

CAF - WORKING PAPER #2018/06

First version: January, 2018

This version: July 10, 2024

The Political Economy of Slum Growth: Evidence from Brazil

Guillermo Alves¹

¹Economista Principal. Dirección de
Investigaciones Socioeconómicas.
CAF - Banco de Desarrollo de
América Latina galves@caf.com

One-quarter of the world's urban population lives in slums, with slum residents growing from 650 million in 1990 to 1 billion in 2018. While rural-urban migration and extreme poverty explain slum growth in rapidly urbanizing low-income countries, this phenomenon also occurs in Latin America's highly urbanized, middle-income nations. This paper provides evidence from Brazil that local government actions can increase the proportion of households living in slums without changes in poverty or immigration. Victories by a pro-poor party in close municipal elections in 2000 significantly increased the share of households living in slums by 2010. A novel panel of census tracts reveals that this increase is due to new slum formation, rather than the expansion of existing slums or fewer slums converting into non-slum areas. This evidence of permitting new slums to form, combined with previous findings of lower enforcement efforts by this party in other areas of public policy, suggests a more permissive attitude towards slum formation as the primary mechanism.

KEYWORDS

Slums, Brazil, Elections

Small sections of text that are less than two paragraphs may be quoted without explicit permission as long as this document is acknowledged. Findings, interpretations and conclusions expressed in this publication are the sole responsibility of its author(s) and cannot be, in any way, attributed to CAF, its Executive Directors or the countries they represent. CAF does not guarantee the accuracy of the data included in this publication and is not, in any way, responsible for any consequences resulting from its use.

CAF - DOCUMENTO DE TRABAJO #2018/06

Primera versión: January, 2018. Última versión: 10 de julio de 2024

La economía política de los asentamientos: evidencia de Brasil

Guillermo Alves¹

¹Economista Principal. Dirección de
Investigaciones Socioeconómicas.
CAF - Banco de Desarrollo de
América Latina galves@caf.com

Una cuarta parte de la población urbana del mundo vive en asentamientos, cuyos residentes aumentaron de 650 millones en 1990 a 1.000 millones en 2018. Si bien la migración rural-urbana y la pobreza extrema explican el crecimiento de los asentamientos en los países de bajos ingresos que se urbanizan rápidamente, este crecimiento también ocurre en los países de ingresos medios y altamente urbanizados de América Latina. Este documento muestra que las acciones de los gobiernos locales pueden aumentar la proporción de hogares viviendo en asentamientos sin cambios en la pobreza o la inmigración. Las victorias de un partido “pro-pobre” en elecciones municipales reñidas en 2000 aumentaron significativamente la proporción de hogares que vivían en asentamientos en 2010. Un nueva base de datos de panel revela que este aumento se debe a la formación de nuevos asentamientos, no a la expansión de asentamientos existentes. Esta evidencia de una actitud más permisiva respecto a la creación de nuevos asentamientos, combinada con evidencia previa de menores esfuerzos de aplicación de la ley por parte de este partido en otras áreas de la política pública, sugiere que dicha actitud más permisiva es el mecanismo principal detrás del efecto encontrado.

KEYWORDS

Asentamientos, Elecciones, Brasil

Pequeñas secciones del texto, menores a dos párrafos, pueden ser citadas sin autorización explícita siempre que se cite el presente documento. Los resultados, interpretaciones y conclusiones expresados en esta publicación son de exclusiva responsabilidad de su(s) autor(es), y de ninguna manera pueden ser atribuidos a CAF, a los miembros de su Directorio Ejecutivo o a los países que ellos representan. CAF no garantiza la exactitud de los datos incluidos en esta publicación y no se hace responsable en ningún aspecto de las consecuencias que resulten de su utilización.

1 | INTRODUCTION

A quarter of the world's urban population lives in slums, with the number of slum residents increasing from 650 million in 1990 to 1 billion in 2018 (UN, 2021). Slum growth is typically attributed to rural-urban migration in rapidly urbanizing, low-income countries (World Bank, 2009). However, this phenomenon is also observed in the highly urbanized, middle-income countries of Latin America. While persistent inequality in the region creates a latent demand for this type of housing, the informal or illegal nature of slums means that specific local institutional conditions are necessary for their formation and growth. This paper provides evidence from Brazil that slums can grow significantly without changes in poverty or immigration when local governments favor their expansion.

