

# Fiscal Capacity, Income Distribution, and Taxation in Brazilian Municipalities\*

Florian M. Hollenbach<sup>†</sup> & Thiago Silva<sup>‡</sup>

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<sup>†</sup>Assistant Professor, Department of Political Science, Texas A&M University, College Station, TX, USA, 77843-4348. Email: florian.hollenbach@tamu.edu

<sup>‡</sup>PhD Candidate, Department of Political Science, Texas A&M University, College Station, TX, USA, 77843-4348. Email: nsthiago@tamu.edu

# 1 Introduction

Why do some countries redistribute more income and wealth than others? This question has been troubling political scientists for a long time (Milanovic, 2000; Iversen and Soskice, 2006, 2009; Timmons, 2010; Albertus and Menaldo, 2014; Acemoglu et al., 2015). One of the most famous explanations is that within democracies higher inequality ought to lead to higher levels of distribution, as the income difference between the median voter and mean income increases (Romer, 1975; Meltzer and Richard, 1981). Yet, empirically this theoretical prediction has found little support (e.g. Elis, 2011). One such case that is hard to reconcile with the Meltzer and Richard (1981) model is Brazil, a democracy since the mid-eighties, with high levels of inequality but comparatively limited redistribution (Barros, Henriques and Mendonça, 2000; Souza and Medeiros, 2015; Medeiros, Souza and Castro, 2015; Arretche, 2015).

Within this work on redistribution, scholars have generally assumed states to be capable of raising taxes efficiently and redistributing income. Thus, the question became under which circumstances do governments decide to pass redistributive policies. More recently, an emerging trend in the literature, however, has argued that political and economic elites in previous autocratic regimes may undermine future political processes and limit political choices through institutional designs (Albertus and Menaldo, 2014; Ardanaz and Scartascini, 2013), opening capital markets (Pond, 2015), or limiting state capacity (Acemoglu et al., 2015; Hollenbach, 2016). Therefore, even if democratic polities are strongly in favor of higher taxes and redistributive policies, institutions and bureaucratic legacies may undermine the political and administrative process such that *de facto* redistribution is blocked.

In this paper, we question whether the influence of economic elites on the ability of the

state to collect taxes can persist through democratization and in democracy. Specifically, can economic and political elites undermine efforts for higher taxation in democracies by lowering tax capacity at the local level in Brazilian municipalities?

We know that countries are far from perfect in their efforts to collect taxes. In fact, governments vary greatly in their ability to collect the taxes they set forth. For example, consider Figure 1, which shows a crude estimate of tax evasion for each country in the world averaged for the years 2000-2007.

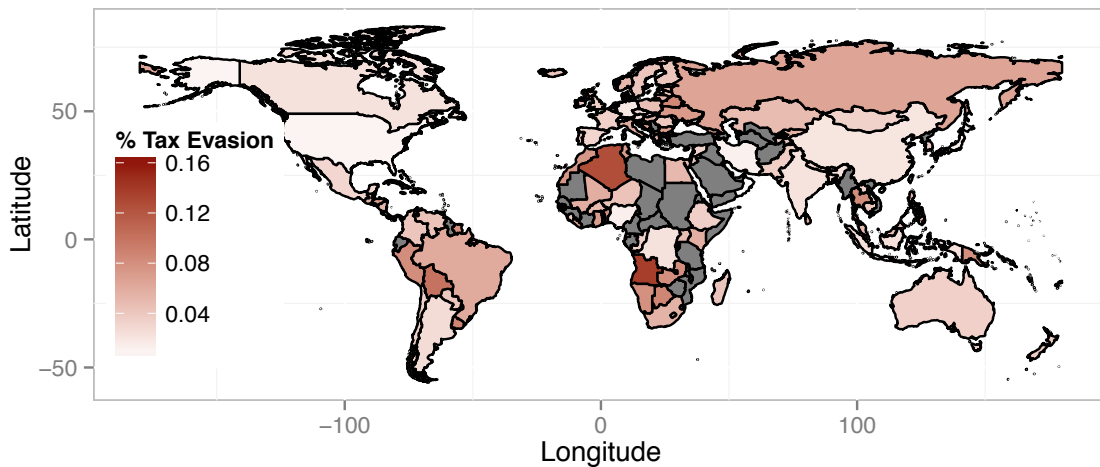


Figure 1: Estimated Tax Evasion around the World in 2000–2007

As one can observe in Figure 1, the level of tax evasion varies considerably around the world. We endogenize the capacity of the state to enforce tax policies and argue that even when political majorities are in favor of redistributive policies, economic elites have incentives to undermine the state’s ability to collect taxes. The incentive to undermine the administrative process of tax collection is especially high when the electoral majorities in favor of high redistribution exist. In fact, the higher the equilibrium level of redistribution without intervention, the stronger is the incentive for economic elites to undermine the state’s fiscal capacity. Weakening the administrative and tax capacity of the state gives economic elites an

avenue to constrain policy choices and *de facto* levels of taxation outside the political system.

To investigate our theoretical argument we examine the taxation, economic, and political institutional structure of Brazil. We collect data on political and economic variables at the municipal level and relate it to collected tax revenue, as well as measures of tax collection capacity. By using data on over 5,500 Brazilian municipalities, we are able to show that, controlling for a variety of other factors, localities with higher levels of inequality actually raise lower levels of revenue from the local property tax. These results are robust to estimating spatial models, as well as two year panel models with year and municipal fixed effects.

This manuscript proceeds as follows. We first shortly discuss related research and build our theoretical argument. Section 4 discusses the institutional and fiscal structure of Brazil and how this unique case enables us to investigate our general theoretical argument. We then discuss the empirical strategy and data. In Section 6 we undertake the empirical analysis and describe our results. The implications of our findings and avenues for future research are discussed in Section 7.

## **2 Fiscal Capacity & Public Spending**

The most common underlying view of political transitions from authoritarian to democratic regimes is that the political power moves from the few to the many. As such, we generally believe that as this shift occurs, the increase in the size of the “selectorate” (Bueno De Mesquita et al., 2005) also lowers the average income of those who are now in charge of the political decision making process (or who (in)directly elect those actually in power). Now as the average income in the group decreases and the size increases we expect to see more demand for taxation, to finance public goods (such as education) or redistribution (Bueno De

Mesquita et al., 2005).

This idea has also been formalized in the work by Acemoglu and Robinson (2006) and Boix (2003), who building on work by Meltzer and Richard (1981), argue that the threat of higher redistribution in democracy can prevent peaceful transitions to democracy when inequality is high (or at medium levels). The underlying model of both formalizations is the Meltzer-Richard (1981) model, which famously shows that within democracies, levels of redistribution ought to be directly related to inequality (or more specifically the difference between the median voter's income and mean income). In other words, given some income distribution and self-interested voters, it is expected that voters demand income redistribution –through transfers and taxes – until the income of the median voter reaches the mean income level (Przeworski, 2009).

Two empirical predictions follow from these formalizations: 1) Within democracies, higher inequality should be associated with more redistribution; 2) As countries transition from autocracy to democracy, redistribution ought to increase, all else equal. Yet, empirically it is hard to find strong support for either of these claims (Ahlquist and Wibbels, 2012; Ansell, 2010; Haggard and Kaufmann, 2012; Milanovic, 2000; Moene and Wallerstein, 2003; Elis, 2011, e.g.).

