only reflect the predisposition of the municipality to help the poor as opposed to any direct effect of PB itself. In our case, we match observations of municipalities that adopted PB (the treatment) with a control group of observations of municipalities that are very similar to the treatment group in terms of population size, wealth, political inclinations, and geographic locations, but that did not adopt PB as in Hansen (2004). This preprocessing gives us approximately 1,100 matched pairs (out of 5,060 municipal years) based on close propensity scores with which to estimate PB's influence on spending priorities, well-being, and civil society. We specify the following three models using cross-sectional time-series regression with random effects and clustered standard errors.[3]

Key Independent Variable: PB

We added to the original database of all Brazilian municipalities with at least 100,000 residents ($N = 253$) constructed for Boulding and Wampler (2010). Our information on the adoption of PB programs comes from similar sources as theirs: interviews with Brazilian officials, a non-governmental organization's records, and secondary sources for the 1989-2010 period (Ribeiro & Grazia, 2003; Wampler & Avritzer, 2005, 2008). We not only begin with a dichotomous measure but also move beyond a simple distinction between whether municipalities do or do not adopt PB to capture the significant variation that exists in the quality of PB programs (Avritzer & Navarro, 2003; Goldfrank, 2007; Nylen, 2003; Wampler, 2007). To explore this issue, our data set records the number of years PB has been used in a municipality—Some municipalities have used PB for 20 years where it has become an institution that anchors the budgeting process. In contrast, other municipalities have yet to adopt the policy or have recently adopted it and are still experimenting with its configuration. During 1989-2008, 122 municipalities in our data set adopted a PB program for at least 4 years, although some adopted PB for the entire 20-year period. Accounting for this variation allows us to determine whether a longer experience with PB influences any relationship it has with well-being. We recorded a 0 for municipalities that had not adopted PB during each 4-year time frame between 1989 and 2010. Following Boulding and Wampler (2010), we also created dummy variables to distinguish between municipalities that adopted PB earlier than the other cities (from 1989 to 1992), those that adopted the policy between 1993 and 2000, and those that

adopted PB relatively recently, between 2001 and 2008 from those that never adopted PB. Some cities in our sample adopted PB and then eliminated it after a few years. These cities' scores reverted to 0 and began anew with 1; in the event, they re-adopted PB as a policy later in the time frame our data cover.[4]

Dependent Variable 1: Per Capita Municipal Spending on Health Care and Sanitation (Logged)

We use multiple indicators to test *whether* PB is connected to improvements in well-being, as well as *how* it might be connected. First, we explore whether municipal spending on health care and sanitation increases in the presence of PB.[5] We want to know whether PB changes local spending priorities as a first step in improving outcomes for the local population. We recorded each municipality's per capita spending on health care and sanitation (available at www.ibge.gov.br) and take the logarithm of the data to normalize it. This generates approximately 20 years of spending data for an issue area we deem critically important to well-being and where changes in spending can generate immediate outcomes (in contrast to education or housing spending). However, we do not believe spending alone serves as an appropriate proxy for well-being. Health care spending may not map onto well-being in many cases: inefficient allocation of funds, corruption, selective spending based on politics, geography, or any number of other factors may undermine a connection between spending and well-being. We therefore want to know whether PB alters the implementation process surrounding spending decisions as opposed to simply increasing spending in these areas.

We evaluate a causal mechanism connecting PB to the configuration of civil society. We argue PB fosters the mobilization of CSOs as new resources become available from the budgeting process. Participation is individual and group-based, so it is in the strategic interest of individuals to form groups to enhance their negotiation efforts inside of PB. Individuals from poor communities that face greater organizational hurdles than middle- or upper-class groups are now given a series of very specific incentives to formally establish CSOs. Furthermore, some organizations may also deliver services (e.g., local health monitoring; day care centers) in conjunction with the municipal government to improve outcomes. We therefore construct a second model to test whether the presence of PB increases the number of CSOs in Brazilian municipalities.

Dependent Variable 2: The Number of CSOs per Municipality (Logged)

This variable counts the number of CSOs in a municipality in 2002 and 2005 (www.ibge.gov.br). Many different types of CSOs are captured in each

observation—The data are not limited to explicitly health care–related CSOs. However, it does include multi-purpose CSOs, such as religious groups, that provide social assistance in the form of food, money, housing, or education. These groups might not emphasize health care outcomes directly, but improvements in education, nutrition, and access to additional resources are all likely to improve health care outcomes—particularly in the context of infant mortality.