Studying the causal effects of local government actions on slum growth presents two main challenges. First, unobserved factors simultaneously influence the election of officials, the policies they implement, and slum growth. For instance, a local economic shock that increases poverty may lead to higher slum growth and greater support for political parties with pro-poor agendas. Second, measuring both slums and slum policies is difficult. The informal nature of slums makes their measurement prone to errors and potential biases. Typically, governments that are more active in policies towards slums do a better job identifying these areas. Regarding policy measurement, there is no systematic data for the entire set of cities in a country for interventions such as slum upgrading, titling, or evictions.

This paper examines the effect of local governments elected in 2000 on the change in the share of households living in slums in Brazilian cities from 2000 to 2010. To address the first challenge, I employ a regression discontinuity design in close mayoral elections. This approach allows me to isolate the causal effect of the party's policies on slum growth. I address the second challenge by measuring slums consistently across cities and over time as those census tracts with at least 50 households lacking access to water, sanitation, property rights, a bathroom, or trash collection. For policy measurement, I construct a novel panel of census tracts from 2000 to 2010, using transitions from slum to non-slum to proxy slum upgrading efforts, and non-slum tracts converting to slums to proxy lower enforcement of property rights. I further complement these proxies with survey and expenditure data on urban policies and regulations.

I find that the election in 2000 of a mayor belonging to a pro-poor party with strong connections with squatter organizations increased the proportion of households in slums in 2010 by eight to twelve percentage points. Using the census tract panel, I show that this increase is due to the formation of new slums rather than a lower conversion rate of slums into non-slums. These findings are robust to several specifications of the regression discontinuity design with a data-driven selection of alternative bandwidths, polynomials, and kernel functions (Cattaneo et al., 2019).

I explore how these mayors increased the share of households in slums with a typology of three mechanisms based on a simple supply and demand framework (Brueckner and Selod, 2009; Cavalcanti et al., 2018; Alves, 2021). First, these mayors could have impacted the supply of slum housing. Changes on this supply side could have increased the share of households in slums if these mayors converted fewer slums into non-slums or did less enforcement against squatting (Jimenez, 1985). Second, mayors could have reduced the supply of non-slum housing by constructing less public housing or restricting private construction with tighter land-use regulations (Glaeser et al., 2005; Saiz, 2010; Anagol et al., 2021; Baum-Snow and Han, 2023). Finally, mayors could have increased the demand for slum relative to non-slum housing if they raised poverty, inequality, or immigration.

Regarding evidence on the first mechanism, the panel of tracts shows no effect on the conversion rate of slums into non-slums. I further confirm that there were no differences

in slum upgrading efforts with survey data on the policies implemented by these municipalities. In contrast, the result of new slum formation as the main driver suggests that lower enforcement efforts could have played a role. Because slums are harder to evict once they have formed (World Bank, 1993), enforcement is more likely to impact the share of households in slums through this extensive margin of new slum formation.

In part because evictions are rare or non-existent in equilibrium (Brueckner and Selod, 2009), there is no direct data on enforcement against squatting. Notwithstanding this, the hypothesis of lower enforcement as the main mechanism is supported by related findings in previous papers, a few critical elements from the political context, and evidence from this paper discarding the alternative mechanisms. Brollo, Kaufmann and La Ferrara (2020) and Feierherd (2022) have shown lower local enforcement efforts by this same party regarding the conditionalities of cash transfers and labor regulations, respectively. In terms of the political context, this party had longstanding connections with organizations promoting rural and urban squatting (Hochstetler, 2000; Samuels, 2004; Albert, 2021).¹ Additionally, in the highly competitive scenario captured by the regression discontinuity design, allowing new slums to form could have been a strategy to gain votes among the poor, as the party was growing strongly among this group during these mayors' term. The poor in Latin America, especially in Brazil, tend to support squatting and land invasions (Zucco, 2008; Holland, 2017).

I use complementary data sources to discard the other two mechanisms. Regarding changes in the supply of non-slum housing, the survey data on municipalities' policies shows no effects on housing policies and regulations, including the construction of new houses, distributing land for housing construction, and the rules of zoning and urban land subdivision. As in Gouvêa and Girardi (2021), I find that these mayors increased social expenditure, but I additionally report that they did not spend differently in housing-related categories such as sewerage, urban infrastructure, and housing policy.

I evaluate changes in housing demand that could have increased the proportion of households in slums with census data on municipalities' sociodemographics. Importantly, the rich migration data of the Brazilian census allows one to measure migration by year of arrival. I find no impact on total migration in 2010 and also on the number of migrants who arrived exactly during these mayors' term. I further find no effect on the number or proportion of poor migrants, the total population, or the poverty rate.

