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Of *Governance* and Revenue

Participatory Institutions and Tax Compliance in Brazil

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Abstract

Traditionally, governments seek to mobilize tax revenues by expanding their enforcement of existing tax regimes and facilitating tax payments. However, enforcement and facilitation can be costly and produce diminishing marginal returns if citizens are unwilling to pay their taxes. This paper addresses gaps in knowledge about tax compliance, by asking a basic question: what explains why citizens and businesses comply with tax rules? To answer this question, the paper shows how the voluntary adoption of two different types of participatory governance institutions influences municipal tax collection in Brazil. Municipalities that voluntarily adopt participatory institutions collect significantly higher levels of taxes than similar municipalities without these institutions. The paper provides evidence that moves scholarship on tax compliance beyond enforcement and facilitation paradigms, while offering a better assessment of the role of local democratic institutions for government performance and tax compliance.

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Of *Governance* and Revenue: Participatory Institutions and Tax Compliance in Brazil

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Introduction

Governments in the developing world often struggle to collect tax revenues. Businesses and individual citizens avoid taxation by underreporting income, keeping business deals off the books, and exaggerating losses and expenses. Civil servants and elected officials may weaken enforcement mechanisms in order to reward allies. Of course, states capture more tax revenues by expanding their enforcement of existing tax regimes and facilitating tax payments. These strategies typically involve increasing penalties to force tax evaders to pay up as well as crafting administrative efficiencies to decrease the burden on citizens and businesses to comply with the law. Increasing penalties for non-compliance increases the risk of avoiding taxes, thus inducing greater tax compliance. Creating better administrative processes increases government efficiency and facilitates tax collection. However, enforcement and facilitation can be very costly and produce diminishing marginal returns if citizens are unwilling to pay their taxes (Kahn et al. 2001; Alm 2012). This scenario is common in the developing world, where public officials routinely misuse, waste, and plunder public resources for private gain as well as to advance their political careers. Although many citizens and firms in such environments see taxation as deceit, the lack of a consistent flow of resources dismisses would-be policy reformers' ability to secure available resources. In turn, lack of resources curtails reformers' influence on public service delivery and social well-being. Governments, especially those in the developing world, require steady revenue streams to expand state capacity, deliver critical services, and improve well-being.

Improving tax compliance requires moving beyond enforcement and facilitation. States and governments must address citizens' and firms' willingness to pay their taxes. We contend that the degree to which taxpayers expect their governments to make wise public investments and to use public resources without corruption strongly conditions citizens' willingness to comply with existing tax rules. We argue that tax compliance also stems from individuals' expectations that other individuals (public and private) will make good faith efforts to adhere to the agreed-upon institutional rules and practices (Putnam et al. 1994; Levi 1989). Individuals are more likely to entrust public officials with their money when public services are well-delivered, when governments are accountable, and when they are considered legitimate. Of course, improving services and fostering accountability in government in the developing world is difficult because many governments are caught in a vicious circle: broad swaths of the population do not receive public services and cannot hold public authorities accountable. In turn, citizens and firms withhold taxes because government officials are unable to deliver public services and are perceived to be illegitimate. The vicious circle continues as governments never collect the tax revenue necessary to improve services even if public officials have good intentions. The result is a downward spiral of unaccountable, illegitimate government, poor tax compliance, low revenue, and poor performance.

Reformist governments experiment with different strategies designed to stimulate virtuous circles of accountability, legitimacy, tax compliance, revenue collection, and public goods provision. For example, administrative reforms entailing greater outsourcing of services, using New Public Management techniques to generate efficiencies, adapting "best practices” to better target under-serviced communities or to improve public oversight, and incorporating citizens directly in policy formulation and oversight all have the potential to promote accountability and legitimacy, improve service delivery, and increase tax compliance. However, there is wide variation in tax collection across the developing world at both national and subnational levels. Some developing countries and cities within developing countries collect ample tax revenue, while others collect almost nothing. Explaining this variation has been difficult due to lack of capacity to collect and report data on tax collection and compliance. Policy makers therefore have very limited knowledge of the general determinants of tax compliance in the developing world, much less whether and how strategies designed to improve tax compliance work.

We address gaps in our knowledge on tax compliance by asking a basic question: what explains why citizens and businesses comply with tax rules? We also want to assess whether some governance arrangements make it more likely for public officials to collect taxes. We test hypotheses surrounding local tax compliance in Brazil and provide a partial answer to this question. Specifically, we show how the voluntary adoption of two different types of participatory governance institutions influences municipal tax collection. This paper, then, allows us to move beyond enforcement and facilitation paradigms and better assess the role of local democratic institutions for government performance and tax compliance.

The results of our statistical analysis indicate that Brazilian municipalities that voluntarily adopt participatory institutions collect significantly higher levels of taxes than other, similar municipalities without these institutions. For example, we find that municipalities that adopt Participatory Budgeting programs collect 39% more locally generated taxes (property, sales, + fees) than similar municipalities without these programs. This corresponds to over 3% of municipalities’ budgets and is equivalent to roughly 40% of their capital investment spending. The rest of this paper explains why these municipalities collect higher taxes. We begin with an overview of the academic literature on tax compliance and trust in government to situate our argument within broader scholarship in this area. We then develop four theoretical pathways that link participatory institutions to tax compliance. Third, we briefly describe the context where we test our hypotheses: Brazil’s subnational tax arena. We describe our methodological approach and identification strategy in the fourth section, followed by the results of our analysis. Finally, we discuss the implications of our results for local governance and tax compliance around the world.

Public Participation and Tax Compliance

The most common factors used to explain variation in revenue collection are enforcement and facilitation. Most of the early academic work on tax regimes focuses on these areas and relies on a fairly straightforward cost-benefit analysis approach to explain willingness to pay taxes (Allingham and Sandmo 1972). Under the enforcement framework, individuals and firms’ willingness to pay taxes is based on their assessment of the extent to which the benefits of evasion (lower taxes) are weighed against their costs: the possibility of being caught and punished (Alm 2012). Tax compliance is high when the likelihood of detecting tax evasion is high and the costs of punishment outweigh the benefits of evasion. Governments following this logic seek to optimize enforcement regimes to increase their revenue.[1]

Although enforcement has remained the foundation for most tax reform strategies, in a similar cost-benefit approach, measures to increase revenue have included attempts to facilitate tax compliance, making tax administrations as "customer-friendly" as possible (World Bank 2015). Citizens and businesses are more willing to pay their taxes when the transaction costs associated with paying taxes are lower. This logic has driven many governments to invest heavily in streamlining the process through which taxes are paid, involving a number of efforts, ranging from the reduction of number of taxes to the development of online systems for tax filing and payment (Martorano 2014, Kochanova et al. 2016, Pogorletskiy et al. 2016) Yet, the cost of the initial investment in state reform and capacity may outweigh the benefits in revenue collection and subsequent investments in facilitating tax collection may face diminishing marginal returns (Kahn et al. 2001, Alm 2012).

The enforcement and facilitation approaches continue to be situated within the cost-benefit analysis that Allingham and Sandmo (1972) initially advanced. Tax enforcement and facilitation are clearly important for tax compliance. However, we argue that a focus on citizens' risk assessment of punishment and the institutional processes through which taxes are collected is too narrow (Torgler 2005 and 2007).