More recently scholars have begun to search for possible explanations for the lack of empirical support for these clean and overall persuasive theoretical predictions. One angle is the idea that authoritarian regimes and politics can have long lasting impact on fiscal policies even in subsequent democratic regimes. For example, Albertus and Menaldo (2014) argue convincingly that regime change only leads to substantive increases in redistribution in those cases where autocratic elites are unable to shape the transition. In other words, it is possible

for autocratic elites to influence and shape future democratic politics via the institutional design of the new democracy or rather by influencing the “rules of the game” (Albertus and Menaldo, 2014). In a similar vein, Ardanaz and Scartascini (2013) contend that higher inequality is associated with more legislative malapportionment, which in turn makes it easier for elites to politically prevent high levels of redistribution under democracy.

On the other hand, instead of influencing the creation or modification of the democratic institutions, others have argued economic elites could undermine the political process by keeping state capacity weak. As defined by Kurtz (2013, 3), state capacity is “the ability of the state to induce residents, firms, and organizations to act in ways they would not in the absence of its regulatory and administrative presence.” Specifically, Acemoglu and Robinson (2008) argue that while *de jure* political institutions may change, this gives economic elites reason to invest in subversion of those institutions, aiming to “capture democracy” and *de facto* influence policy decisions. Similarly, Acemoglu, Vindigni and Ticchi (2011) formalize the idea that when inequality is high and the potential cost from redistribution under democracy is large, the expectation of a transition to democracy can lead autocratic elites to push for an inefficient state structure with corrupt (“captured”) bureaucrats. This inefficiency of the state can become self-sustaining and at the same time lowers the cost of democracy for the rich elite. Neither work by Acemoglu and Robinson (2008) or Acemoglu, Vindigni and Ticchi (2011), however, provides empirical evidence for the argument.

Building on this work, Hollenbach (2016) pushes the idea that autocratic elites may undermine the state’s capacity to tax in an effort to keep redistribution at low levels should a transition to democracy occur. Using county level data for 19th century Prussia, Hollenbach shows that areas with high levels of inequality invested less in the fiscal capacity of the state.

All these studies have in common, the idea that political elites in authoritarian regimes and economic elites have incentives to undermine the redistributive capacity of the state, be it via the institutional design or through influencing the bureaucratic and fiscal capacity.

In line with the above explanations, we aim to investigate whether elites can truly undermine redistributive efforts by the state, even after a transition to democracy. We argue that even after countries have transitioned to a democratic political system, wealthy elites can ensure that their interests are (over) represented and redistribution is limited. One way to do so is by constraining the fiscal capacity of the state, i.e., limiting the ability of the state to collect taxes. Raising taxes is a complicated undertaking that involves the collection of massive amounts of data and requires a functioning bureaucracy. Yet, many governments, especially in developing countries, still lack the capacity to enforce the tax policies chosen by the governing bodies (Bird and Zolt, 2004, 2008; Fjeldstadt and Moore, 2008). In settings like these, we argue economic elites can have strong incentives to further undermine the state and limit their taxation by lowering the state's ability to correctly assess tax bases.

For illustration, consider a theoretical society with rich (r) and poor (p) citizens, where the median voter is poor and sets the *de jure* tax rate. Following the Acemoglu and Robinson (2006) model, in the simplest of models, let the utility (or post tax income) of the (poor) median voter be  $u_p = y_p(1 - \tau) + \frac{Y(\tau - \tau^2)}{N}$ , where  $y_p$  is the poors' income,  $\tau$  the chosen tax rate,  $Y$  the society's total income, and  $\tau^2$  some cost of taxation.  $\frac{Y(\tau - \tau^2)}{N}$  is therefore the lump sum transfer to all citizens resulting from the equilibrium tax rate. Maximizing the function with respect to  $\tau$  results in the equilibrium tax rate chosen by the median voter:  $\tau^* = \frac{1}{2} - \frac{y_p}{\bar{y}}$ , where  $\bar{y} = \frac{Y}{N}$  is the average income of all citizens. This is the standard result that taxation and redistribution ought to increase with higher levels of inequality (difference between median

(poor) and mean income).

When citizens vote rationally and based on income, we should therefore see higher levels of *de jure* taxation in states/districts with higher levels of inequality. In addition, in representative democracies with somewhat traditional political parties, we would expect this increase of taxation and redistribution to be carried out by left parties. On the flip side, under this standard model, the post-tax income of the wealthy elite decreases with higher levels of inequality, since taxation rises. Consider this the standard hypothesis: Based on the Meltzer-Richard model (1981), with increasing inequality (*de jure*) tax rates in democracies should increase.

The distinction of *de jure* and *de facto* taxation is important here. We contend that *de jure* tax rates do not necessarily translate into the same *de facto* level of taxation. For example, a legislature could decide on a *de jure* income tax rate of 15%, nevertheless for the state to actually collect 15% of its citizens income in tax revenue, the tax administration has to be flawless and highly effective. In fact, most likely no country in the world is able to fully collect the *de jure* income tax rate across its citizenry. As we have shown in Figure 1 in the introduction, tax evasion is a problem in many countries around the world. We argue, that as the inequality rises and the *de jure* tax rate is expected to increase, economic elites have incentives to fight those changes, in part by undermining the ability of the state to collect taxes and enforce the *de jure* tax rates.

Now consider a democracy with weak administrative capacity and entrenchment of the economic elite in the political process. As inequality increases, these elites have stronger incentives to undermine the ability of the state to assess their tax liabilities or influence the political process through other means. This could happen by bribing local tax officials that are responsible for tax assessment, placing cronies in important positions in the local



bureaucracy, or impeding the purchase of necessary tools to make tax collection more efficient. As also argued Acemoglu and Robinson (2008) and Acemoglu, Vindigni and Ticchi (2011), higher levels of inequality increase the incentives for elites to engage in these actions and actually lead to stronger subversion of the state – in an attempt to thwart any democratically demanded tax increases.

From this theoretical argument we develop one main hypothesis to be investigated in the empirical analysis. Specifically, we expect that higher inequality is associated with less fiscal capacity and ergo less *de facto* tax revenue. Again, contrast this with the traditional hypothesis that higher inequality would be associated with more tax revenue.

### 3 Research Design: The Case of Brazil

In this paper, we use data on tax collection in 5,570 Brazilian municipalities. There are several reasons that make Brazil and its municipalities an ideal case to investigate our argument, which we outline here.

The democratization of Brazil in the mid-eighties, and the enactment of a progressive constitution in 1988, advanced the country socially and politically (Oliven, Ridenti and Brandão, 2008; Diniz and Praça, 2008). The barriers to voter registration are minimal (Limongi, Cheibub and Figueiredo, 2015) and with voting in Brazil being compulsory, voter turnout is close to 80 percent of registered voters (Nicolau, 2012). The disenfranchisement based on literacy was removed in 1985, further increasing the extension of the right to vote to all Brazilians (Limongi, Cheibub and Figueiredo, 2015). Moreover, the adoption of electronic voting in Brazil since the 1998 elections has reduced fraud in the vote counting process and aided voting of illiterates and other low information voters (Hidalgo, 2010). Brazil is thus a case of relatively recent democratization that has stabilized as a strong democracy over the last three decades.