This paper offers several contributions to the literature on the determinants of slum growth. Local government actions have occupied a central role in economic models of slums, including a focus on enforcement efforts and the links with squatter organizations (Jimenez, 1985; Brueckner and Selod, 2009; Cai et al., 2018; Cavalcanti et al., 2018). These elements have also been present in a rich sociological literature studying slum growth in Latin America with a mix of ethnographic, survey, and time-series methods (Perlman, 1980; Gay, 1994; Alvarez Rivadulla, 2017; Holland, 2017). Within this literature, Holland (2016) coined the term "forbearance" to refer to lower enforcement efforts against squatting and suggested it is a form of redistribution in contexts where regular housing policy is resource-constrained. Alvarez Rivadulla (2017) emphasized the role of intense competition for the vote of the poor in the huge expansion of slums in Montevideo in the 1990s. This paper complements these previous works in economic theory and sociology by providing quasi-experimental evidence that changes in local institutional conditions cause slum growth.

¹The pro-squatting movements include the rural "Movimento de Trabalhadores Rurais Sem Terra" (MST, Landless Peasants' Movement), the largest social movement in Latin America, and the urban "Movimento de Trabalhadores Sem Teto" (MTST, Homeless Workers' Movement) (Albert, 2021). The capacity of squatters to organize and form coalitions was a key component in Jimenez's (1985) seminal analysis of the causes of slum formation.

Feler and Henderson (2011) have previously suggested that local political economy conditions are relevant for the evolution of housing quality in Brazilian municipalities. They found that lower water provision in the 1980s decreased the growth in the number of low-income households, and interpreted it as a sign of exclusionary efforts by local governments. Interestingly, their results and the ones in this paper align with the changing political context in Brazil over the decades. The levels of water provision observed by Feler and Henderson are mostly a consequence of policies implemented during the dictatorship, a period of record-high and increasing inequality (Bonelli and Ramos, 1992), and they find evidence of efforts against slums. I examine a democratic context with intense political competition and decreasing inequality, and find that pro-poor local governments have a favorable attitude towards slums.

I further contribute to the literature on slums on the measurement dimension. As noted above, the lack of comprehensive data is one of the fundamental challenges for the empirical study of slums. A series of recent studies overcome this challenge by collecting rich historical data on slums in certain cities (Henderson et al., 2020; Harari and Wong, 2021; Rojas Ampuero and Carreras, 2022). I contribute with a new method that tracks the evolution of the universe of slums in a country using publicly available census data.

Beyond the literature on slums, the paper contributes to understanding the determinants of informality more generally. Government regulations and enforcement efforts are major determinants of informality (Perry et al., 2007; La Porta and Shleifer, 2014; Ulyssea, 2020). The paper joins a set of previous works that show that the enforcement of formal institutions does not depend only on state capacity and has political roots (Casaburi and Troiano, 2016; Brollo et al., 2020). The paper also relates to previous research suggesting that the non-enforcement of certain rules operates as a form of redistribution and insurance in the context of high inequality and imperfect social safety nets of Latin America (Holland and Schneider, 2017; Feierherd, 2022; López-Cariboni, 2022).

The rest of the paper is organized as follows. I begin by describing the institutional and political context of the study, which is central to understanding its findings. The following section describes the data sources. A methodology section follows, which presents the regression discontinuity design. Next, I develop the results, and then close by offering some concluding remarks.

2 | CONTEXT

Brazil is a highly decentralized country and municipalities manage land use regulations and are in charge of providing urban infrastructure (Garman, Haggard and Willis, 2001). Municipalities are governed by a mayor elected for a four-year term.² Elections take place in October and mayors take office in January of the following year. State and federal elections are also held every four years, but their timing is such that there are two years between municipal and general elections. I study the effect on slum growth of mayors whose tenure falls entirely between the 2000 and 2010 censuses. These are the ones elected in the 2000 or 2004 elections.