Finally, we test whether PB improves health care *outcomes*, not just inputs and processes of well-being.

Dependent Variable 3: Infant Mortality per 100,000 Live Births

Infant Mortality rates provide an assessment of health care outcomes that can change rapidly in the face of new funding and outreach efforts. If there *is* a connection between PB and well-being, we might anticipate being able to measure it in our data set. Our data include the rate of infant mortality per 100,000 live births in each Brazilian municipality over the previous 20 years. The data comes from the Brazilian Institute of Geography and Economics (www.ibge.gov.br), which reports rates on an annual basis. Such data allow us to determine whether PB is tied to health care outcomes in addition to health care spending.

Control Variables

We control for many factors we think influence our dependent variables. In each case, we include controls for the size of the municipal population, the per capita budget of the municipality, the mayor's party, and the region of Brazil where the municipality is located. The population (logged) is included as a measure of the size of the municipality, which we believe will be directly related to spending, infant mortality, and the number of CSOs in a municipality. We use the per capita local budget (logged) as a proxy for the wealth of a municipality, which we also believe will influence spending, public, and nonprofit service provision and outcomes. Brazil's economy boomed during the 2000s, thus providing resources for municipal governments to begin to address long-standing and deeply entrenched economic and social inequities. Including the level of municipal wealth allows us to assess whether new democratic institutions helped governments improve policy and governance outcomes independent of municipal wealth. Next, our models also control for aspects of local politics that may influence both spending priorities and the adoption of pro-poor, health care policies. Our models capture the influence of the PT, an ideologically leftist party associated with social justice and

institutional innovations. It was also the party of Brazil's President from 2003 to 2008, when many municipalities adopted PB. The variable we employ is a dummy for whether the mayor of the municipalities is a member of the PT (PT Mayor) and stems from the Brazilian Superior Electoral Court's data repository (www.tse.gov.br).[6] Eighty-seven out of 253 municipalities featured PT mayors, but did not have PB for at least 1 year in our data set. This translates into 34% of municipalities. Next, 181 of 253 cities were not governed by the PT, but practiced PB for at least 1 year in the data set.

The correlation between PT mayors and the use of PB is .29. The variance inflation factor is 3.70, which is under the commonly used rule of thumb of 5. We believe this indicates correlations low enough to mitigate concerns for endogeneity and multicollinearity between the PT and PB. In other words, any impact PB and the PT might have on our dependent variables are relatively independent of one another. Finally, we control for the region of Brazil where a municipality is located. Levels of inequality, corruption, governance, education and health care outcomes are very different in Northeast Brazil than in the South for a variety of reasons (Engle & Lemos, 2010; Fally, Paillacar, & Terra, 2010; Ferreira, Leite, & Ravallion, 2010; Paim, Travassos, Almeida, Bahia, & Macinko, 2011; Studnicka, 2010). We capture this potential variation by including a series of geographic dummy variables for Northeastern Brazil, Southeastern, Central Brazil, and the Amazon and test whether policies simply function differently in different parts of Brazil. Southern Brazil is the omitted category.[7]

Results

PB and Spending on Health Care

We find the presence of PB is associated with an increase of municipal spending on health care and sanitation at a statistically significant level. The coefficient on PB in Table 1, Model 1, is positive and statistically significant. Our calculations show adopting PB generates an estimated 6% increase in spending on health care and sanitation while holding all other variables constant at their means. *Furthermore, Table 1, Models 2 and 3 provide evidence moving from no PB to 8 or more years of PB increases our estimate of municipal spending on health care and sanitation by 23%.*

PB and CSOs

We find the presence of PB is associated with an increased presence of CSOs at a statistically significant level. Our calculations show adopting PB

Table 1. PB and Health Care and Sanitation Spending 1989-2008.