In addition, ever since its transition to democracy, Brazil has been known for its high levels of income inequality, making it one of the most unequal democracies in the world and this inequality has not been significantly reduced since the end of the military dictatorship. In fact, as Arretche (2015) shows, inequality in Brazil has been reduced on multiple dimensions, e.g. access to elementary education, electricity, garbage collection has become practically universal (Marques, 2015), and the association between poverty and lack of access to basic services has decreased significantly (Ribeiro, Ceneviva and Brito, 2015; Menezes Filho and

Kirschbaum, 2015; Coelho and Dias, 2015). Nevertheless, income inequality has been surprisingly resilient and stable throughout the transition from the military dictatorship (1964-1985) to the new democratic regime (Weyland, 1996; Barros, Henriques and Mendonça, 2000; Souza and Medeiros, 2015). Indeed, any reduction in income inequality that had thought to have been uncovered, has been revealed to be spurious due to the underestimation of top incomes by surveys and other measurement errors (Souza, 2013; Medeiros, Souza and Castro, 2015; Souza and Medeiros, 2015; Gobetti and Orair, 2015). Compared to other countries for which data on top incomes is available (Piketty, 2014), Brazil still has one of the highest levels of income concentration by the richest top one percent of the population (Gobetti and Orair, 2015; Medeiros, Souza and Castro, 2015).

Brazil's transition to democracy and the persistence of inequality are two reasons that make it a great case to investigate our argument. If the traditional story would have been correct, we ought to have seen strong decreases in inequality and high levels of taxation since Brazil's democratization in the 1980s. Moreover, recent work by Bechtel, Hangartner and Schmid (2016) has shown that, in the case of Switzerland, compulsory voting leads to more leftist policies. And again, similarly, for Brazil with its now almost 30 years of continued democratic practice and compulsory voting laws, common political science models would lead us to expect that the Brazil's high levels of inequality would slowly be reduced over time. The "non-finding" with respect to the traditional hypothesis begs the question why this hasn't been the case.

There are a multitude of possible reasons for the continued high level of income inequality in Brazil, such as the institutional structure. Yet, since the enactment of the new democratic constitution in 1988, Brazil comprises one of the world's most politically and fiscally

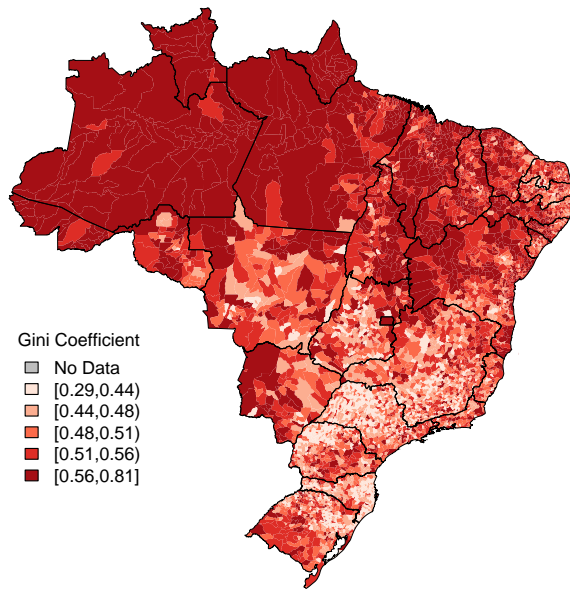
decentralized systems (Samuels and Mainwaring, 2004), with a degree of municipal autonomy –Brazil’s lowest level of government –that is much higher than in any other Latin American country (Nickson, 1995; Rodríguez and Velásquez, 1995). In addition, municipalities are have the power to raise their own tax revenue via the IPTU, or urban property tax. Property taxes are one of the most progressive tax sources available to governments and thus ought to be used heavily by left municipal governments in an attempt to increase redistribution/reduce inequality. Instead, comprehensive studies on the Brazilian property tax (IPTU), again, one of the main sources of revenue that mayors in Brazil have discretion over, indicate that it is much underused as a tax source (Afonso, Araujo and Nóbrega, 2013; De Cesare and Ruddock, 1999). Municipalities differ significantly in their ability to raise revenue based on the property tax, and Brazil does much worse than most developed countries in terms of the collection level of this tax (De Cesare, 2005; Carvalho Jr., 2006; Afonso, Araujo and Nóbrega, 2013).

In addition to it’s regime history and consistent level of inequality, Brazil also exhibits high geographic variation in both inequality and tax collection. In fact, in our sample for 2010, our preferred measure of income inequality in the municipalities, Gini, ranges from 0.28 to 0.8. We compare this to country level Gini data for the world for 2010 published by Solt (2009). Here the data ranges from 0.24 to 0.6. Thus, Brazilian localities actually provide a similar but larger variation in inequality than countries across the world do. This variation is shown in Figure 2(a). Brazil exhibits strong geographic variation when it comes to income inequality within its municipalities. <sup>1</sup>

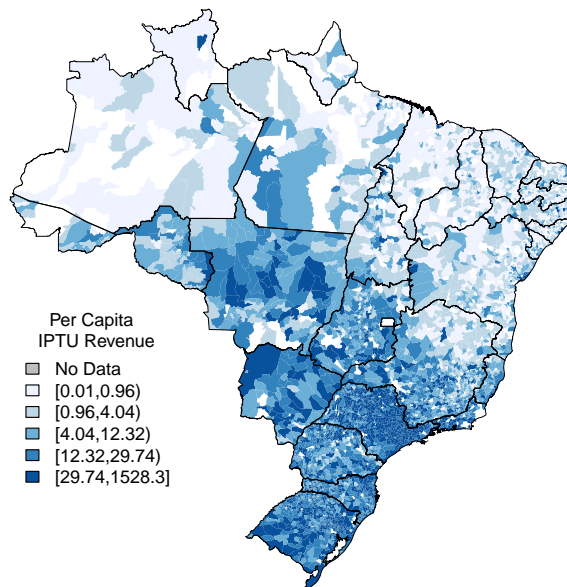
Municipalities also have a high discretion when it comes to raising certain taxes, especially the urban land and property tax (IPTU), which we make use of below. Furthermore, since

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<sup>1</sup>The ranges for each category in the maps are the quantiles of the data.



(a) GINI



(b) IPTU

Figure 2: GINI Coefficient and IPTU Revenue in Brazil in 2010

the 1980s, the level of transfers from the federal and state governments has decreased, making local tax collection more and more important if municipalities want to provide local public goods and possibly lower inequality. Figure 2(b) shows per capita revenue from the IPTU (property tax) in 2010.

While Brazil exhibits high variation when it comes to local inequality and tax capacity, the usage of subnational data allows us to hold a number of variables constant across the observations. For example, we do not have to worry about differences in the political system influencing our results. Brazil is, therefore, an ideal case to better understand fiscal capacity and investigate our argument. As described above, it has exhibited a recent transition process from a nondemocratic regime to a democratic regime and yet still has persistently high inequality. Moreover, as we can see in the maps in Figure 2 it exhibits a large variation in both inequality and local tax capacity.

## **4 Structure of Brazilian Federalism: Political & Fiscal Decentralization**

In this section of the paper we shortly summarize the most important facts about the fiscal and political structure of Brazil.

### **4.1 Political Structure**

As stated by the current Brazilian Constitution (1988), Brazil is a federal presidential republic with several important tiers of government. The federal system includes the Union, States, and municipalities. The Brazilian federative union is composed of twenty-six states and the federal district, which is home to the federal capital, Brasília. Below the level of states, Brazil

currently has 5,570 different municipalities that have additional political autonomy (Baiocchi, 2006; IBGE, 2016).