I find that mayors belonging to the Workers' Party (*Partido dos Trabalhadores*), known by its acronym "PT", increase the proportion of households in slums. The PT is often characterized as a programmatic party with a strong pro-poor agenda (Samuels and Zucco, 2014; Klasnja and Titiunik, 2017). Two characteristics of PT help to understand why their

²Mayors are elected by simple majority rule in municipalities with fewer than 200,000 people and absolute majority when the municipality population is 200,000 or more. In these larger municipalities, a runoff is required if none of the candidates reach the absolute majority. See Brollo and Nannicini (2012) and Fujiwara (2015) for detailed descriptions of Brazil's political system.

mayors could have favored the formation of slums, especially during the term following the 2000 election. First, an attitude of forbearance by PT mayors towards slum formation could have been functional for gaining votes among the poor. [Holland \(2017\)](#) has shown that the poor in Latin America, especially in Brazil, tend to support squatting and land invasions. During the 1990s the party was stronger in the largest and wealthier cities of the country, and in the 2001-2004 tenure it needed to grow its support at the local level, particularly among the poor. By the 2006 election, the party had successfully redirected its electoral support from more developed areas to the country's poorest regions ([Zucco, 2008](#)).

The second "pro-slum" characteristic of PT refers to the party's strong ties with organizations that promote rural and urban squatting ([Hochstetler, 2000](#); [Samuels, 2004](#)). These include the rural "Movimento de Trabalhadores Rurais Sem Terra" (MST - Landless Peasants' Movement) and the urban "Movimento de Trabalhadores Sem Teto" (MTST - Homeless Workers' Movement) ([Albert, 2021](#)). The role of squatter organizations in coordinating squatting attempts and mitigating negative externalities has been central in economic models of slums ([Jimenez, 1985](#); [Brueckner and Selod, 2009](#); [Brueckner, 2013](#)). The relationship between squatter movements, political parties, and slum growth has also been a central topic in the sociological and political science literature on Latin American slums since the 1970s ([Perlman, 1980](#); [Gay, 1994](#); [Alvarez Rivadulla, 2017](#)).

3 | DATA

3.1 | Slums in a panel of census tracts

I measure slums using the basic structure of the UN-Habitat definition ([UN, 2003](#)). According to this definition, a slum household is one that exhibits deprivation in basic urban services, property rights, housing quality, or living space. Following common intuition and the practice of several national statistical agencies, such as those of Brazil and India, I add an agglomeration dimension to the UN-Habitat definition. I identify a slum when a critical number of contiguous households experience some of these deprivations (IBGE 2011, Census of India, 2013).

I identify contiguous households as those living in the same census tract. Census tracts in Brazil are relatively small, with an average of 240 households per tract in the 2000 census, and this constitutes an advantage in terms of identifying neighboring households. In terms of the critical number of contiguous households needed to define a slum, I follow Brazil's official slum definition and set the threshold at 50 households.³

I follow two rules to define which variables are included in the slum measure. First, these variables must be available and consistently measured in the data aggregated by census tract in both the 2000 and 2010 censuses. Second, the variables must be part of the dimensions of the UN-Habitat slum definition mentioned above. Five variables jointly comply with these rules: access to water, access to sanitation, access to trash collection, existence of a bathroom, and squatting status.

³The IBGE classifies census tracts as slums using the category of "subnormal agglomerates" (*aglomerados subnormais*). A tract is classified as subnormal agglomerate if at least 51 households meet each of the following conditions: lacks essential public services (water, electricity, trash collection, sanitation), until recently (10 years or fewer) or currently occupies land without property rights, and constitutes a dense and disordered settlement. Although this classification is interesting, since it provides an official multidimensional measure of slums, the IBGE explicitly states that the resulting measure should not be used to compare slum growth between the 2000 and 2010 censuses. This is because the classification is not exhaustive and there is no measure of how exhaustive it is. Moreover, the ability to identify a subnormal agglomerate improves over time depending on how successful is the collaboration between the IBGE and the municipality. This could introduce a serious bias in estimates of the impact of local policies and politics on slum dynamics.

The next step consists of defining what constitutes a situation of deprivation in each of those five variables. I also follow the UN-Habitat slum definition as a reference for this step. I define a deprivation in access to water as having no piped connection or well or spring inside the property. For sanitation, I define a situation of deprivation when the house is not connected to the local sewer system or has no septic tank. Deprivation in trash collection means that the household does not have its trash collected by a trash company, and instead buries or burns it or throws it into vacant land, a river, or the sea. The absence of a bathroom for the exclusive use of the household defines a situation of deprivation. Finally, the indicator in the legal dimension establishes that the household is in a situation of deprivation if it does not own, rent, or have another type of legal permission from the owner of the house.

In summary, a census tract is defined as a slum if at least 50 households in that tract exhibit deprivation in at least one of those five variables. The main outcome variable of the paper is the proportion of urban households in a municipality that are located in slums. I compute this share by dividing the number of households in all the urban tracts classified as slums by those in all the urban tracts of the municipality.