	Model 1	Model 2	Model 3	Model 4
Variable	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)
PB	0.162 (0.035)*			
Early PB adopters		0.276 (0.015)*		
Middle PB adopters			0.209 (0.044)*	
Late adopters				0.091 (0.068)
Per capita municipal budget (logged)	0.558 (0.113)*	0.554 (0.120)*	0.469 (0.273)*	0.508 (0.392)*
Population (logged)	1.061 (0.216)*	0.946 (0.302)*	1.148 (0.135)*	1.036 (0.287)*
Mayor's party	0.083 (0.017)*	0.109 (0.074)	0.088 (0.016)*	0.059 (0.013)*
Health care spending (lagged)	0.706 (0.004)*	0.715 (0.010)*	0.651 (0.022)*	0.605 (0.013)*
Northeast Brazil	−0.016 (0.014)	0.038 (0.029)	−0.025 (0.019)	−0.011 (0.0001)*
Southeast Brazil	0.010 (0.010)	0.006 (0.004)	0.087 (0.069)	0.019 (0.011)
Central Brazil	0.132 (0.091)	0.086 (0.079)	0.148 (0.106)	0.055 (0.045)
Amazonian Brazil	−0.222 (0.184)	−0.189 (0.043)	−0.163 (0.025)*	−0.207 (0.030)*
Constant	−0.697 (0.380)	−0.779 (0.071)*	−1.038 (0.042)*	−0.315 (0.196)
n	1,171			
F	751.36*	739.53*	748.61*	723.40*
Root MSE	0.664	0.592	0.639	0.621
Adjusted R^2	.730	.724	.735	.724

Clustered standard errors were used above. PB = participatory budgeting; MSE = mean square error.
*Indicates significance at better than .01 (two-tailed test).

generates an estimated 8% increase in the number of CSOs operating in a Brazilian municipality while holding all other variables constant at their means. Thus, *PB has generative effects within civil society, which is an important finding for researchers and policy makers concerned with the importance of social capital*. This finding supports qualitative research conducted on PB in Brazilian and other Latin American municipalities (Avritzer, 2002; Baiocchi, 2005; Baiocchi et al., 2011; Donaghy, 2011; McNulty, 2011). However, it is possible having a large number of CSOs in a municipality increases the likelihood of PB adoption in the first place. This scenario could also occur with Health Care and Sanitation Spending as well as Infant Mortality rates. Perhaps municipalities where spending on public goods is low and infant mortality is high are more likely than others to adopt PB in the first place. We present the results of our assessment of reverse causation (Table 2) in the Technical Appendix section along with similar checks for health care and sanitation spending and infant mortality. Some of the control variables in our model are statistically significant determinants of PB, but the number of CSOs is not statistically significant. These results provide support for our assertion *PB increases the number of CSOs in a municipality rather than the other way around*. We believe this evidence to be a critical finding:

Table 2. Participatory Budgeting and Civil Society Organizations 2002-2005 (Logged).

Variable	Coefficient (*SE*)
Participatory budgeting	0.043 (0.009)*
Per capita municipal budget (logged)	0.337 (0.024)*
Population (logged)	1.061 (0.013)*
Party of the mayor	0.068 (0.039)
Northeast Brazil	−0.042 (0.030)
Southeast Brazil	0.070 (0.066)
Central Brazil	0.011 (0.008)
Amazonian Brazil	−0.085 (0.021)*
Constant	−9.893 (0.268)*
n	272
F	1,173.169*
Root MSE	0.501
Adjusted R^2	.684

Robust standard errors were used above. MSE = mean square error.
*Indicates significance at better than .01 (two-tailed test).

We interpret it to mean that several key rules associated with PB promote the strengthening of civil society. These rules include internal vote aggregation, which encourages individuals to form groups and for groups to forge alliances with other stable groups; a preferential bias in favor of poor groups, which encourages poor citizens and communities to participate in policy making; citizen mobilization supported by government funds but organized by groups (i.e., transportation to distant meetings); and, finally, increased ease of oversight of policy implementation. Therefore, the institutional rules of this new democratic institution promote new organizations because the rules favor collective action via community groups. A more mobilized citizenry then has greater opportunities to pressure government officials to fund public goods that correspond to their interests while also decreasing the cost for citizens to monitor state action (see Table 2).

PB and Infant Mortality

We find the presence of PB is associated with decreases in infant mortality at a statistically significant level. Our calculations show adopting PB generates an estimated 11% decrease in infant mortality per 1,000 live births while holding all other variables constant at their means. *Calculations based on Table 3, Models 2 and 3, show that a municipality practicing PB for 8 or*

Table 3. PB and Infant Mortality 1989-2008.