Rather, we argue that the socio-political and institutional context in which citizens live and work conditions their willingness to pay taxes. Citizens are more likely to comply with existing tax regimes when they believe that their taxes will be used appropriately, as well as when they can exercise voice in the political system (Torgler 2007; McKerchar et al 2013). At the broadest level, we would expect that citizens' perceptions of having a say in the political system conditions their attitudes toward government, especially surrounding accountability and legitimacy (Putnam et al. 1994; Levi 1989). We thus expect tax compliance to be systematically greater when local governments are perceived to be legitimate. Legitimacy may accrue to governments that use policy processes with multiple venues for citizens to signal their preferences to responsive government officials as well as those that offer multiple opportunities to make demands of those officials (Persson and Tabellini 2005; Besley and Burgess 2002). It may be possible for non-democracies to produce strong outcomes in this area, but we argue that formally-democratic governments that actively incorporate citizens into decision-making processes are more likely to be perceived as legitimate, which then improves tax compliance. More narrowly, citizens are more likely to comply with local tax regulations when governments are more transparent, when citizens exercise voice in the policy process, and when governments deliver better public services.

A growing academic literature seeks to test these assertions. The primary difficulty in this field is the absence of good data,[2] which is due to the obvious, sensitive nature of taxes as

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[1] Conversely, governments may also choose to greatly decrease enforcement mechanisms to satisfy the needs and interests of their political allies.

[2] For a discussion of the issue, see Torgler 2016.

well as the weak state capacity in the vast majority of countries in the developing world. National and subnational states generally do not provide tax data at the individual or firm level. There are some public opinion surveys that link specific tax behaviors to public opinion (Alm 2012), but these studies are conducted in wealthier democratic countries and do not provide leverage on explaining tax compliance in the developing world (e.g., non-OECD countries). Wealthier countries tend to have more capable states, less corruption, and higher government legitimacy than those in the rest of the world. We lack basic knowledge of tax compliance in countries where corruption is high, state capacity is fragmented, and governments must contend with low legitimacy.

Researchers have turned to survey data and laboratory experiments to better understand what factors condition citizens' willingness to pay taxes without excessive coercion or high investment in state capacity because observational research has been so difficult to successfully carry out. James Alm has been at the forefront of research that uses laboratory experiments to better understand citizens' levels of tax compliance. In an early contribution to this area, Alm and his co-authors report "experimental results provide strong evidence that individuals are more likely to respond positively - and so to increase their tax compliance - when faced with a public sector expenditure program that they select themselves and that they know enjoys widespread approval. In contrast, compliance suffers when individuals have no control over the use of their tax payments, when their taxes pay for public goods that are unpopular, and when they do not know the level of support for the government program" (Alm et al. 1993: 201). This experimental finding is in line with our expectation that the direct engagement of citizens in policy making venues is associated with a change in the policy environment, which then leads to changes in tax compliance.

Torgler conducted a field experiment among ordinary citizens in Costa Rica to side-step the criticism that too many lab experiments rely on college students. Torgler found evidence that participants were influenced by the decisions of other participants. "It is interesting to notice that taxpayers do not behave as free-riders, but are willing to comply. Thus, it seems that *tax morale* is important for a satisfactory explanation of tax paying behaviour" (Torgler 2003: 43). This finding suggests that citizens look to their fellow citizens for cues regarding the extent to which they should comply with the existing tax regime. Casal et al. (2016) also found that the "availability of voice reduces the frequency of the implementation of the exit option" in a similar lab experiment. Feld and Tyran argue that "(d)irect voter participation in the political decision making process in the form of referenda might be a beneficial condition increasing tax compliance by citizens" (Feld and Tyran 2002: 218). Lamberton, De Neve, and Norton also find that providing individuals with the ability to express policy preferences makes them much less likely to underpay their taxes or to use a questionable loophole in another experiment (2014). Wahl et al. find that giving respondents greater voice in the decision-making process leads to a greater willingness to support higher cooperation and taxation (2010). Finally, in an online survey experiment spanning 50-countries, Sjoberg et al. (2019) finds sizeable improvements in tax morale when the salience of anti-corruption efforts is increased and when citizens are able to state their expenditure preferences to the government.

Several recent studies, including RCTs, provide support for the idea of reciprocity in tax compliance. In these cases, perceptions of government services and the quality of government in general drive tax compliance, even without enforcement provisions (Doerrenberg and Peichl 2017; Bott et al. 2017; Hallsworth et al. 2017). Similarly, Besley et al. (2015) found that perceived fairness of government tax policy was important for tax compliance, which also corresponds to a sense of reciprocity.

In sum, there is now a broad body of experimental evidence that demonstrates that higher tax morale significantly affects the willingness of individuals to comply with tax regimes. However, we should note potential disconnects between laboratory findings regarding participatory decision-making and "real world" policy implementation processes. Additional research efforts have sought to address this issue through case studies, large-N cross-national surveys, and randomized, controlled trials. Schneider and Baquero (2006) closely analyzed the tax revenue collection system in Porto Alegre, Brazil, during the early days of the city's pioneering Participatory Budgeting (PB) program. They find that government officials invested heavily in building administrative capacity to better capture taxes as they developed the PB program. The municipal government significantly reduced late tax payments as well as non-payments in the ensuing years. Part of this result could be due to improved facilitation, but Schneider and Baquero provide interview evidence from governing elites and media sources that people were more willing to pay their taxes because of government officials' success in producing public goods through PB. Unfortunately, Schneider and Baquero did not provide any evidence that more closely linked taxpayers' attitudes to their tax compliance behavior. Spada (2012) also evaluated Participatory Budgeting's impact on taxation and found a long-term, positive relationship between PB and tax-share of municipal revenue, though a negative short-term relationship. Again, a lack of data prevented an examination of the mechanisms driving both short and long-term relationships.

Randomized controlled trials represent an important means to collect new data and evaluate relationships between political institutions and tax compliance. Beuermann and Amelina (2014) led an important, recent, RCT that assigned two different types of participatory programs across three Russian regions. One treatment involved capacity-building around Participatory Budgeting, using workshops over a two-week period to provide information to government officials regarding how they could incorporate citizens into budget-related decision-making. A second intervention was much more intensive—it involved training and then supporting local officials over the course of a year. These officials provided administrative support to governments and CSO activists as they sought to implement local transparency and participatory initiatives.

Beuermann and Amelina's study produced mixed results. In two of the three regions, the treatments were not associated with any changes in civic engagement, quality of public hearings, and satisfaction with public services. But in the third region the authors found that both types of interventions had significant and positive impacts on civic engagement, quality of public hearings, and satisfaction with public services. In this region, the policy intervention that focused on citizen participation as well as the programs geared toward improving service delivery and state capacity both had positive impacts on tax revenue collections. They argue that the prior experience with decentralization in the more successful region established fertile ground for interventions involving participation and state capacity-building. Whether the effects observed in the third region were sustainable beyond the experimental period remains an open question.

In sum, existing research provides a suggestive body of evidence that direct citizen engagement in participatory processes influences how citizens interact with the state and civil society. Many scholars expect citizens' relative levels of engagement in participatory processes to influence their behavior surrounding taxation as well. Yet, a large, long-term observational study that links political institutions to tax compliance is missing from this line of research, particularly in developing countries and examining the longer-term effects of these institutions. We address this lacuna by drawing from a database of 5,570 Brazilian municipalities, over a 13-year period to evaluate the extent to which participatory institutions affect local tax outcomes. As noted earlier, our analysis demonstrates a connection between the presence of participatory institutions and municipal revenue collection. We develop theoretical rationales for how participatory institutions influence tax compliance in the next section of the paper.