In the federal setup of Brazil, a number of political responsibilities lie with the Union, for example, to maintain relations with foreign states, national defense, maintain the judiciary, etc. Moreover, the Union has exclusive power to legislate in a number of areas. On the other hand—and important to note for the research design employed in this study—both the states and municipalities have autonomy in a number of policy areas, such as health, education, public transportation, and the parceling of land (Constituição do Brasil, 1988; Almeida, 1995), target redistributive programs (Arretche, 2000, 2012), and most importantly, taxation (Andrade, 2007).

The Union, States and Federal District share, among others things, the power to legislate on taxation, financial and economic planning, as well as the budget (Andrade, 2007). The municipalities have the power to legislate on subjects of local interest and supplement federal and state legislation where applicable (Arretche, 1999, 2000, 2012). As such, they can institute and collect taxes within their jurisdiction and use the collected revenue for local policies (Arretche, 1999; Andrade, 2007).

## **4.2 Political System & Parties**

As in other republics, the branches of government in Brazil are the executive, legislative, and judiciary branches (Constituição do Brasil, 1988). Across the different political units, the president, state governors, and municipality mayors are elected by popular vote, requiring a majority to win (Nicolau, 2007). A runoff between the two best candidates is necessary, if the

leading candidate does not reach a majority.<sup>2</sup>

The Union, states and municipalities have legislatures that are responsible for passing laws and enacting legislation (Constituição do Brasil, 1988). Yet, Brazil has one of the most fragmented party systems in the world (Nicolau, 1996; Mainwaring, 1999; Ames and Power, 2007), making coalition politics necessary at almost every level of government (Andrade, 1998; Nicolau, 1996; Santos, 2001; Praça and Garcia, 2011).

#### **4.2.1 Local elections in Brazil**

Brazilian municipalities are all governed by a mayor (executive branch) and a municipal legislative branch (*Câmara de Vereadores*).<sup>3</sup> Both are elected for four year terms in general and direct elections. Even with the large number of parties that compete in elections across Brazil – commonly more than 30 political parties – electoral success is limited to only a few parties. For instance, in the 2008 and 2012 municipal elections four political parties together won more than 50 percent of municipal governments (TSE do Brasil, 2016).<sup>4</sup>

### **4.3 Fiscal Structure of Brazil**

According to the 1988 Constitution (1988), the current Brazilian taxation system grants power to Federal, State, and Municipal Governments to collect taxes.<sup>5</sup> In general, most taxes are raised by the federal government, such as taxes on exports and imports, or large fortunes. In addition, the federal government can create taxes that are not specified in the constitution,

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<sup>2</sup>In municipalities with less than 200,000 voters, mayors are elected by a plurality voting system without a run-off process (Nicolau, 2007, p. 298).

<sup>3</sup>The judiciary is organized as counties that include several municipalities or part of a very populous municipality. Therefore, there is nothing like a single judiciary specific to each municipality in Brazil.

<sup>4</sup>Those parties were the Brazilian Democratic Movement Party (PMDB), Workers' Party (PT), Brazilian Social Democracy Party (PSDB), and Democrats (DEM) in 2008, and PMDB, PSDB, PT, and Social Democratic Party (PSD) in 2012. The PMDB alone won 1.202 local governments in 2008, and 1.022 local governments in 2012 (TSE do Brasil, 2016).

<sup>5</sup>A description of Brazilian taxes by tiers of government can be viewed in Table 3 of Appendix A.



as long as they are not specifically the jurisdiction of municipalities or states.

The states and the Federal District, in turn, have the power to impose taxes on goods and services, financial donation and heritage, and automotive vehicles. Lastly, and most important for our empirical analysis, the most important local tax source for municipalities is the taxation of property and land in urban areas (IPTU).

#### **4.3.1 The Autonomy of Brazilian Municipalities & the Taxation on Property**

The new Brazilian Constitution of 1988 gave substantial autonomy to the municipalities (Andrade, 2007; Baiocchi, 2006; Samuels, 2004), which are since considered among the most decentralized local governments in Latin America (Nickson, 1995; Gibson, 2004; Samuels, 2004).

With the adoption of the new constitution, local governments in Brazil have seen a major increase in responsibility (Andrade, 2007). As aforementioned, municipal governments are responsible for the organization and provision of public services of local interest, i.e. the public transportation system, basic education, and health services (Samuels, 2004; Arretche, 2004). In addition, while municipalities receive substantial transfers from the federal government, mayors have discretion over local budget and some taxation (e.g., IPTU). In line with the increase in political authority, the constitution adopted in 1988 also allowed the municipalities to raise more taxes (Andrade, 2007). After the transition to democracy municipalities were highly dependent on transfers from the federal and state governments. More recently, however, these transfers have significantly declined, leading to difficulties and low revenues for many municipalities, which increasingly had to find their own revenue sources. The importance of the IPTU has therefore increased significantly (De Cesare and Ruddock, 1999). In sum, Brazil is seen as a highly decentralized federation, with politically autonomous sub-

national governments, where mayors are important political players with powers in taxation and spending (Shah, 2006; Afonso and Araujo, 2000; Samuels, 2004).

In this study, we are interested in the fiscal dimension of state's capacity, defined here as the ability of the government to tax incomes, property, and other sources of economic activity (Besley and Persson, 2009; Cárdenas, 2010). Particularly, our focus is in the capacity of local municipalities to raise revenues from the taxation over property. Therefore, we aim to analyze the fiscal aspect of the Brazilian Real State Tax (IPTU). While IPTU is one of the main sources of revenue that mayors in Brazil have discretion over, comprehensive studies on this tax in Brazil indicates that it is still a highly overlooked tax source that has a much larger potential revenue collection by local governments (Afonso, Araujo and Nóbrega, 2013; De Cesare and Ruddock, 1999).

The IPTU is a local tax, which is charged to property owners located in the urban area of Brazilian municipalities. As aforementioned, the collection level of this tax in Brazil is lower than in most developed countries (De Cesare, 2005; Carvalho Jr., 2006; Afonso, Araujo and Nóbrega, 2013). In addition, as De Cesare and Ruddock (1999) point out, wherever localities aim to increase the quality of assessment and revenue of the property tax they are met with strong opposition. Large differences exist in the ability of municipalities to assess properties and thus raise revenue. The calculation of the IPTU liability demands several types of information, such as the property size, the location of the property, the property use, the front area, the background area, the property construction standard, etc (Carvalho Jr., 2006). Carvalho Jr. (2006) estimates that only 60 percent of urban real state in Brazil is registered by the state. Another difference is the frequency of assessment, i.e. how often does the administration update/assess the value of properties? For example, in Porto Alegre after

1987 property values were assessed in 1988, 1990, 1991, and were scheduled to be assessed in 1997. The Brazilian central government recommends that property values ought to be assessed every five years, with yearly adjustments. Even though Porto Alegre had relatively regular assessment intervals in the 1990s, assessed values of residential properties in the 1990s were only 19.2% of their sales prices (De Cesare, 2012). Again, this only goes to show that governments are not able to flawlessly enforce the property tax and differ greatly when it comes to raising revenue from it.