I apply the slum definition to a novel panel of urban census tracts built with the 2000 and 2010 censuses. The main objective of this panel is to be able to separately identify the processes of the creation of new slums and of upgrading existing slums into non-slums. The panel further allows one to decompose the municipality-level change in the share of households in slums in an extensive margin, given by changes in the slum status of the tracts, and an intensive margin, given by population growth within each type of tract.

Creating a panel of census tracts is a challenging undertaking due to the shifting boundaries of tracts between censuses. I construct a panel of tracts that have consistent boundaries over time using the area of the 2000 tracts as the benchmark and applying areal weighted interpolation to allocate the population of the 2010 tracts to the 2000 tracts with which they intersect.⁴ The areal weighted interpolation procedure implies that the 2010 population is allocated proportionally to the area of the intersection of the 2010 tract with the 2000 tracts. For instance, if half of the area of a 2010 tract falls on 2000 tract A and the other half on 2000 tract B, then half of the population of the 2010 tract is assigned to A and the other half to B.

The areal interpolation procedure fully assigns 89% of the 2010 tracts to a 2000 tract.⁵ The remaining 11% have some or all of their population unassigned to a 2000 tract because their area was partly or fully rural in 2000.⁶ I treat the unassigned population of this 11% of 2010 tracts differently if the area of the 2010 tract was mostly rural or urban in 2000. If it was mostly rural, I place the unassigned population in a new tract with zero population in 2000. If the majority of the area was urban in 2000, I distribute the unassigned population among the 2000 tracts they intersect with.⁷

Figure 1 displays a map of the municipality of Curitiba showing the classification of census tracts into four categories based on their slum status in each census. The map reveals a spatial pattern observed in multiple cities in the dataset that is closely aligned with the model and data for Nairobi in [Henderson et al. \(2020\)](#). In this typical pattern, the

⁴[Lee and Lin \(2018\)](#) employed a similar procedure to construct consistent neighborhoods in the US using census tracts.

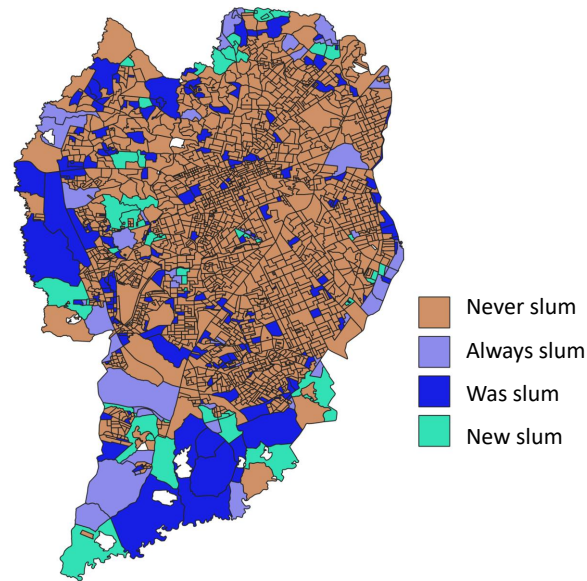
⁵Fully here corresponds to at least 99% of the area of the 2010 tract being assigned to a 2000 tract.

⁶Half of these have at least 90% of their area matched to a 2000 tract. 14% of them have an area that was entirely rural in 2000.

⁷For tracts in this second group, assigning their unmatched population to a new tract would have created tracts that are too small to reach the critical threshold of 50 households required to identify a slum. When these 2010 tracts intersect with a single 2000 tract, their unmatched population is fully assigned to that 2000 tract. When they intersect several 2000 tracts, their unmatched population is assigned to those 2000 tracts proportionally to the area of each intersection.

central region of the city primarily comprises tracts not classified as slums in both censuses. Additionally, slums are more likely to transition to non-slums if they are close to the center of the city, while the majority of those in the outskirts remain slums. New slums form primarily in the periphery of the city.

FIGURE 1 Slum dynamics in a large Brazilian city. The case of Curitiba between 2000 and 2010.



Source: Own elaboration based on 2000 and 2010 census data aggregated at the tract level.

Notes: See Section 3 for details on the binary classification of tracts into slum or non-slums as well as on the construction of the panel of tracts. “New slum” are tracts classified as slums in 2010 but not in 2000, “Was slum” are classified as slums in 2000 but not in 2010, “Stayed slum” are classified as slums in both censuses and “Never slum” are not classified as slums in any of the two censuses.