We theorize that these participatory institutions have an effect on tax compliance because they lie at the confluence of efforts to promote transparency, participation and accountability. Greater transparency associated with public forums dedicated to budgets increases the likelihood that citizens and civil society organizations can hold their governments accountable. The direct, ongoing participation of citizens in policy-making forums increases the likelihood that this information will be used in the policy cycle's formulation and implementation stages as citizens provide important knowledge to inform policies and monitor officials.

Brazil: Municipalization and a new Participatory Architecture

Brazil provides an excellent environment to test hypotheses connecting governance to tax compliance for several reasons. First, Brazil's 1988 Constitution decentralized significant service delivery responsibilities to municipalities. Municipalities are now partially responsible for producing public services that allow citizens to more-fully exercise their formally guaranteed constitutional rights; municipal governments now account for roughly 15% of all public spending. Municipal governments receive most of their revenues from the federal government to fund these services, but municipalities also retain the ability to collect property and sales taxes. The federal government sets the level of the sales tax. Municipalities have some authority to set the property tax rate, but the variation is between 2% and 5% of assessed property value. Thus, federal rules severely constrain municipal governments' tax authority. The municipalization of service delivery made public officials directly responsible for schools, roads, and public health clinics– all visible areas that citizens demand.

Second, Brazil's governments built a vast participatory architecture during the 1990s and 2000s. Tens of thousands public policy councils are now in use across the country and millions of individual citizens have participated in policy conferences (Barretto Santos

2011; Pires and Vaz 2011). Most large municipalities have also used participatory budgeting programs that allow citizens to allocate a percentage of the municipal budget directly. This participatory architecture opened significant channels into policy-making arenas, giving citizens meaningful access to budgetary and policy-making processes and potentially strengthening connections between citizens and governments (Afonso and Rodrigues 2003).

Finally, Brazil features wide variation in municipal governance and municipal tax outcomes. Some municipalities collect taxes successfully while others, frequently with similar economies and local state capacity, do not. We test hypotheses connecting the equally-wide differences in municipal participatory architecture to tax compliance by exploiting variation across Brazil's 5,570 municipalities and within those municipalities over time. The result is a unique opportunity to estimate relationships and build rare, systematic knowledge surrounding tax compliance in the developing world.

Two New Types of Participatory Institutions

Local governments in Brazil experimented with and institutionalized two types of participatory institutions during the 1980s and 1990s: participatory budgeting and public policy councils.[3] In both institutions, citizens voluntarily participate in state-sanctioned policy-making process in which these citizens express *voice* and exercise *vote* on specific budget and policy issues. These are co-governance institutions, relying on the active engagement of both government officials and citizens. There is a voluminous literature on Brazil's PB programs and policy councils, so we only briefly describe these institutional processes.

Government officials adopt and initiate PB programs to reshape how the local government interacts with the broader public. Governments typically allocate 2-5% of the overall municipal budget to the programs, which incorporates citizens directly into decisions on how the money is spent. Citizens participate in the programs by attending a series of meeting over the course of the year, from large meetings that pull in thousands of people to small planning meeting that focus on technical issues. Citizens have three basic roles: the right to deliberate (exercise voice) in public forums over the distribution of scarce resources, the right to vote for specific projects, which governments then implement, and the right to monitor project implementation to ensure that public resources are spent as they were intended (Baiocchi 2005; Wampler 2007; Goldfrank 2011; Shah 2007). Importantly, municipalities often decentralize their PB meetings to encourage greater numbers of people to participate in their home communities, where they are typically better-informed about their needs. The programs theoretically result in more-informed citizens, better-targeting of community needs, more efficient, transparent spending, and stronger connections

[3] In addition, Brazilian governments also made extensive use of public policy conferences, which are held around thematic issues (health, environment). These councils are open to all citizens and produce non-binding policy recommendations at municipal, state and federal levels. Pogrebinschi and Samuels demonstrate how these decisions made in these conferences were later reflected in the decision-making of national executives and legislatures (2015).

between citizens, civil society organizations, and government officials. Recent evidence supports these assertions: studies show that PB promotes civil society organizations and is associated with lower infant mortality rates, all else equal (Touchton and Wampler 2014; Gonçalves 2014).

Brazilian municipalities also use public policy management councils to incorporate citizens into policy-making processes. Governments establish policy councils within specific policy arenas, such as health, education, and the environment. The councils' composition is typically split 50-50 between government officials and civil society. Municipal officials are typically appointed by the mayoral administration to occupy government seats, while community organizations, social movements, union representatives and service providers fill civil society seats; there are typically elections for the civil society positions. Citizens attend council meetings and raise concerns or offer insights about a specific policy area.

Councils are infused with two types of authority: policy formulation and oversight. Council members have the right to propose new policies and councils must approve the annual budget for the relevant policy arena and council. Council members also have a post-hoc oversight authority in which they must approve quarterly and end of year spending accounts as well as ongoing, active monitoring of policy implementation. The Brazilian federal government now requires that municipalities adopt councils in five areas (education, health, children's and adolescents' rights, social protection, and social assistance). However, municipalities voluntarily adopt many other councils and have done so in at least 20 different policy arenas, including women's rights, school nutrition, sanitation, and public safety.

Theoretically, councils incorporate citizens into many aspects of the policy-making process, from policy design and formulation, to implementation, oversight, and policy revision. Similar to PB, policy councils are designed to improve municipal performance by generating social accountability. There is evidence that the presence of voluntary policy councils related to health care improves municipal performance in that area (Touchton et al. 2017).

Previous studies of Brazil's participatory institutions thus show participatory institutions' promise for improving municipal governance, service delivery, and tax compliance. The previous studies are valuable, but limited data prevents them from developing and testing the many causal mechanisms that could link participatory institutions to improved municipal outcomes. Our study takes steps to address this gap and builds theory surrounding the causal mechanisms underlying relationships between participatory institutions and municipal performance in the next section.

Developing Theory and Specifying Causal Pathways

The institutionalization of participatory institutions creates opportunities for elected governments to shift how they engage citizens and civil servants. Under ideal circumstances, basic shifts in governance patterns follow the adoption of participatory institution, often leading to new policy-making and budgetary processes. Most importantly, the institutionalization of participatory institutions theoretically allows citizens to directly exercise formal votes over how governments and states will allocate scarce resources and utilize state authority.

Although there is a broad body of work on participatory institutions, there are few theories that specify how actual, existing, participatory institutions would affect key components of governance, such as tax compliance. To address this lacuna, we develop four potential causal pathways connecting participatory institutions to tax compliance. We categorize these pathways based on key mechanisms within each area: Individual inputs, collective inputs, collective oversight, and collective coalition-building. Importantly, we believe that there are valid theoretical reasons for why each pathway may alter tax compliance. Our theoretical contribution, below, is then to illuminate the distinct, but parallel ways that participatory institutions may affect tax compliance. We devote this section to building theory and therefore note that the causal pathways are based on an ideal type of how a well-functioning participatory institution may influence citizens and government officials.

Individual Inputs: Individuals engage in participatory institutions to draw the attention of government officials and their fellow citizens to pressing social and policy problems. Citizens participate under the reasonable expectation that their direct engagement will influence policy decisions. In many participatory institutions, including the two types covered in this paper, citizens insert their policy preferences at the beginning of the annual policy cycle when they participate in deliberative, policy-making processes. Most participatory venues use deliberative forums where citizens debate their preferences and vote on policy alternatives (often specific projects within PB or specific policies in Brazil's policy councils). Government officials are then charged with the responsibility of implementing the selected policies and projects.