	Model 1	Model 2	Model 3	Model 4
Variable	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)
PB	−0.915 (0.308)*			
Early PB adopters		−2.149 (0.151)*		
Middle PB adopters			−1.368 (0.175)*	
Late adopters				−0.527 (0.126)*
Per capita municipal budget (logged)	−3.184 (0.235)*	−4.610 (0.593)*	−4.092 (0.312)*	−4.313 (0.459)*
Population (logged)	−0.041 (0.171)	0.043 (0.043)	−0.037 (0.035)	−0.088 (0.062)
Party of the mayor	−1.569 (0.371)	−2.308 (0.189)	−1.294 (0.263)	−1.235 (0.047)*
Infant mortality (lagged)	0.249 (0.012)*	0.300 (0.074)*	0.221 (0.047)*	0.235 (0.032)*
Northeast Brazil	1.253 (0.302)*	1.972 (0.399)*	1.049 (0.564)	1.805 (1.431)
Southeast Brazil	0.016 (0.013)	0.023 (0.018)	0.008 (0.006)	0.017 (0.013)
Central Brazil	0.435 (0.380)	0.521 (0.365)	0.394 (0.278)	0.457 (0.412)
Amazonian Brazil	1.908 (0.318)*	1.277 (0.304)*	1.022 (0.529)	1.310 (0.337)*
Constant	36.091 (2.640)*	37.832 (4.319)*	36.180 (3.186)*	37.035 (3.157)*
n	1,196			
F	56.67*	58.32*	56.59*	56.01*
Root MSE	4.962	4.641	5.007	4.954
Adjusted R^2	.281	.283	.272	.273

Clustered standard errors were used above. PB = participatory budgeting; MSE = mean square error.
*Indicates significance at better than .01 (two-tailed test).

more years will experience an estimated 19% less infant mortality than a municipality practicing PB for less than 4 years.

Discussion

The relationships we describe between PB and health and sanitation spending, PB and CSOs, and PB and health care outcomes in this section are greater in magnitude and stronger in statistical significance for municipalities that have used PB for a longer period of time. Municipalities using PB for less than 4 years do exhibit lower infant mortality rates than municipalities that never adopted PB. However, there is no statistically significant difference in spending on health care and sanitation between municipalities using PB for less than 4 years and municipalities that never adopted the program. This demonstrates the benefits from adopting PB are not related to low-hanging fruit, but built over a great number of years. *Our results imply PB is associated with long-term institutional and political change—not just short-term shifts in funding priorities*. PB is an important proxy that captures shifts in basic governance arrangements.

Population and budget size are both statistically significant determinants of the dependent variables in many of our models. As anticipated, municipalities with greater populations and wealthier governments are associated with greater spending on health care and sanitation, lower infant mortality, and greater numbers of CSOs. In addition, municipalities in Northeastern and Amazonian states feature comparatively lower spending, fewer CSOs, and higher infant mortality than municipalities in Southern states.

The presence of a mayor from the PT has a positive, statistically significant impact on one of our dependent variables—health care and sanitation spending—in the models in Table 1. This was anticipated given the PT's status as a left-leaning pro-poor party with stated aims to dedicate resources to improve social well-being for the poor majority. PT mayors enjoyed direct ties to the President of Brazil (also of the PT) from 2003 to 2010 so it is reasonable to believe 8 years of PT government at the federal level allowed the party to transfer additional resources into PT-governed municipalities, which could then spend more on social priorities. However, there is no statistical connection between a PT mayor and infant mortality or the presence of CSOs in these first models. In contrast, PB influences these variables controlling for the political party in the mayor's office.

This evidence thus shows that PB alters inputs, processes, and outcomes *independently* of the PT. However, we want to know whether PB functions differently in conjunction with a mayor from the PT. We believe PT mayors are likely to provide greater support to PB programs than non-PT mayors. PB is one policy the PT mayors implement to follow through on the electoral promises and fundamental mission of the party. Furthermore, these PT supporters might have access to more federal resources or ties to civil society than a non-PT mayor due to their connections with the nationally powerful party. PB could then have a greater impact on well-being when implemented by a PT Mayor than by a Mayor from another political party. We test this hypothesis by creating a new variable, PTBudgeting, which is an interaction between the mayor's party variable and the PB variable. We use this variable in all of its configurations following Brambor, Clark, and Golder (2006) and Braumoeller (2004) to model our three dependent variables below.