I further use the 10% sample of the 2000 and 2010 censuses to measure the evolution of migration and poverty in the municipalities. For migration, the Brazilian census asks if the head of the household was born in the municipality and, if not, for how long she has been living there. Using these two variables, I identify the total number of migrant households as those whose heads were not born in the municipality. Additionally, I separately identify migrants who arrived in the municipality during the 2001-2004 term. For measuring poverty rates, I use a relative line of half the median of the national distribution of households' per capita income.

3.2 | Data on politics and policies

Data on mayoral elections are publicly available from Brazil's national electoral authority (Tribunal Superior Eleitoral). There are two sources of information on policies implemented during the 2001-2004 term. The first is a survey conducted by IBGE, called MUNIC, which asks municipality authorities about the policies implemented in the years immediately preceding the survey. I use the 2004 version of this survey because it provides data on

policies implemented between 2001 and 2004. The second source on policies is the data on municipalities' expenditures from Brazil's Federal Ministry of Finance (Secretaria do Tesouro Nacional). I use these data for all the years in the 2001-2004 term except for 2001, as the data for that year has a much lower level of disaggregation in terms of expenditure categories.

3.3 | Selection of the Sample and Period

The main sample consists of 270 municipalities that meet three criteria. Since slums are an urban phenomenon, the first and primary criterion is that the municipality is urban. I consider the 462 municipalities that had an urban population of at least 50,000 in the 2010 census. The second criterion is given by the close election regression discontinuity design, which requires that the PT participated in the 2000 election. As discussed in the previous section, in the 2000 election the PT had much less support than what it would have in the following decade, and the party had a candidate for mayor in only 1,300 municipalities out of 5,555. 271 of these met the 50,000 urban population threshold. The third criterion excludes only one additional municipality that suffered significant territorial splitting between 2000 and 2010.⁸

The final sample of 270 municipalities encompasses the largest urban areas in Brazil, including the 20 most populated cities and the vast majority of the country's urban population.⁹ This sample includes 71% of the Brazilian population considering municipalities with at least 50,000 inhabitants and 81% considering a population threshold of 500,000. This high representativeness in terms of the urban universe of Brazil is a direct consequence of PT being traditionally stronger in the country's largest cities.

The fact that PT was stronger in larger and wealthier cities in 2000 is also demonstrated in Table A1, which presents descriptive statistics for the 464 Brazilian municipalities with more than 50,000 urban inhabitants in 2010. The table distinguishes whether a PT candidate participated in the 2000 election and shows that municipalities with PT candidates are larger and have lower poverty rates and incidence of slums.

The choice to evaluate slum growth between 2000 and 2010 is based on the availability of census tract data. Although Brazil has publicly available data for previous censuses, there are no data by census tracts before 2000. In addition, dealing with the rapid process of municipalities' division in the 1990s in Brazil would have reduced the sample size considerably.

4 | EMPIRICAL STRATEGY

Studying the effect of changes in the political environment on economic outcomes is challenging because a variety of unobserved phenomena affect both electoral and economic outcomes. I address this issue by estimating the effects of political conditions on slum growth with a regression discontinuity in close municipal elections.¹⁰ This estimation procedure consists of comparing outcomes in those municipalities in which the PT won by a small margin versus those in which the party lost by a small margin. In this section, I first

⁸Thirteen municipalities of the final sample of 270 experienced some level of splitting, but the impact was relatively small in all of them, with the urban population of the new municipality averaging 1.1% of the original, with a maximum of 3.8%.

⁹These 20 largest cities do not include the capital city, Brasilia, because it does not have mayoral elections due to its status of federal district.

¹⁰See Lee and Lemieux (2010) and Cattaneo et al. (2019) for comprehensive reviews of the regression discontinuity design.

describe the regression discontinuity design and the details of its implementation in the current paper. Then I present evidence in favor of the validity of the design for the setting I study.