Government services may then expand into areas that were previously underserved, both from a thematic and geographic standpoint, because citizens and CSOs use the deliberative forums to draw government officials' attention to pressing problems. Citizens are invested in the policies and project they select and therefore engage in greater oversight of policy implementation than they otherwise might, which leads to more and better quality public services. As a result of the direct citizen engagement with government officials, individual participants are more likely to hold their governments accountable and ensure that they deliver services using their tax revenue. They are also likely to perceive of governments as more legitimate in general, disseminating this perception within their social networks. Both the participating individuals and their social networks are then more likely to comply with tax rules.

However, most citizens do not participate in these participatory institutions and many may not know someone who does participate. Importantly, we hypothesize that municipalities where the government voluntarily adopts participatory institutions generate a network effect[4] in perceptions of accountable, legitimate government. Adopting participatory institutions drives a shift in governance as governments and civil society actors establish co-governance processes. Some citizens' effective participation and government support for this participation thus arguably generates a shift in governance, which spills over to non-participating citizens' perceptions as well. Thus, a shift in governance patterns generates attitudinal changes among non-participants.

Additionally, governments' political platforms are increasingly based on their ability to deliver the public goods that citizens select through participatory institutions. We hypothesize that governments are motivated to increase enforcement and facilitation efforts in conjunction with citizens' increased willingness to pay. Quite simply, it is more likely that government officials will look for additional resources to support public goods if government officials engage in ongoing deliberations with citizens on service delivery, policies, and project implementation.

Previous literature provides some evidence to support the claim that citizens' attitudes are shaped by their experience within participatory processes. For example, Wampler (2007) found that increases in governments' ability to implement projects through PB were statistically associated with survey respondents' belief that they had decision-making authority. This evidence, although not directly related to tax compliance, suggests that government performance shapes citizens attitudes. The broader lesson is that the presence of voluntarily-adopted participatory councils can shape citizens' attitudes.

<u>Collective Inputs</u>: Individual citizens may participate in these participatory venues, but most citizens are more likely to participate through their involvement in community organizations. Community groups often hold meetings prior to the formal government-sponsored meetings within the PB process and select individuals who will speak on behalf of their group's interests at the PB meeting. In the council system, community organizations often seek to have their leaders elected to the councils to represents their interests. Thus, solitary individuals are not the typical participants in these institutions. Instead, citizens that are linked to community organizations or social movements participate at greater rates.

The basic logic connecting collective inputs to tax compliance is similar to the logic surrounding individual-level processes—Groups mobilize in civil society, where they begin to establish their priorities. They then move into participatory programs where they express their policy preferences. The deliberation processes in the institutions leads them to interact with other groups as they vote for specific policy projects. The government, in turn, takes these policy decisions and implements the selected projects.

Project implementation results in an expansion of public services to underserviced areas, as shown by Marquetti (2003) and Wampler (2015). Participants thus learn that pursuing public goods through collective decision-making processes is beneficial, which increases accountability among governments and perceived legitimacy among citizens. Both

[4] On network effects and attitudes towards governments see, for instance, Delhey & Newton (2003), Settle et al. (2011).

governments and organized groups are quick to publicly hail the programs, which then reinforces perception of good governance and strong outcomes. Tax compliance then improves because a broader number of citizens come to believe that they have a voice in the political system and also because public services improve.

Thus, we also hypothesize that the network effect from individual participants to the rest of the municipalities will be greater when individuals participate as members of groups. One reason is that larger groups are more likely to have a greater impact on policy decisions because the leaders representing larger groups carry more weight in decision-making processes. The leaders then report back to their group about their positive impact, which then spills-over beyond the group members as these citizens take their ideas back to their broader communities. In addition, collective participation through community groups decreases the cost and time burden on the broader population, which then has the effect of overcoming basic collective action problems associated with participation.

Several studies provide evidence for the "collective-input" pathway connecting participation to civil society development and public services. For instance, Hordjik (2006) and Touchton and Wampler (2014) demonstrate that PB is associated with an increase in the number of civil society organizations operating in areas where PB has been implemented. In a similar vein, the literature suggests PB strengthens the provision of public services. For instance, a World Bank study (2008) assessing PB in Brazil finds a strong, positive association between PB and access to water services. Several studies in Brazil also find that PB is associated with higher spending in health care–related areas and lower levels of infant mortality (Gonçalves 2014; Touchton and Wampler 2014). Furthermore, Touchton et al. (2017) connect the presence of Brazil's policy management councils in areas related to health care with systematically lower infant mortality levels.

We evaluate the potential impact of individual and collective inputs by using data from participatory budgeting, where participants have the right to select infrastructure projects, social programs, or some combination of the two. We argue that the presence of participatory budgeting directly incorporates citizens' voice into budgetary and policy-making processes. In turn, these programs lead to greater support for state and government activities because governments using participatory institutions produce better well-being outcomes (see paragraph above). The process of incorporating citizens' voice and improving well-being then generates broader support for tax compliance.

> Collective Oversight: Groups that are involved in the selection of specific projects have vested interests in working to ensure that these projects are implemented well. Participatory institutions typically establish oversight committees to monitor project design, project bidding, as well as actual project implementation. These committees generate close working relationships among civil society leaders, civil servants, and contractors as they seek to ensure that scarce public resources are properly used.

For example, in Belo Horizonte the health council actively monitored how the government allocated resources to public health clinics and programs as well as to outsourced service delivery (Wampler 2015). In one instance, the health councils refused to approve the government's request to build a new hospital because the government had provided no information about the new project. The council ultimately approved the hospital, but not until after government presentations describing the project and several months of deliberation. This deliberative process generated wide-ranging discussions around resource allocation, tax revenues, municipal bonds, curative vs. preventive health care. Thus, the council made transparent and informed what had been a pro forma, opaque decision.

Oversight through participatory institutions limits waste, fraud, and incompetence in project implementation. Services expand and improve as a result and community members recognize these changes. In turn, community members are more likely to hold governments to their promises to deliver services using their tax revenue and to see governments as legitimate. Individuals and firms are then more likely to comply with local tax regulations.

We evaluate this potential using data on the formal, legalized presence of policy councils. Policy council representatives must approve the annual budget, significant policy additions, and year-end reports for their respective agency/department (e.g., health, education). In addition, council representatives (citizens voluntarily serving on councils) can more easily engage in ongoing monitoring because they are afforded a formal status that permits them to request and receive public information as well as enter public facilities (e.g., public hospitals).

Collective Coalition-Building: The literature lends wide support to the importance of coalitions between governments and citizens to carry out tax reforms (Brautigam 2004; Fjeldstad 2014; Flores-Macias 2016). Simultaneously, participatory processes are associated with building or sustaining broad social and political coalitions. These institutions increase contacts between governments, citizens, and CSOs, which leads to opportunities for building broader coalitions around policy reform and new institutional arrangements.

Building this broader political and policy coalition then allows for reforms, which may include creating administrative efficiencies. In turn, these administrative efficiencies may include better tax facilitation and enforcement mechanisms, which would increase tax collection. This has been the case, for instance, in some municipalities in the South-Kivu Province (DRC), with PB providing an enabling environment for local governments to review their administrative procedures and to implement reforms that may not have taken place otherwise. As Mbera & Allegretti (2014) show, through the PB implementation process in 2011, citizens and local authorities engaged in a constructive dialogue on how to increase local governments' tax revenues. This dialogue culminated with the abolishment of the system of direct cash payments to tax collectors, which was perceived by governments and citizens as a major source of leakage and corruption.