Our models highlight the strong, positive relationship between the presence of both a PT mayor *and* PB in a municipality. Tables 4, 5 and 6 connect the presence of both PB and a PT mayor to increases in social spending, increased presence of CSOs, and improvements in well-being. We also provide estimates of the impact of PB, conditioned on a PT mayor for health and sanitation spending, the number of CSOs in a municipality, and infant mortality rates. Finally, we estimate the impact of a PT mayor, conditioned on the presence of PB (while holding all other variables constant at their means).

Table 4. PB and Health Care and Sanitation Spending for Different Configurations of PB and PT Leadership 1989-2008.

	No PT, no PB	PT, no PB	PB, no PT	PT and PB
Variable	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)
PT and PB				0.629 (0.128)*
Per capita municipal budget (logged)	0.561 (0.110)*	0.450 (0.271)*	0.583 (0.386)*	0.570 (0.284)*
Population (logged)	1.426 (0.208)*	1.003 (0.129)*	1.041 (0.280)*	1.133 (0.275)*
Mayor's party	Dropped	0.091 (0.014)*	Dropped	0.161 (0.142)
PB	Dropped	Dropped	0.160 (0.023)*	0.078 (0.048)
Health care spending (lagged)	0.741 (0.015)*	0.642 (0.026)*	0.649 (0.009)*	0.663 (0.027)*
Northeast Brazil	−0.024 (0.004)*	−0.033 (0.010)*	−0.007 (0.002)*	−0.028 (0.147)
Southeast Brazil	0.052 (0.029)	0.040 (0.031)	0.065 (0.036)	0.027 (0.028)
Central Brazil	0.141 (0.090)	0.148 (0.117)	0.054 (0.043)	0.098 (0.076)
Amazonian Brazil	−0.249 (0.014)*	−0.263 (0.028)*	−0.131 (0.025)*	−0.162 (0.091)
Constant	−0.738 (0.162)*	−1.520 (0.124)*	−0.375 (0.184)	−0.855 (0.201)*
n	1,171			
F	753.19*	751.20*	726.78*	771.52*
Root MSE	0.593	0.662	0.697	0.688
R^2	.512	.651	.730	.766

Clustered standard errors were used above. PB = participatory budgeting; PT = Workers' Party; MSE = mean square error.
*Indicates significance at better than .01 (two-tailed test).

Table 5. PB and Civil Society Organizations 2002-2005 (logged) for Different Configurations of PB and PT Leadership.

	No PT, no PB	PT, no PB	PB, no PT	PT and PB
Variable	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)
PT budgeting				0.184 (0.032)*
Per capita municipal budget (logged)	0.314 (0.103)*	0.379 (0.238)*	0.383 (0.331)*	0.277 (0.035)*
Population (logged)	1.063 (0.219)*	1.150 (0.172)*	1.042 (0.286)*	0.959 (0.278)*
Mayor's party	Dropped	0.113 (0.011)*	Dropped	−0.048 (0.044)
PB	Dropped	Dropped	0.055 (0.025)*	0.081 (0.054)
Northeast Brazil	−0.023 (0.010)	−0.030 (0.008)*	−0.015 (0.012)	−0.011 (0.007)
Southeast Brazil	0.006 (0.005)	0.014 (0.010)	0.014 (0.009)	0.021 (0.017)
Central Brazil	0.141 (0.089)	−0.150 (0.107)	−0.059 (0.044)	−0.052 (0.036)
Amazonian Brazil	−0.291 (0.012)*	−0.173 (0.024)*	−0.183 (0.028)*	−0.265 (0.006)*
Constant	−8.758 (0.220)*	−8.035 (0.041)*	−8.316 (0.106)*	−9.395 (0.132)*
n	1,171			
F	753.10*	947.59*	1,125.88*	1,192.63*
Root MSE	0.628	0.604	0.599	0.513
Adjusted R^2	.491	.532	.601	.734

Robust standard errors were used above. PB = Participatory budgeting; PT = Workers' Party; MSE = mean square error.
*Indicates significance at better than .01 (two-tailed test).

Table 6. PB and Infant Mortality for Different Configurations of PB and PT Leadership 1989-2008.