4.1 | Regression Discontinuity Designs in Close elections

The regression discontinuity design in close elections is of the sharp type. In sharp regression discontinuity designs the treatment variable T changes from zero to one at a given point of a continuous observable variable v , such that:

$$T = 0 \quad \text{if} \quad v < 0, \quad T = 1 \quad \text{if} \quad v \geq 0 \quad (1)$$

The researcher's interest relies on the impact of T on an outcome variable Y , with the usual problem being that there might be unobserved variables that are correlated with both T and Y . The identifying assumption of the design is that the relationship between unobserved confounders and v is continuous at the threshold, and then any observed discontinuous variation in Y may be rightly attributed to T . Adopting the potential outcomes notation and adding the subscript i to index municipalities, the regression discontinuity estimate of the treatment effect of T on Y at $v = 0$ is:

$$\lim_{\epsilon \uparrow 0} E[Y|v = 0 + \epsilon] - \lim_{\epsilon \downarrow 0} E[Y|v = 0 + \epsilon] = E[Y_i(1) - Y_i(0)|v = 0] \quad (2)$$

In close elections, the forcing variable v is the difference in the percentage of votes between candidates. In the context of this paper, it is defined as the difference between the PT candidate and the non-PT candidate who obtained the highest number of votes among all non-PT candidates. In cases where a runoff election was held, the vote difference from the runoff election is considered. This was the case in 23 of the 270 municipalities in the sample.

In practice, because there are no observations exactly at the cutoff, the estimation of the two conditional expectations on the left-hand side of Equation 2 requires using observations further away from the cutoff. The contemporary approach to approximating those two regression functions consists of estimating low-order (first and second) local polynomials separately for each side of the discontinuity (Cattaneo et al., 2019).

Local polynomial estimation must use observations that are further away from the cutoff, but not too far away to preserve the local nature of the design. Thus, selecting the bandwidth within which the local polynomials are estimated is a critical aspect of the regression discontinuity design. I define the bandwidth in a fully data-driven way by minimizing the mean-squared error of the local estimator. For the paper's benchmark estimations, I use a first-order local polynomial, a uniform kernel, and the same optimal bandwidth on both sides of the discontinuity. Benchmark estimations also include as controls the size of the urban population and the poverty rate, both measured in 2000. Including controls is not necessary for identification but improves efficiency. I show that the main results are robust to not including these controls. Beyond this benchmark, I provide results using different optimal bandwidths on each side, using zero and second-order polynomials, and using a triangular instead of a uniform kernel.

4.2 | Validity of the Regression Discontinuity Design

I provide evidence in favor of the identification assumption of the regression discontinuity design by showing that there is no sorting around the threshold and no discontinuities in a broad set of covariates measured before the election.

Figure A1 in the Appendix presents a histogram of the distribution of the forcing variable with no evidence of sorting around the threshold. Furthermore, the test proposed by Cattaneo et al. (2020) for the null hypothesis of continuity of the density at the threshold yields a p-value of 0.53. This evidence on the absence of manipulation of the running variable coincides with previous studies of close elections in Brazil and other countries (Eggers et al., 2015; Akhtari et al., 2022).

Table A2 in the Appendix shows that there are no discontinuities in a broad set of relevant variables measured in 2000. Critically, the first column shows no discontinuity in the share of households in the municipality who lived in slums, which is related to the main outcome of the paper. Among other variables, the table shows that there are no discontinuities in the size of the urban population, the poverty rate, and the proportion of migrants.