The most successful PB cases in Brazil are noteworthy for the creation of new governing coalitions. In Porto Alegre, Belo Horizonte, and Recife, political outsiders came to power promising new ways of governing. In all three cities, governments that invested heavily in PB won 4 consecutive elections, thus permitting them sufficient time to initiate a new democratic and policy cycle. In Belo Horizonte, for example, 57% of PB resources were spent in low-income and high-need neighborhoods (which comprised 34% of the city's population), which created an incentive for citizens and community leaders in these communities to vote for the incumbent party (Wampler 2015).

We evaluate this potential by analyzing the number of years that PB is in place. We hypothesize that an increase in the number of PB years contributes both to its institutionalization as a policy-making venue as well as to consolidating a broader base of political support. PB programs are most vulnerable to abandonment when the implementing government loses the subsequent elections; PB programs become "stickier" when governments win multiple elections. We would expect that a greater number of PB years indicates greater support for the new governance model and, hence, produces greater tax compliance.

In sum, the section above contributes to building theory to help us better explain why and how participatory institutions may alter governance patterns. We specify four pathways for how the presence of new democratic institutions may alter citizens' attitudes and behaviors as well as government officials' activities. It is important to highlight that these different pathways are not mutually exclusive, and are likely to be mutually reinforcing. We also contend that local context is likely to determine which pathway, or combinations of pathways, may have a stronger effect on tax compliance. For instance, the collective coalition pathway may play a less important role than the collective input and collective oversight pathways in environments where tax administration capacity of enforcement and facilitation is well-developed. Conversely, the collective coalition model may play a more important role in mobilizing support to carry out additional tax reforms in contexts where citizens' tax morale is relatively high. The validation of these pathways, however, remains an empirical question, and one which we only have sufficient data to partially address in this study.

Data and Methods

We use a variety of analytic techniques to estimate relationships between participatory institutions and local tax outcomes in Brazil. The following section describes our variables and the techniques we use to evaluate potential relationships between them. We selected these variables as indicators of local community's willingness to fund the local government. However, they could also reflect the local government's efforts surrounding enforcement and facilitation. We use several additional variables to capture the government's ability to enforce and facilitate tax collection as well as local economic and political conditions that could influence tax outcomes. We then use matching to isolate the remaining variation to better estimate our treatments' impact on tax outcomes after accounting for local tax facilitation and enforcement capabilities, economic conditions, and other confounding variables. All dependent variables are in constant, 2010 Brazilian *reais*.

We also present the results of hypothesis tests using various lags between the participatory institutional treatment and tax outcomes. For example, we know when PB programs began, with many emerging during the timeframe of the study. We can therefore assess different arguments surrounding when tax outcomes might be expected to appear, if they are indeed connected to PB. We begin with one-year lags, but also develop models using two and five-year lags of our dependent variables as well as a three-year moving average of tax outcomes. Unfortunately, we do not know when municipalities adopted policy councils and therefore estimate their relationship with tax outcomes based on the councils' presence, with no lag in terms of potential impact.

Dependent Variables

Local Tax Share of Municipal Revenue

We collect data on the local tax share of municipal revenue as our first indicator of tax compliance. The local tax share of revenue reflects the community's willingness to fund the government as well as the municipal government's ability to collect tax revenue. The tax share of municipal revenue is distinct from federal transfers, which comprise a large percentage of local budgets in Brazil. The measure has a mean of 5% and a standard deviation of 5.

Per Capita Local Tax Revenue

This indicator provides a broad view of the local tax environment. Annual, per capita, local tax revenue also reflects the relative willingness of municipal residents and firms to fund the local government and the municipal government's ability to collect revenue. We use the base 10 logarithm of this indicator, whose mean is 3.80 with a standard deviation of 1.13.

Per Capita Property Taxes (IPTU)

The tax collected on the value of land and improvements is another locally-collected tax that reflects individuals' and firms' willingness to fund the government. Municipal governments assess property values on an annual basis and then levy taxes at identical rates across municipalities. We use the base 10 logarithm of this indicator whose mean is 1.28 with a standard deviation of 2.08.

Per Capita Sales Taxes (ISS)

Municipalities are required by federal law to have a sales tax. The sales tax collected per capita is another indicator of commercial firms' willingness to fund the local government. The sales tax rate varies across municipalities and can be set between 2% and 5%. Complete data on municipal sales tax rates are not available, but we account for this variation in a sub-sample of the 100 most populous municipalities in São Paulo below. We use the base 10 logarithm of this indicator as well. The mean is 2.65 and the standard deviation is 1.36.

Independent Variables

Voluntarily-adopted Policy Management Councils

We use the Brazilian Institute of Geography and Statistics' survey data on the presence of 21 different local policy councils among Brazil's municipalities (IBGE 2016). These councils include health councils, women's councils, housing councils, and cultural councils among others. Municipalities adopt some councils, such as health and education councils, at very high rates due to federal financial incentives. For example, the mean health council adoption rate in our data is 80% and adoption rates in 2013 approach 100%. Thus, the presence of a health council is an inappropriate measure for testing our arguments connecting participatory institutions to tax outcomes due to the very low variation across municipalities. However, many other councils could relate to public services, democratic accountability, legitimacy, and taxation and carry no federal funding with them. For example, urban planning, food security, environmental sanitation, and women's rights councils do not come with federal funds. The adoption rates for these councils are subsequently much lower, as low as 5% across Brazil.

We treat the councils that carry no federal funding as being more "voluntary" than those for which there is a clear financial benefit for municipal adoption. The presence of voluntary councils allows for a better test of our arguments than the "induced" councils because their adoption is not required. We thus hypothesize that adopting these more voluntary councils represents a greater municipal and civil society commitment to democratic participation than does adopting councils with federal inducements. This argument is consistent with scholarship connecting the growth of a stronger civil society and an interested mayoral administration with the voluntary adoption of additional councils (Pires and Vaz 2012; Gurza Lavalle et al. 2015). Finally, voluntary council adoption signals that CSOs and public officials also seek collaborative relationships to improve policy outputs.

We use several variables to account for the presence of local policy councils. First, we use a dummy variable to record whether municipalities have a council presence that is greater or lesser than the mean. This indicator is coded "1" if a municipality features more than the mean number of voluntary policy councils in a given year and "0" if it does not.[5] The second indicator records whether a municipality has greater than one standard deviation above the mean voluntary council presence and 0 if it does not. Of these observations, 14% are coded "1" and 86% are coded "0". The third variable records whether municipalities have a mean or greater than mean-level of councils that do carry federal funds with them. Finally, we record the percentage of voluntary councils, out a possible total of 17. The mean percentage is 35 and the standard deviation is 21.

Participatory Budgeting (PB), Years PB has been in place

We updated Boulding and Wampler's (2008) original database of PB for all Brazilian municipalities with at least 100,000 residents (N = 253). Our information on the adoption of PB programs comes from similar sources as theirs: surveys of Brazilian officials, a non-governmental organization's records, and secondary sources for the 1989–2016 period (Spada et al. 2016; Wampler and Touchton 2017; Spada et al. 2012; Torres and Grazia 2003; Wampler and Avritzer 2008). We 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 participatory budgeting programs (Avritzer and Navarro 2003; Goldfrank 2007; Nylen 2003; Wampler 2007). 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 1989–2016, 138 municipalities in our data set adopted a participatory budgeting program for at least four 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 tax outcomes. We recorded a 0 for municipalities that had not adopted PB during each four-year timeframe between 1989 and 2016 and a 1 for those that had. 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 timeframe our data cover.[6]

We select municipalities with more than 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 the overwhelming majority

[5] The source surveys we use do not always include the same question for each year. We assume municipalities maintained their policy councils through the mayoral administration when the survey question was originally asked in the absence of countervailing evidence. This assumption aligns with survey responses in our data set where only 3% of municipalities eliminated a policy council during the same mayoral administration.