## 5 Empirical Strategy: Data & Models

State capacity has been measured by several indicators and proxies (Hendrix, 2009; Hanson and Sigman, 2013). Scholars have used GDP per capita (Fearon and Laitin, 2003), military expenditure and personnel (Hanson and Sigman, 2013), or census administration data (Soifer, 2013) as measures of state capacity. Particularly in Latin America, state capacity has been described as exceptionally weak (Cárdenas, 2010) or spatially uneven within states' territories (O'Donnell, 1993, 1999). However, by usually being national-level indicators, these measurements of state capacity do not consider the uneven reach of the state within a country (Hollenbach, Wibbels and Ward, 2016). As explained above, in this study we are interested in one particular part of state capacity: fiscal capacity or the ability of the state to effectively raise revenue. Our unit of analysis are Brazilian municipalities and we measure their fiscal capacity with data on revenues from the municipal property tax (IPTU). We aim to understand how the ability of the state to collect taxes varies across the Brazilian state and how local tax capacity is affected by local economic conditions.

In order to test whether low levels of fiscal capacity are utilized by high-income earners to limit redistribution and taxation in high inequality municipalities, we have collected cross-sectional data on taxation, political, and socioeconomic variables for the years 2000 and 2010 from different sources. The dependent variable, our proxy for fiscal capacity at the local level is the property tax revenue collected by municipalities. The measure of revenue collection comes from the Brazilian Ministry of Finance, released by the National Treasury Secretariat, and is made available by the Institute of Applied Economic Research (IPEA, 2016).

Our main independent variable is a measure of income inequality at the municipal level,

the Gini coefficient.<sup>6</sup>

We include a number of control variables in the regression model to account for possible confounders. First, we include a control for municipal income (i.e. GDP) to account for the fact that higher inequality may be caused by increasing incomes, while richer municipalities have a larger tax base and are more likely to be more efficient at revenue collection. Additionally, we control for population size. Brazilian municipalities are heterogeneous in regard to their size, their economic condition, and their capacity to tax. Studies have shown that municipal size is positively correlated with property tax revenue (Gomes, Alfinito and Albuquerque, 2013; Avellaneda and Gomes, 2014), most likely because larger municipalities tend to be richer, and also present more efficient and modern bureaucratic structures. Both these measures—GDP and Population—were gathered from the Brazilian Institute of Geography and Statistics (IBGE, 2016).

Municipalities are only allowed to collect property taxes from urban areas, it is therefore pertinent for us to account for differences in urbanization. Hence, we control for the share of the population living in rural areas, expecting a negative relationship to property tax revenue collection.

Given that municipal investment in housing is likely to affect inequality as well as the tax base, we include a measure of municipal spending on housing and urbanization. Moreover, the inclusion of this variable is important as spending on housing and urban development impact real estate evaluation, increasing the base for calculating the IPTU tax. We expect that the greater the government spending on housing and urbanization, the higher the state capacity.

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<sup>6</sup>A Gini coefficient of 0 expresses the theoretical level of perfect equality—i.e. where everyone earns the same income. A Gini coefficient of 1, in turn, expresses maximum inequality—i.e. a situation in which one person earns all the available income, whereas the rest of the population has an income of zero. In our data, the Gini coefficient ranges from a minimum value of 0.28 to a maximum value of 0.87. Descriptive statistics can be seen in Table 4 in Appendix.

A second important fiscal variable included in our models is the level of transfers from both the federal and state governments to each of the municipalities. Transfers that arise from the sharing of taxes collected by the federal and the state governments to municipalities represent an important source of funding for Brazilian local governments (Arretche, 2004; Andrade, 2007). At the same time, the level of transfers is likely related to local conditions, such as income or inequality. We expect that municipalities highly dependent on transfers tend to have less incentives to increase their own revenues and capacity (Afonso, Araujo and Nóbrega, 2013). Data on transfers and housing spending was gathered from the Institute of Applied Economic Research (IPEA, 2016).

In addition, in our cross-sectional models, we include an indicator variable with value 1 if the mayor of the municipality is from a left party, and 0 otherwise. The inclusion of this variable is an attempt to understand whether left parties are in fact more likely to raise the fiscal capacity/redistributive taxation and whether they are able to achieve this goal. Given our theoretical argument, we do not expect left party governance to have a strong impact on *de facto* tax revenue. Political data were collected from the Superior Electoral Court (TSE do Brasil, 2016), and left parties were classified based on surveys and roll-call vote studies of Brazilian legislators (Power and Zucco Jr., 2009, 2012; Zucco Jr. and Lauderdale, 2011; Samuels and Zucco Jr., 2014; Saiegh, 2015).

We were able to collect these variables for the years 2000 and 2010 and first estimate simple cross-sectional models. In some of the specifications we include unit intercepts for the different regions of Brazil: *North*, *Northeast*, *Midwest*, *Southeast*, and *South*. We generally estimate simple OLS regressions for the cross-sectional models, but calculate standard errors clustered at the state level, as municipalities in the same state might be more similar to each

other. The dependent variable (IPTU revenue) and the independent variables *housing*, *gdp*, *transfers*, and *population* were log transformed in order to reduce the right-skewness of their distribution.<sup>7</sup>

In addition to the cross-sectional model, we also estimate a panel model for the year 2000 and 2010, in which we include municipal and year fixed effects. Using the different unit specific intercepts we aim to control for unobserved confounders that do not vary over time or across the units.

## 6 Empirical Analysis: Results and Discussion

Table 1 presents the estimation results for four models for the 2010 data.<sup>8</sup> As aforementioned, all models (with the exception of Model 4) were estimated calculating standard errors clustered at the state level, therefore relaxing both assumptions of homoskedasticity of the variances of the errors and independence of the observations. Model 4, in turn, was estimated using a jackknife estimation technique to check for overly influential observations. Model 2 (column 2 in Table 1 adds the control for left party mayors, while model 3 (column 3 in Table 1) adds region specific intercepts.

Figure 3 shows the results from model 1 in graphical form, which lend support to our hypothesis. Particularly, the coefficient for inequality (GINI) is estimated to be negative, large, and its confidence interval does not cover zero. In other words, as income inequality increases, the state's ability to raise revenue from citizens decreases substantially. Greater inequality seems to undermine tax collection and inhibit the state's fiscal capacity. Similarly in line with our expectations, the coefficient for logged GDP is large and precisely estimated,

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<sup>7</sup>In order to avoid the missing values we added 0.01 to the values of *housing* and *transfers* variables.

<sup>8</sup>We also ran the same models using data for 2000. The results can be seen in Table 5 in Appendix.