	No PT, no PB	PT, no PB	PB, no PT	PT and PB
Variable	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)
PT budgeting				−2.725 (0.207)*
Per capita municipal budget (logged)	−5.548 (0.372)*	−3.460 (0.202)*	−3.485 (0.224)*	−3.293 (0.082)*
Population (logged)	−0.057 (0.072)*	−0.049 (0.105)*	−0.048 (0.093)*	−0.041 (0.020)
Mayor's party	Dropped	−1.324 (0.029)*	Dropped	−0.255 (0.058)*
PB	Dropped	Dropped	−1.927 (0.044)*	0.136 (0.096)
Infant mortality (lagged)	0.273 (0.014)*	0.196 (0.034)*	0.230 (0.005)*	0.207 (0.036)*
Northeast Brazil	1.387 (0.364)*	1.540 (0.373)*	1.675 (0.281)*	1.551 (0.341)
Southeast Brazil	0.027 (0.020)	0.052 (0.039)	0.021 (0.017)	0.045 (0.032)
Central Brazil	0.447 (0.289)	0.452 (0.263)	0.506 (0.244)	0.473 (0.296)
Amazonian Brazil	1.681 (0.190)	1.592 (0.028)*	1.544 (0.031)*	1.39 (0.417)*
Constant	38.651 (0.336)*	36.149 (0.068)*	36.603 (0.285)	38.354 (0.931)*
n	1,171			
F	60.39*	56.48*	51.85*	57.65*
Root MSE	4.562	4.843	4.570	4.305
R^2	.243	.256	.262	.301

Clustered standard errors were used above. PB = participatory budgeting; PT = Workers' Party; MSE = mean square error.
*Indicates significance at better than .01 (two-tailed test).

Table 7. Mean Health Care and Sanitation Spending Estimates for Different Configurations of Participatory Budgeting and Partisan Municipal Leadership.

	Participatory budgeting	No participatory budgeting
PT mayor	812 R$/person/year	234 R$/person/year
No PT mayor	275 R$/person/year	192 R$/person/year

PT = Workers' Party; R$ = Brazilian Reais.

On average, our estimates for health care and sanitation spending and infant mortality rates for municipalities that have PB under a PT mayor are lowest, followed by municipalities with PB, but without a PT Mayor; municipalities with a PT mayor, but without PB; and finally by municipalities without either PB or a PT mayor. The order is similar for the number of CSOs in a municipality, but the relative roles of the PT and PB are reversed (see Tables 7, 8, and 9).

The results of this exercise show PB influences social spending, social processes, and social outcomes (infant mortality) more than the PT in two of

Table 8. Estimated Number of CSOs for Different Configurations of Participatory Budgeting and Partisan Municipal Leadership.

	Participatory budgeting	No participatory budgeting
PT mayor	776	661
No PT mayor	589	384

CSOs = civil society organizations; PT = Workers' Party.

Table 9. Mean Infant Mortality Estimates for Different Configurations of Participatory Budgeting and Partisan Municipal Leadership.

	Participatory budgeting	No participatory budgeting
PT mayor	23 per 1,000 live births	27 per 1,000 live births
No PT mayor	26 per 1,000 live births	29 per 1,000 live births

PT = Workers' Party.

three cases. Therefore, the presence of a PT mayor is important for well-being independent of PB, but it is not driving our results for PB.

Robustness Checks: Model Type and Specifications

We perform a variety of robustness checks to address questions of whether we adequately isolate the influence of PB on well-being in Brazil. For example, we assess whether *Bolsa Família* transfers from state governments account for changes in inputs, processes, and outcomes surrounding well-being. We also evaluate the direction of causation in our models of CSOs in municipalities by using PB as the dependent variable and the number of CSOs as the independent variable. We present these new models and new results in the Technical Appendix section of the article.

Bolsa Família is a statistically significant determinant of infant mortality in Model IIx, but PB is still significant as well. Furthermore, *Bolsa Família* is not a statistically significant determinant of health care and sanitation spending or the number of CSOs in a municipality whereas PB is still significant in both areas (Models Ix and IIIx). We do not contest the relevance of conditional cash transfers for the poor programs such as *Bolsa Família* are important cogs in Brazil's poverty reduction machine. The important aspect of this analysis is PB's strength as an independent policy reform improving well-being stands up to the inclusion of a *Bolsa Família* variable as well as dummy variables for state resource transfers in our models.