[6] There are approximately 3% of cases in our data set where a municipality adopted participatory budgeting, abandoned it and then adopted it again.

of this 85% lived in cities with more than 100,000 residents (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 5,317 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.

Administrative Capacity: Permanent administrative employees per capita, decentralized management score (IGD)

The Bolsa Família program is administered at the municipal level and management quality varies considerably. We use operational data from the Ministry of Social Development (MDS), called the Index of Decentralized Management (IGD), to capture this variation. The MDS rates each municipality on how well it administers program elements, such as updates to the Unified Registry and tracking of beneficiaries' compliance with conditionality requirements. The MDS offers greater funding to cities that perform better on the IGD. Quality of local management should reflect a combination of local political commitment as well as existing municipal state capacity. Quality of local management is likely to influence local outcomes independently from the broad Bolsa Família coverage, which is often high in municipalities where management is poor, such as settings with dense poverty. This variable is continuous from 0 to 1 and each municipality receives an annual score; better management results in scores closer to 1 and worse management closer to zero. The mean score is .76 and the standard deviation is .15.

Other Sources of Revenue: Capital Revenue, Federal Budget Transfers, Gross Local Product per Capita

We collect data on sources of revenue beyond local tax collection as well as federal transfers, the primary source of municipal budgets in Brazil. Revenue collected from non-tax sources and federal transfers could influence local tax collection in different directions. On the one hand, access to revenue and resources beyond the local tax base may limit municipal governments' incentives to collect additional revenue from local sources, especially if collecting that revenue comes at a political cost. On the other hand, external resources may promote municipal capacity to enforce tax regulations and facilitate payments. Either way, we include data on these external resources to account for their influence on tax collection. other sources evaluate the extent to which public spending contributes to well-being. Finally, we include an indicator for local GDP per capita to account for local economic activity that we expect to be associated with tax revenue. Including local GDP per capita in models of tax collection also captures economic and resource based unobservables that could influence both the adoption of participatory institutions and tax outcomes. The measure is in constant Brazilian *reais* and comes from Brazil's Institute for Geography and Statistics (2017).

Competitive Elections

We code data on the relative competitiveness of municipal elections to address the prospect that electoral accountability drives better municipal governance and incentivizes tax collection. Specifically, we address this prospect by recording the mayor's overall vote share in the previous election's first round.[7] These measures come from Brazil's Superior Electoral Tribunal: http://www.tse.jus.br/.

Mayor's Party

Mayors from Brazil's Workers' Party (PT) have historically supported local political participation. PT mayors may therefore adopt and support participatory institutions at greater rates than non-PT mayors, which could influence institutional performance. Mayors from the PT may also support greater spending on services, such as for health and sanitation, and efforts to achieve desirable outcomes in these areas, such as by reducing infant mortality levels (Touchton and Wampler 2014). PT mayors might convince residents to comply with tax regulations at greater rates than other mayors in this scenario, but there are also reasons to believe that municipalities with PT mayors could collect systematically lower taxes than other municipalities with mayors from a different party, all else equal. For example, the PT is a center-left party, but firms may believe that other parties serve their business interests better and may withhold taxes to protest PT spending on poor populations over infrastructure projects that benefit firms as well as middle- and upper-class Brazilians more directly. The point here is that the mayor's party could influence participatory institutional performance and tax compliance and we therefore account for it in our estimates. We do this by coding a dummy variable as "1" if municipalities have a PT mayor in a given year, with mayors from all other parties receiving a score of "0" to account for this prospect.

Presidential Vote

We include a measure of municipal support for PT presidential candidates, who were elected in 2002, 2006, 2010, and 2014. These PT Presidents promoted participatory institutions and social programs; we control for the possibility that some municipalities and their residents are more committed to specific programs and institutions associated with these presidents, which could potentially influence the general support for empowering these programs, and, in turn, the municipal governments that adopt them by complying with tax laws.

[7] Brazilian municipalities with fewer than 200,000 residents use single-round mayoral elections. These municipalities represent the overwhelming majority of our data set.

Identification Strategy

We deploy a series of treatment effects estimates using nearest-neighbor and propensity score matching to address concerns for endogeneity in estimating relationships between participatory institutions and tax outcomes (Ho et al. 2007). Specifically, municipalities that adopt participatory institutions may be predisposed toward good governance or have an unobserved proclivity to pursue pro-tax outcomes and employ superior tax collection practices relative to those that do not adopt participatory institutions. Any results from analyses that do not account for this possibility in some way risk attributing tax outcomes to participatory institutions when the outcomes might simply reflect municipalities' underlying predispositions or unobserved, omitted variables that influence both adoption of participatory institutions and tax outcomes. Matching allows us to simulate an experiment and use participatory institutions as experimental "treatments". We match municipalities on annual observations of per capita gross local product, the index of decentralized management, the level of political competition in mayoral races, and the mayor's party.[8] We can then estimate the effects of the participatory treatment by comparing municipalities that are otherwise similar (the nearest neighbor to one another), with the exception being that one municipality had a participatory institution or set of institutions and the other, very similar municipality did not. This reduces the likelihood that municipalities' unobserved predispositions toward strong or weak service delivery, superior resources, or strong or weak governance is driving any results because we would expect such predispositions to appear in other areas, like administrative capacity or local economic conditions. In this way, we compare municipalities that exhibit high and low levels of other factors that might influence tax outcomes with other municipalities that feature similarly high or low levels.

We present the results of matching using nearest-neighbor algorithms to generate propensity scores over other matching options (e.g. kernel, nearest-neighbor with caliper, etc.) because nearest-neighbor matching results in more balanced covariates. The general algorithm we use is as follows:

$$\text{ATT} = \frac{1}{N^T} \sum_{i \in t} [\, Y_i^T - \sum_{j \in C(i)} w_{ij}\, Y_j^C]$$

Where N^T is the number of treated units, $C(i)$ is the set of covariate control variables we match to each treated unit i, N_i^C is the number of control variables matched to each treated unit i, and $w_{ij} = \frac{1}{N_i^C}$ if $j \in C(i)$, otherwise $w_{ij} = 0$.

Matching improves the variance ratio among the covariates between raw and matched data, though balance decreases across covariates as we move from policy management councils, with almost 6,000 treatment observations, to municipalities

[8] We do this with replacement, where the same annual, municipal observation can be used more than once as other municipalities' three nearest-neighbors.

with eight or more years of PB, and only 156 treatment observations.[9] These tables help us select between nearest-neighbor matching, which we use in most cases, and other matching options, which occasionally generate greater balance across covariates.