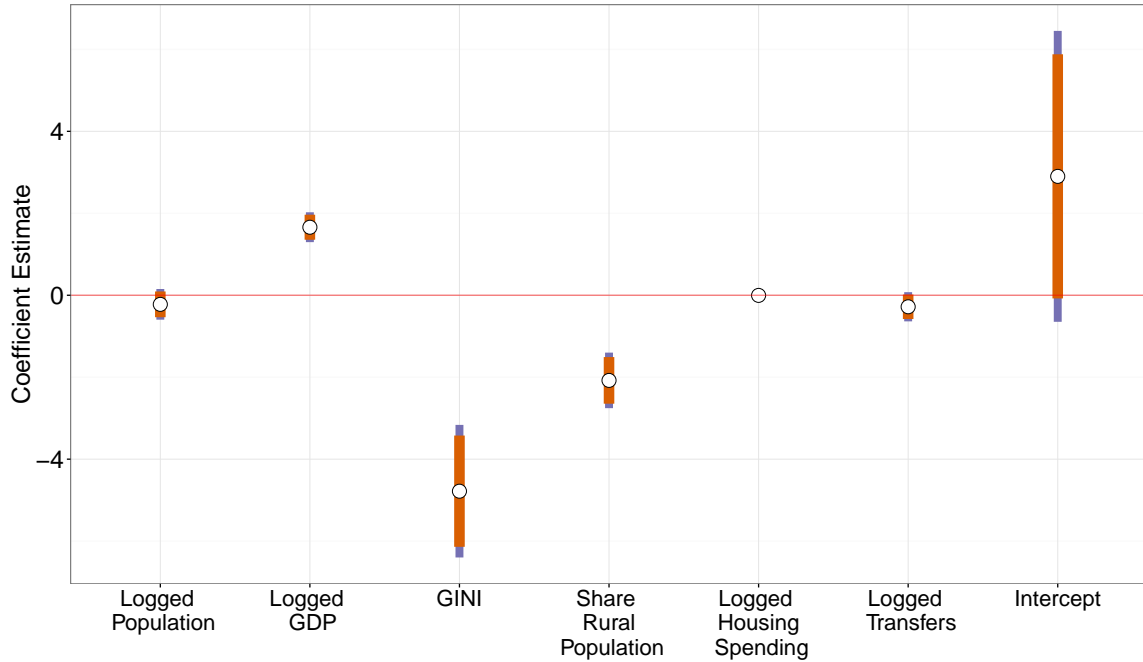


Figure 3: Coefficient Estimates from Model 1

i.e. richer municipalities are able to raise more revenue from property taxes. In contrast, again as expected, the larger the share of the population living in rural areas, the lower the revenue from the IPTU. Logged transfers has a slight negative effect, but its 95% confidence intervals covers zero, the coefficient for logged housing spending is essentially zero.

These general results are very similar across the different models specifications, as can be seen in Table 1. Also, as expected, mayors from left political parties (Model 2) seem to have little impact on state capacity – the coefficient for left party mayor is very small and associated with high uncertainty. It is important to note that this is no evidence of a null effect, however, there is no clear relationship between left party mayor and fiscal capacity in this model specification. These results for Gini coefficient and left party are consistent in all models—although in Model 3 the negative correlation between Gini coefficient and fiscal capacity is statistically significant at level 0.1.



The results for population size seem to contradict some studies showing that larger cities are better able to collect property tax (Gomes, Alfinito and Albuquerque, 2013; Avellaneda and Gomes, 2014). According to our results, an increase in municipal population size has either no effect on state capacity (Model 1 and 2), increases IPTU tax revenue (Model 3, with regions added to the model), or decreases IPTU tax revenue (Model 4). The estimates for financial transfers from the union and states to municipalities also reveal contradictory findings; in which more transfer can mean no effect on state capacity (Model 1), a decrease in tax revenue (Model 2 and Model 4), and an increase in tax revenue (Model 3).

By adding dummy variables for regions into our models (Model 3), “Midwest” the reference group, the results support studies showing lower revenue from the property tax in regions with higher inequality and poverty—e.g., North and Northeast of Brazil—and a higher tax revenue in richer region, e.g., the South region of the country (Villela, 2001).

Lastly, as an additional robustness check, Table 6 in the Appendix displays the results from two spatial autoregressive models based on continuous boundaries between the municipalities.

<sup>9</sup> Recall the maps in Figure 2 above, which displayed both inequality and per capita property tax revenue for the municipalities. Based on these maps, spatial autocorrelation seems likely, which could potentially affect our results. Using Moran’s I test, we can not reject spatial correlation in the residuals of the OLS models and thus additionally estimate the spatial autoregressive models. Yet, overall, the results from the spatial models are in line with the findings presented above. Compared to the standard OLS model, the coefficients for inequality are a bit smaller, yet still substantively meaningful, negative, and precisely estimated. Most interestingly, in column 2, the effect of left party mayor is actually estimated to be negative

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<sup>9</sup>Results in column 1 are based on a binary neighbor matrix, while the results in column 2 are based on a row-standardized weights matrix.

Table 1: Inequality and Fiscal Capacity in Brazilian Municipalities in 2010

	Model 1	Model 2	Model 3	Model 4
GINI	-4.781*** (0.825)	-4.331*** (0.772)	-1.107* (0.557)	-4.351*** (0.384)
Left		-0.049 (0.059)	-0.028 (0.046)	-0.052 (0.039)
log(GDP)	1.660*** (0.186)	1.690*** (0.187)	0.727*** (0.083)	1.688*** (0.045)
log(Population)	-0.222 (0.191)	-0.236 (0.193)	0.396*** (0.082)	-0.233*** (0.062)
Rural	-2.078*** (0.346)	-2.145*** (0.320)	-2.178*** (0.187)	-2.138*** (0.116)
log(Housing)	-0.003 (0.017)	-0.002 (0.017)	-0.001 (0.010)	-0.002 (0.008)
log(Transfers)	-0.281 (0.182)	-0.337** (0.161)	0.260*** (0.090)	-0.338*** (0.090)
North			-1.382*** (0.333)	
Northeast			-1.392*** (0.160)	
South			0.903*** (0.157)	
Southeast			0.216 (0.310)	
Constant	2.901 (1.811)	3.495** (1.592)	-3.322*** (0.926)	3.520*** (0.857)
$N$	5,110	4,808	4,808	4,835
$R^2$	0.724	0.726	0.786	0.726

*Dependent variable:* Logged IPTU tax revenue.

Standard errors in parentheses.

Two-tailed test. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

and statistically significant at the 5% level.

## 6.1 A “fuzzy” differences-in-differences design

So far we have seen that across the different municipalities, higher inequality is robustly associated with less municipal revenue collected from property taxation. This lends some support to our theoretical argument that in higher inequality districts, wealthy elites undermine the ability of the state to collect tax revenue. The finding is robust to a number of control variables that may be associated with our variable of interest and the outcome variable. Nevertheless, inference on the cross-sectional model can only take us so far, as there are a number of unobservable factors that could affect both tax capacity and inequality or the estimates could be biased due to reverse causality. In this section, we present evidence based on a simple panel model for the years 2000 and 2010 with both municipal and year fixed effects. Controlling for municipal and time fixed effects allows us to control for unobservables at the municipal level that do not vary over time, as well as shocks in time that do not vary across the different municipalities. Given these additional parameters, the results from the two-period panel model ought to give us more robust estimates of any effect of inequality on fiscal capacity. The main assumption for this model, however, is that conditional on our control variables and aside from the effect of inequality, each of the municipalities would have had similar developments in fiscal capacity between 2000 and 2010 (i.e. the parallel trends assumption).

Specifically, we specify the following model for the two-period panel data:

$$y_{it} = \alpha_i + \gamma_t + \beta \mathbf{X}_{it} + \delta G_{it} + \epsilon_{it}, \quad (1)$$

where  $\alpha_i$  and  $\gamma_t$  are municipality and year specific intercepts,  $\mathbf{X}_{it}$  is a matrix of time-varying

covariates and  $\beta$  a vector of the corresponding estimated coefficients.  $G_{it}$  is the main variable of interest, the gini coefficient for municipality  $i$  at time  $t$ . Based on our theoretical argument, we expect its coefficient  $\delta$  to be negatively signed. We estimate the model with normal and robust standard errors, as well as standard errors clustered at the municipality.