Conclusion

There is a significant body of literature suggesting participatory programs might lead to improvements in accountability, government efficiency, and perceptions of state efficacy (Avritzer, 2002; Baiocchi, 2005; Baiocchi et al., 2011; Fung & Wright, 2003; Gaventa & Barrett, 2012; Gibson & Woolcock, 2008; Labonne & Chase, 2009; McNulty, 2011; Wampler, 2007). We believe PB to be a powerful participatory mechanism because it has the power of public authority and resources behind it; municipal governments have incentives to implement citizens' specific decisions because many of these programs are not consultative but mandate a certain percentage of the municipal budget be allocated through PB. *If the poor want increased health care funding in these municipalities, then they will get increased health care funding*.

This article is the first large-*N* study to identify a relationship between PB and well-being in a broad set of municipalities over time and across space. Our study of Brazilian municipalities shows a positive relationship between PB and three critical aspects of any effort to improve well-being. First, our research connects the presence of PB to increases in health care and sanitation spending, an important first step in improving outcomes. Second, our research connects PB to an increased number of CSOs in municipalities practicing PB. Finally, our research connects PB to decreases in infant mortality—an important outcome.

Overall, our results demonstrate PB programs have produced important improvements in social well-being in the field of health care. In contrast to Michael Ross (2006; discussed above), these results provide evidence of the potential for new democratic institutions to improve the lives of the poor when designed with the purpose of incorporating poor citizens into public decision-making processes. The connection between PB and well-being for the poor better reflects Sen's (1999) arguments that the expansion of citizen capabilities and democratic rights is a necessary part of improving basic social well-being.

We argue the strong emphasis on participatory democracy appears to be justified: Brazilian municipalities with PB programs enjoy better results than similar municipalities without participatory governance programs. Our evidence shows these policy experiments are producing some of the anticipated benefits including broadening civil society and generating improvements in social well-being. This should help international funding agencies (e.g., World Bank, UN Habitat) that are considering whether to promote the participatory institutions. However, it remains premature to evaluate the role of PB in other policy arenas (e.g., education) where changes in social well-being are slow to develop. Most of the cities in our data set only adopted PB in the

last decade, which is not enough time to see changes in many long-term measures of well-being. In contrast, infant mortality can improve quickly and does so in our data set. This is only one issue area, but it is an important issue area for well-being and provides important new evidence in favor of PB.

Ultimately we argue the direct incorporation of citizens in PB produces a broad series of effects related to citizen participation such as information sharing, oversight, accountability, knowledge, and the creation of policy networks. The decision to adopt PB implies a commitment to expand human capabilities, modify the role of the state, and focus on the policy needs of poor majorities. As such, PB represents a powerful channel for democratic practice to improve human capabilities and developmental outcomes.

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Notes

1. The Dominican Republic and Peru also feature widespread adoption of participatory budgeting (PB; Sintomer, Herzberg, Allegretti, & Rocke, 2011, World Bank, 2011) although the total populations involved are likely to be much smaller than in Brazil given the difference in the populations of each country.
2. We administered a survey in 2012 to 94 municipalities with PB. Spending on health care and infrastructure were identified by municipal administrators as receiving the most funding through PB.
3. We use clustered standard errors to account for the serial autocorrelation of the dependent variables. Models using the number of civil society organizations as the primary dependent variable use ordinary least squares (OLS) with robust standard errors because the data only cover the time frame from 2002 to 2005.

4. There are approximately 3% of cases in our data set where a municipality adopted PB, abandoned it, and then adopted it again.
5. We also test whether PB influences other social spending priorities beyond health care. The models presented in Tables IV and V in the Supplemental Information section highlight the positive, statistically significant relationships between PB and education spending along with housing and social assistance spending.
6. Models IL, IIL, and IIIL in the Technical Appendix use a broader measure of mayors' political leanings. We include this measure to determine whether leftists in general behave more favorably toward the poor compared with other mayors. This is distinct from our assessment of whether Workers' Party (PT) mayors (leftists with access to federal resources) behave more favorably toward the poor. It is coded 0 for centrist and right-wing mayors and 1 for mayors from Brazil's left-leaning parties.
7. The Technical Appendix also includes models that control for transfers of resources from state governments. We do this by including dummy variables for 26 of the 27 federative units in Brazil. São Paulo, the wealthiest state on a per capita basis and the state with the second highest Human Development Index (HDI) score, is the omitted category. We present the results, which are broadly similar to those using other model specifications in Tables Is, IIs, and IIIs of the appendix.

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