Table 1

Average Treatment Effects of Participatory Institutions on Tax Outcomes

Variable	**Tax Share of Revenue** **Treatment Effect (SE)**	**Per Capita Taxes (logged)** **Treatment Effect (SE)**	**Per Capita IPTU (property tax, logged)** **Treatment Effect (SE)**	**Per Capita ISS (Sales tax, logged)** **Treatment Effect (SE)**
Policy Management Councils	0.02** (0.002)	1.33** (0.05)	1.13** (0.03)	1.17** (0.05)
PB	0.01** (0.003)	2.19** (0.03)	2.47** (0.08)	2.44** (0.05)
Years of PB (8 or More)	0.04** (0.01)	2.39** (0.04)	2.45** (0.06)	2.52** (0.11)
N: Councils	62,954	60,361	59,524	59,648
PB	7,005	6,990	3,416	6,375

* indicates P> IZI at less than 0.05.
** indicates P> IZI at less than 0.01

Results

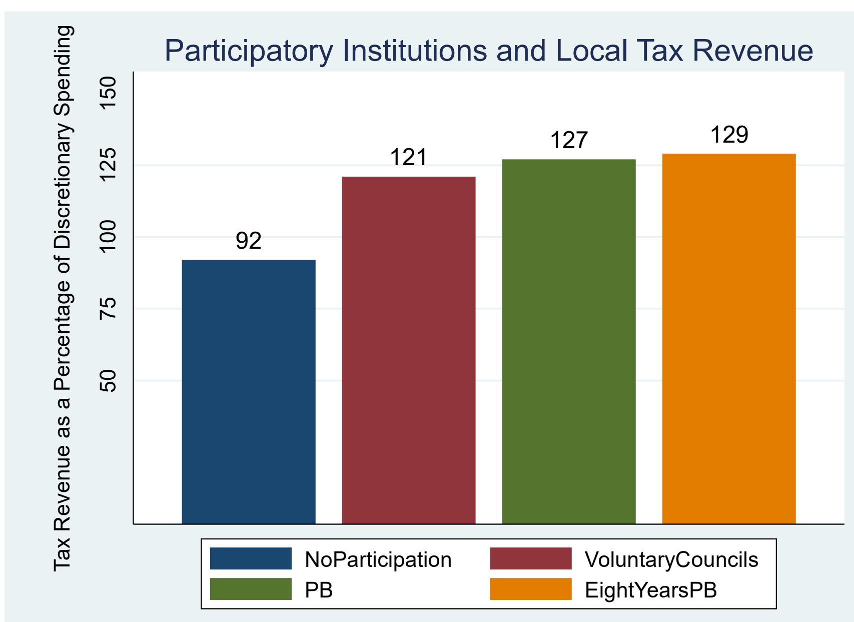
Our results demonstrate positive, statistically significant relationships between policy management councils and tax outcomes. Matching isolates the effects of councils and PB on tax outcomes from other confounding factors, such as local GDP, administrative capacity, and the political environment. We present the results of estimation in terms of average treatment effects, which we consolidate across the different dependent variables. On average, municipalities with greater-than-mean-levels of policy councils have tax outcomes that are 27% greater than those without the councils averaged across

[9] We present extensive balance tables in separate appendix that include summary statistics for the matched pairs we generate for each participatory treatment and each outcome variable.

different tax areas. This is after matching on other important dimensions, such as local GDP, administrative capacity, and the local political environment. This estimate translates to approximately 2.5% of mean municipal budgets, but to 31% of capital investment spending. [1] We also find support for the relationship between a continuous measure of the percentage of voluntary policy councils over the possible total and tax outcomes.

On average, municipalities with PB have tax outcomes that are 34% greater than those without PB. This translates to approximately 3% of mean municipal budgets, but 38% of capital investment spending, which is largely discretionary at the municipal level. These relationships strengthen when PB has been in place longer. On average, municipalities with PB for over 8 years have tax outcomes that are 39% greater than those without PB (3.3% of mean budget, and 40% of capital investments). We do not know how governments spend the new revenue. Some of the revenue could be spent at the municipal government's discretion to fund new programs, but much of the revenue also likely goes toward non-discretionary spending to fund existing obligations. Still, the potential for impacting programs, service delivery, and well-being is large in comparison to existing discretionary spending. We therefore depict the relationships above in terms of discretionary spending to show the power of the treatments. For example, we estimate that having PB for eight years generates tax revenue equal to 1.29 times mean discretionary spending, or, a 29% increase. Figure 1 presents these estimates graphically.

Figure 1



Addressing the Causal Chain

Our results demonstrate connections between participatory institutions and tax outcomes, but we do not know which, if any, of the potential causal pathways we describe above generate these results. We now address these questions in several ways. First, we estimate treatment effects for participatory institutions on municipal spending and outcomes surrounding health care. Our logic is that tax compliance is conditional on service delivery and outcomes. One way that participatory institutions may influence tax compliance, then, is by improving services and outcomes in specific issue areas of concern to the community. Bodea and LeBas identify service delivery performance as a central factor explaining support for universal tax obligations (Bodea and LeBas 2016). Municipal spending is not always sufficient to improve performance in different issue areas, but it is often a precursor to better services and improved standards of living. We do not have data on when the participatory institutions are adopted in some cases, or coverage of covariates going back to the time of adoption in others. We therefore focus on participatory institutions' influence on the next year's spending levels and outcomes associated with spending. We focus on health care spending and infant mortality, where short-term change is possible, and where coverage of participatory institutions in plausibly-related areas is high. In this case, we explore the extent to which the presence of voluntary sanitation, environmental sanitation, women's rights, food security, and urban policy councils are associated with health and sanitation spending in the subsequent year and then infant mortality in the year after that. These are the voluntary councils most closely related to infant mortality, with health and sanitation spending as a potential intermediate step toward reducing infant mortality. We also evaluate the extent to which PB, and eight years or more of PB, are independently associated with health and sanitation spending and infant mortality.

Table 2

Average Treatment Effects of Participatory Institutions on Health and Sanitation Spending and Infant Mortality (2001-2013)

Variable	**Health and Sanitation Spending (per capita, logged, year n+1)** **Treatment Effect (SE)**	**Infant Mortality per 1,000 Births (year n+2)** **Treatment Effect (SE)**
Policy Management Councils	0.02* (0.008)	-4.003** (0.35)

PB	0.18** (0.03)	-0.91** (0.23)
Years of PB (8 or More)	0.32* (0.16)	-7.07** (1.41)
N: Policy Councils	62,954	60,361
PB	7,005	6,990

We find that voluntary policy management councils in areas surrounding health care are associated with high levels of health and sanitation spending relative to municipalities that lack these councils, all else equal. Similarly, we find that PB is associated with still higher levels of health and sanitation spending. Voluntary policy management councils related to health care are also related to infant mortality levels, which are systematically lower in municipalities with these councils.

Another possibility in the causal chain is that participatory institutions might lead to very visible public spending in areas that are desirable to the taxpayer. This is also similar to Bodea and LeBas' survey results in Nigeria: citizens satisfied with government services support universal tax obligations (Bodea and LeBas 2016). In this case, we exploit variation in PB spending decisions across municipalities and assess the extent to which spending patterns are associated with subsequent tax outcomes. Specifically, we asked PB administrators whether their programs supported more social programs and projects, such as those in health care and education, more capital projects, such as roads, buildings, or other facilities, or a mixture of both. Previous scholarship suggests that capital projects tend to appeal more to middle- and upper-class residents than social programs that target the poor (Wampler 2015). Roads and buildings are also theoretically more visible than social programs in the sense that new roads and buildings are potentially more apparent than new programs that use existing infrastructure or additional funding for existing programs– especially those that are geographically concentrated in poor communities. Only a handful of municipalities selected capital spending as their primary use of PB funds, but PB programs are relatively split between supporting a mix of capital and social spending alone. We therefore expect a mix of projects and programs to increase projects' visibility and, subsequently, improve broader perceptions of government performance and service delivery for tax compliance purposes.