Table 2 displays the results for the panel data models. Recall that we are estimating the model based on data for two years: 2000 and 2010. The results from the panel model with municipal fixed effects are similar to the cross-sectional model results, which again lends confidence to our hypothesis. First, the strongest predictor of fiscal capacity or property tax revenue is the local GDP, i.e. economic activity. Similarly, higher municipal spending on housing is robustly associated with higher property tax revenue. Across all models the coefficient on inequality ( $\delta$  above) is negative and relatively precisely estimated (significant at the 10% level). Similarly, as expected and similar to the cross-sectional results, the share of rural population is negatively associated with property tax revenue.

Once we include the variable for left party mayor (not shown here), the uncertainty associated with the inequality coefficient increases. In our view, however, the meaning of the left party mayoral variable is somewhat problematic in the panel models. First, over the time period between 2000 and 2010 there are three different mayoral elections – 2000, 2004, 2008 – while we are only able to use whether a left party was elected in 2000 and 2008 for the years 2000 and 2010. Even if this is the correct specification, it is unclear what the theoretical meaning of the coefficient (especially in a dynamic setting) for left party mayor in the panel model would be. Second, especially for the year 2000 there are a large number of municipalities for which we do not have data on the partisanship of the mayor. Thus, when we include the left party indicator variable in the panel model, the number of observations

Table 2: Inequality and Fiscal Capacity – Panel Model 2000 & 2010

	Model 1	Model 2	Model 3
Logged Population	0.0394 (0.113)	0.0394 (0.128)	0.0394 (0.128)
Logged GDP	0.263*** (0.0668)	0.263*** (0.0688)	0.263*** (0.0688)
Gini	-0.530* (0.279)	-0.530* (0.318)	-0.530* (0.318)
Share Rural Population	-0.441** (0.194)	-0.441* (0.260)	-0.441* (0.260)
Logged Spending Housing	0.0105** (0.00472)	0.0105* (0.00541)	0.0105* (0.00541)
Logged Transfers	0.00914 (0.0857)	0.00914 (0.104)	0.00914 (0.104)
Intercept	8.045*** (1.399)	8.045*** (1.640)	8.045*** (1.640)
$N$	9986	9986	9986
$R^2$	0.542	0.542	0.542

*Dependent variable:* Logged IPTU tax revenue.

Standard errors in parentheses.

Two-tailed test. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

decreases significantly. Based on these reservations, we prefer the specification of the panel model without the left variable. Overall, we believe, our panel model results, which are in line with the cross-sectional findings lend additional support to our hypothesis that higher inequality is in fact associated with less fiscal capacity at the local level.

## 7 Conclusion

One of the most famous formal models in political economy has made the simple prediction that taxation ought to increase with inequality in democracies (Meltzer and Richard, 1981). Yet, we don't find this simple relationship to be true across the world. In this paper we argue that part of the lack of finding may lie in the fact that in highly unequal societies, wealthy elites have incentives to undermine the ability of the state to collect taxes, especially in countries where the state's capacity is already limited. We investigate the question whether

in democracies economic elites hinder the states ability to raise taxes in an effort to thwart redistribution and taxation.

In an attempt to answer this question, we have collected data on property tax revenue, inequality, and other economic variables across 5,570 municipalities in Brazil. Using cross-sectional models and a panel model with year and municipal fixed effect we show that municipalities with higher inequality have lower levels of fiscal capacity/raise less revenue from the local income tax. Controlling for local income, the share of the rural population, federal and state transfers, we consistently recover a negative association between inequality and local tax revenue.

While the results are robust with respect to numerous control variables and model specifications, we see several avenues for further improvement. First, we aim to add data for 1990 to our time series. Second, we are collecting data to control for state and local revenues from oil, as well as of a potential instrument for inequality. Furthermore, we aim to try to get a better empirical grasp at the mechanism outlines in this paper, trying to understand how exactly elites could undermine local fiscal capacity.

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# A Brazilian Taxes

Table 3: Brazilian Taxes

Tax	Tax Description
<b>Federal Taxes</b>	
II	Tax on imports.
IOF	Tax on financial transactions. It focuses on loans, financing and other financial transactions and financial actions.
IPI	Tax on industrialized products. It charges from industries.
IRPF	Personal income tax. It focuses on the citizen's income.
IRPJ	Corporate income tax. It focuses on corporate profits.
ITR	Tax on rural property.
Cide	Intervention contribution in the economic domain. It focuses on oil and natural gas and their derivatives, and also on ethanol.
Cofins	Contribution to the financing of social security. It charges the companies.
CSLL	Social contribution on net income.
FGTS	Guarantee fund of service. Percentage of the salary of each worker on the payroll deposited by the company.
INSS	National Institute of Social Security. Percentage of the salary of each employee charged from the company and from the worker to health care. The amount of the contribution varies by line of business.
PIS / Pasep	Social integration programs and training of the heritage of civil servants. It charges the companies.
<b>State Taxes</b>	
ICMS	Tax on the circulation of goods.
IPVA	Tax on motor vehicle ownership.
ITCMD	Tax on transfer by death and financial donation. It focuses on heritage.
<b>Municipal Taxes</b>	
IPTU	Tax on built property and urban land (i.e. property tax).
ISS	Service tax. It charges the companies.
ITBI	Tax on transfer of property between alive people. It focuses on the change of ownership of real estate.

*Source:* Elaborated by the authors, from information gathered at the web portal of open information of ministries and secretaries of the Brazilian Federal Government (<http://www.brasil.gov.br/economia-e-emprego/2010/01/o-que-sao-os-impostos>).

Table 4: Summary Statistics: Brazilian Municipalities in 2010

	Mean	Std. Dev.	Min.	Max.	N
<b>Dependent variable:</b>					
IPTU Tax Revenue (in R\$) <sup>a</sup>	3082611.208	61652289.391	1	4049113821.71	5140
<b>Independent variables:</b>					
GINI Coefficient	0.494	0.066	0.28	0.87	5565
Left Party	0.418	0.493	0	1	5217
Population	33749.937	201432.321	805	11166543	5565
GDP (in R\$)	302335.55	3213560.23	3229.42	197933952	5564
Share of Rural Population	0.373	0.232	0	1.84	5565
Housing and Urbanization (in R\$)	6811802.665	62638508.31	0	3501618462	5211
Financial Transfers (in R\$)	40867380.492	201882168.087	2291567	11310887973	5211
North	0.078	0.269	0	1	5596
Northeast	0.316	0.465	0	1	5596
Midwest	0.083	0.276	0	1	5596
South	0.212	0.409	0	1	5596
Southeast	0.297	0.457	0	1	5596

a: R\$ = "Real," Brazilian currency.

Table 5: Inequality and Fiscal Capacity in Brazilian Municipalities in 2000

	Model 1	Model 2	Model 3	Model 4
GINI	-1.952*** (0.600)	-1.221* (0.664)	-0.0299 (0.803)	-1.470*** (0.366)
Left		0.042 (0.071)	0.039 (0.052)	0.048 (0.045)
log(GDP)	1.740*** (0.159)	1.716*** (0.171)	0.970*** (0.089)	1.733*** (0.065)
log(Population)	-0.566*** (0.174)	-0.570*** (0.178)	0.109 (0.092)	-0.574*** (0.072)
Rural	-1.803*** (0.307)	-1.952*** (0.294)	-1.783*** (0.172)	-1.963*** (0.117)
log(Housing)	0.005 (0.011)	0.005 (0.013)	0.004 (0.009)	0.001 (0.007)
log(Transfers)	-0.076 (0.180)	-0.085 (0.201)	0.210 (0.163)	-0.106 (0.145)
North			-0.692*** (0.208)	
Northeast			-0.783*** (0.136)	
South			1.045*** (0.185)	
Southeast			0.705** (0.312)	
Constant	-0.174 (1.596)	-0.087 (1.742)	-4.031*** (1.397)	0.246 (1.238)
$N$	4,461	3,714	3,714	4,015
$R^2$	0.722	0.709	0.758	0.696

*Dependent variable:* Logged IPTU tax revenue.

Standard errors in parentheses.

Two-tailed test. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table 6: Results from Spatial Autoregressive Model 2010

	<i>Dependent variable:</i>	
	log(iptu)	
	(1)	(2)
log(pop)	-0.237*** (0.052)	0.141*** (0.051)
log(gdp)	1.533*** (0.041)	1.293*** (0.039)
gini	-3.626*** (0.345)	-2.152*** (0.331)
left	-0.060 (0.038)	-0.084** (0.036)
shareRural	-2.204*** (0.104)	-1.917*** (0.100)
log(HousingSpending + 0.01)	-0.002 (0.008)	-0.0002 (0.008)
log(TransfersFederal + 0.01)	-0.258*** (0.085)	-0.436*** (0.080)
Constant	2.856*** (0.795)	1.460* (0.756)
Observations	4,828	4,828
Log Likelihood	-8,133.228	-7,932.179
$\sigma^2$	1.700	1.538
Akaike Inf. Crit.	16,286.450	15,884.360
Wald Test (df = 1)	186.981***	667.918***
LR Test (df = 1)	184.352***	586.450***

*Note:* \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Table 7: Brazilian Taxes According to the Economic Base

Economic Base	Tax
Tax on personal income	IRPF
Taxes on profit	IRPJ and CSLL
Taxes on the payroll	Social security contributions, work injury insurance, “S” System, Education Allowance and “other”
Taxes on revenues	IRPJ and CSLL (presumed profit), SIMPLES and ISS
Taxes on the sale and movement of goods	IPI, PIS/PASEP, COFINS, CIDE and ICMS
Property taxes	IPTU, ITR, IPVA, ITCD, IBTI
Taxes on financial transactions	IOF and CPMF
Taxes on foreign trade	II and IE
Variable and other taxes	Other federal, state and local taxes (taxes that vary, and are not included in the Constitution)

Source: Junqueira (2010, p. 31)

Table 8: Distribution of Transfers Revenues According to the Brazilian Constitution of 1988

Tax Revenue Distributed	% of Distribution and Source
<b>Union to States</b>	
States Participation Fund	21.5% of the tax revenues received with IR and IPI taxes
IPI Proportional to Exportations	10% of the tax revenue received with the IPI tax
Taxes the Union instituted in the exercise of residual powers	20% of the tax revenue
Regional Funds (FNE, FNO, FCO)	3% of the tax revenues with IR and IPI taxes
Withholding income tax	Withheld at the source
<b>Union to Municipalities</b>	
Participation Fund of Municipalities	22.5% of the tax revenues received with IR and IPI taxes
ITR	50% of the tax revenue received with ITR tax
Withholding income tax	Withheld at the source
<b>States to Municipality</b>	
ICMS	25% of the tax revenue received with the ICMS tax
IPVA	50% of the tax revenue received with the IPVA property taxes
IPI	25% of the tax revenue received with the by the proportional IPI export

Source: Cossío (1998, p. 29-30) (Afonso, Rezende, Silva, and Varsano 1989).

Table 9: Brazil's Tax Revenues (1986-2014)

Year	GDP	Federal		State		Municipal		Total		Growth (%)
		Revenue	Revenue/GDP (%)	Revenue	Revenue/GDP (%)	Revenue	Revenue/GDP (%)	Revenue	Total/GDP (%)	
1992	355.453	60.437	17	26.297	7.4	3.48	0.98	90.214	25.38	0.77
1993	429.968	79.51	18.49	25.398	5.91	2.971	0.69	107.879	25.09	-0.29
1994	477.92	98.199	20.55	34.334	7.18	4.2	0.88	136.733	28.61	3.52
1995	646.192	124.695	19.3	53.139	8.22	9.024	1.4	186.858	28.92	0.31
1996	857.857	139.484	16.26	62.98	7.34	10.116	1.18	212.58	24.78	-4.19
1997	955.464	158.566	16.6	69.32	7.26	11.305	1.18	239.191	25.03	0.25
1998	1.005.986	181.828	18.07	72.07	7.16	14.219	1.41	268.117	26.65	1.62
1999	1.092.276	210.691	19.29	79.154	7.25	15.096	1.38	304.941	27.92	1.27
2000	1.202.377	241.602	20.09	96.223	8	16.371	1.36	354.196	29.46	1.54
2001	1.316.318	278.599	21.17	108.262	8.22	16.884	1.28	403.745	30.67	1.21
2002	1.491.183	341.51	22.9	122.234	8.2	18.742	1.26	482.486	32.36	1.68
2003	1.720.069	391.052	22.73	139.137	8.09	22.99	1.34	553.179	32.16	-0.2
2004	1.958.705	454.313	23.19	166.117	8.48	29.705	1.52	650.135	33.19	1.03
2005	2.171.736	514.417	23.69	186.675	8.6	33.016	1.52	734.108	33.8	0.61
2006	2.409.803	570.789	23.69	208.306	8.64	37.957	1.58	817.052	33.91	0.1
2007	2.718.032	650.997	23.95	229.57	8.45	43.018	1.58	923.585	33.98	0.07
2008	3.107.531	739.682	23.8	270.089	8.69	49.96	1.61	1.059.731	34.1	0.12
2009	3.328.174	759.88	22.83	287.853	8.65	55.221	1.66	1.102.954	33.14	-0.96
2010	3.886.835	895.112	23.03	352.457	9.07	64.688	1.66	1.312.257	33.76	0.62
2011	4.374.765	1.051.829	24.04	400.574	9.16	74.753	1.71	1.527.156	34.91	1.15
2012	4.713.096	1.117.214	23.7	429.116	9.1	85.103	1.81	1.631.433	34.61	-0.3
2013	5.157.569	1.232.740	23.9	479.347	9.29	94.967	1.84	1.807.054	35.04	0.42
2014	5.521.256	1.292.686	23.41	557.72	10.1	105.398	1.91	1.955.804	35.42	0.39

Source: Do Amaral, Olenike, Do Amaral, and Yasbek (2015, p. 3).

Notes: Revenue in Millions of Brazilian Currency R\$. Presidents: Fernando Collor de Mello (1990-1992); Itamar Franco (1993-1994); Fernando Henrique Cardoso (First Term) (1995-1998); Fernando Henrique Cardoso (Second Term) (1999-2002); Luiz Inácio Lula da Silva (First Term) (2003-2006); Luiz Inácio Lula da Silva (2007-2010); Dilma Rousseff (2011-2014).