Table 3

Average Treatment Effects of Participatory Institutions on Tax Outcomes (2000-2012)

Variable	Tax Share of Revenue Treatment Effect (SE)	Per Capita Taxes (logged) Treatment Effect (SE)	Per Capita IPTU (property tax, logged) Treatment Effect (SE)	Per Capita ISS (Sales tax, logged) Treatment Effect (SE)
PB Spending on Capital Projects and Social Programs	0.006* (0.003)	2.04** (0.09)	1.92** (0.17)	1.85** (0.23)
N: 3,256 treated/3,744 control				

* indicates P> IZI at less than 0.05.
** indicates P> IZI at less than 0.01

We find that municipalities with PB that pursue a mix of capital and social projects collect more tax than those with PB that pursue more social projects and programs and more than municipalities without PB. This suggests that broad, visible public spending is associated with democratic accountability and perceived legitimacy in government- particularly among wealthy property owners and firms paying the bulk of local tax who might not support a government that spends on health care for the poor to the exclusion of infrastructure projects that could benefit a broader swath of residents.

Robustness Checks

We use matching to address the prospect of endogeneity driving relationships between participatory institutions and tax outcomes above. However, we can go farther to model the presence of participatory institutions and any subsequent relationships they might have with tax outcomes. There is some anecdotal evidence that municipalities with stronger economic conditions adopt and maintain participatory institutions, all else equal, because of the need for resources to administer the programs and to provide project funds. Municipalities that are more economically productive also tend to have greater concentrations of CSOs, which are thought to pressure municipal governments to adopt participatory institutions and sustain their performance. The prospect for omitting these potential connections using matching is not great, given our large number of municipal observations. Nevertheless, we use an endogenous treatment effects estimator to address this prospect by removing the log of GDP per capita from our set of matched covariates and using it as a direct, first stage estimator for participatory institutions below.

Table 4

Endogenous Treatment Effects with logGDP per capita as determinant of Participatory Institutions.

Variable	**Tax Share of Revenue** **Treatment Effect (SE)**	**Per Capita Taxes (logged)** **Treatment Effect (SE)**	**Per Capita IPTU (property tax, logged)** **Treatment Effect (SE)**	**Per Capita ISS (Services tax, logged)** **Treatment Effect (SE)**
Policy Management Councils	0.11** (0.001)	1.95** (0.01)	1.25** (0.01)	1.30** (0.003)
PB	0.19** (0.004)	2.18** (0.04)	2.51** (0.02)	2.34** (0.002)
Years of PB (8 or More)	0.14** (0.01)	1.55** (0.12)	1.37** (0.03)	1.63** (0.01)

We find that the log of GDP per capita is indeed related to the presence of voluntary policy management councils and PB. Using those estimates, we still find connections between participatory institutions and tax outcomes, though some of the estimated average treatment effects are lower than in Table 2 above.

We then consider the possibility that variation in municipal tax rates drives our results surrounding tax outcomes. As noted above, Brazilian municipalities set their own sales tax rates, which can fall between 2% and 5%. Data on local sales tax rates are not available across Brazil, but we were able to collect them for a subset of São Paulo's 100 most populous municipalities in 2015. Estimating average treatment effects within these municipalities decreases our matched observations substantially, but does not change the direction or statistical significance of the relationships we identify between participatory institutions and tax outcomes in the broader sample. Municipal tax rates are statistically significant determinants of some tax outcomes (sales, per capita tax revenue) in Arellano-Bond models, but participatory institutions also remain statistically significant. We take these results as good omens for the independence of relationships between participatory institutions and tax outcomes, though we would be more certain with full data on sales tax rates for all Brazilian municipalities.

Next, we address the possibility of non-linear relationships between participatory institutions and tax outcomes at different levels of taxation and tax shares of revenue. This is because participatory institutions might promote tax collection differently in different socioeconomic environments. For example, participation could be associated with tax compliance in places where tax revenue is low, but face diminishing marginal returns in areas where tax collection is already relatively high.[10] We find that the average treatment effects of participatory institutions on tax outcomes are consistent across municipalities with different levels of tax collected. The one exception is the number of years that PB has been in place, which is not statistically connected to the municipal tax share of revenue or per capita tax revenue in municipalities where tax collection is more than one standard deviation above the mean.

Finally, we address concerns for our matching exercise in general. We use matching because it provides highly-targeted hypothesis tests connecting participatory institutions to tax compliance. However, our goal is not to build comprehensive models of tax compliance because we lack strong, direct measures of local enforcement and facilitation. Instead, we build theory and test hypotheses surrounding alternative, complementary ways to generate compliance using propensity score matching to isolate participatory institutions' independent effects. Nevertheless, we also provide the results of estimation for tax outcomes using Arellano-Bond Dynamic Panel Estimation, allowing a full range of covariates to vary across our models. Participatory institutions remain statistically significant determinants of tax outcomes in these models, along with measures of local administrative capacity and local GDP per capita. Participatory institutions are positive determinants of tax outcomes. Councils are consistently connected to tax outcomes. Other variables we use in the matching exercises above are not statistically connected to tax outcomes in these models.

Conclusion

Our results demonstrate broad connections between participatory institutions and local tax outcomes in Brazil. Policy management councils and participatory budgeting programs are both statistically significant determinants of a variety of tax measures after accounting for local economic and political conditions as well as proxies for the capacity to enforce tax regulations and facilitate tax collection. Participatory

[10] Data available in separate appendix.

institutions are designed to engage citizens, increase transparency, and improve governance.

This study also highlights an important point for those working with development and public sector reform. The findings suggest the need to consider the fact that participatory institutions, as most institutional reforms, may take time to produce noticeable effects. Rushing to draw conclusions at early stages of participatory governance interventions may result in misleading assessments or, even worse, it may lead to discontinuing efforts that are yet to bear fruit in the medium and longer terms.

Concerning our findings' external validity, our results may stem, in part, from Brazil's decentralization of service delivery and taxation combined with legal and *de facto* structures that promote participation. However, whether these are necessary conditions for the generalization of our results remains an empirical question. Nevertheless, our findings lend additional support to the broader and growing body of evidence – beyond the Brazilian context – that links participatory governance to tax compliance.

Ultimately, we argue that good governance promotes accountable, legitimate government, and tax compliance. Our results align with this reasoning, but we also address several segments of the causal chain connecting participatory institutions to tax compliance. We argue that one aspect of good governance is delivering public goods and promoting high standards of living. In turn, the public will deliver taxes when they believe that they can hold the government to account for spending decisions. Our results surrounding health care and sanitation spending and infant mortality corroborate this reasoning: health care and sanitation spending is systematically higher and infant mortality systematically lower in municipalities that voluntarily adopt participatory institutions. These results do not encompass all links in the causal chain connecting participatory institutions to tax outcomes. Nevertheless, they shed light on important elements of good governance, accountability, and perceived legitimacy as key elements of tax compliance. We do not suggest that governments should ignore enforcement and facilitation as measures to increase tax revenues. These aspects of tax compliance are also important and should be retained as compliance strategies.

However, our research provides evidence that good governance can complement other strategies in pursuit of tax compliance. Governments that adopt participatory institutions make investments in democratic accountability and legitimacy that pay dividends in tax revenue. In turn, more revenue can increase the capacity to deliver better services, which begets still more legitimacy. Optimally, rather than simply extracting revenue from an unwilling population, tax compliance strategies that emphasize accountability and legitimacy can inaugurate a virtuous circle that benefits citizens and governments alike.

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