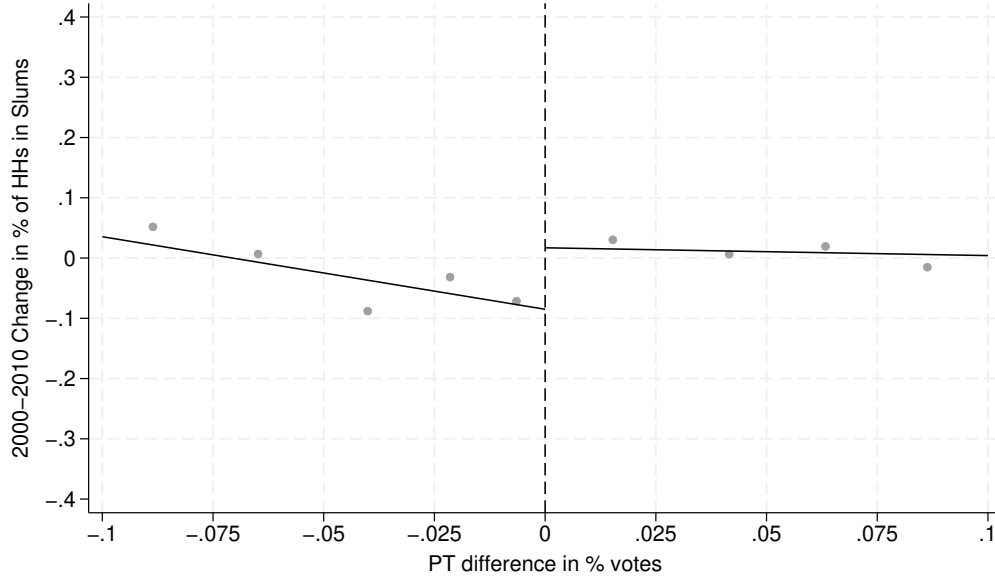
5 | RESULTS

5.1 | The Impact of PT mayors on Slum Growth

Figure 2 presents the main result of the paper. The figure plots the change in the share of households living in slums between 2000 and 2010 as a function of the difference in the share of votes between the PT candidate and the highest-voted non-PT candidate in the 2000 election. The two key methodological decisions in this graph are the number of bins used to compute the local averages and the range or window considered for the share of votes. These two decisions are data-driven and implemented with the software provided by Calonico et al. (2017).

The figure shows a reduction in the share of households in slums in non-PT municipalities between 2000 and 2010, which is consistent with the general improvement in living conditions in Brazil during this period (World Bank, 2011). In contrast, the share of households in slums increases in the municipalities governed by PT, generating a large positive discontinuity at the threshold. The estimates of this discontinuity in columns 1 to 4 of Table 1 indicate an impact between 11 and 12 percentage points. This is a large effect given that on average 38% of households lived in slums in 2000 in the 270 municipalities in the sample.

FIGURE 2 Impact of PT victories in 2000 on slum growth between 2000 and 2010



The x-axis measures the vote difference in percentage points in the 2000 mayoral election between the PT candidate and the most voted non-PT candidate. The y-axis measures the change between the 2000 and 2010 censuses in the share of households in the municipality who live in slums. See Section 3 for details on the definition of slums. The two elements of the graph, i.e. the local averages and the polynomial, were produced using the software provided by [Calonico et al. \(2017\)](#). The local averages are computed with a data-driven procedure to select the bins, which is the mimicking variance quantile-spaced method using spacing estimators. The solid lines are first-degree polynomials estimated separately for each side of the discontinuity. Observations are restricted to those municipalities in which PT won or lost by less than 10% ($N=49$) to reflect the local nature of the design. This window coincides with the data-driven optimal bandwidth (0.103) in column 1 of Table 1.

The result of the increase in the proportion of households in slums after a PT mayor won a close 2000 election is robust to several alternative specifications. First, columns 1 to 4 in Table 1 present estimates with a first-degree local polynomial and different data-driven optimal bandwidths on each side of the discontinuity and a triangular instead of a uniform kernel function. Second, columns 1 to 4 in Table A3 in the Appendix present very similar estimates with the same specifications as Table 1 but no controls. Third, columns 5 to 12 in that same Table A3 show similar estimates with a second-order local polynomial with four different specifications in terms of bandwidth and kernel and with and without controls. Fourth, the local randomization approach to the regression discontinuity design, which consists of comparing unconditional averages in a small data-driven window, yields a point estimate of 0.084 with a p-value of 0.018 ([Cattaneo et al., 2019](#)).¹¹ Finally, the results in the next subsection exploit the panel of census tracts and show robust discontinuities in several variables capturing the creation of new slums.

¹¹I implement this approach by comparing unconditional averages between municipalities governed by PT and non-PT mayors within a fully data-driven bandwidth. The choice of the bandwidth and the inference on the resulting point estimate are implemented with the tools provided by [Cattaneo et al. \(2016\)](#). The optimal bandwidth is obtained by computing balance tests for a set of covariates measured before the election. I use three variables from the 2000 census: the share of households in slums, the urban population, and the poverty rate obtained with a poverty line of half the national median per capita income. The optimal bandwidth is $(-0.077, 0.077)$ and includes 36 municipalities.

TABLE 1 Effect of PT Victories in 2000 on the Distribution of Households by Slum Status and Tract Evolution, 2000-2010.

	2000-2010 Change in % HHs in the municipality by type of tract							
	In slums				New slum	Was slum	Stayed slum	Never slum
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PT wins	0.126*** (0.043)	0.120*** (0.044)	0.112*** (0.043)	0.114*** (0.041)	0.128*** (0.035)	0.004 (0.048)	0.012 (0.022)	-0.059 (0.037)
Average in 2010	0.40				0.12	0.09	0.28	0.51
Obs	49	48	60	67	49	57	39	61
Left Bandw.	0.103	0.132	0.135	0.156	0.086	0.129	0.146	0.136
Right Bandw.	0.103	0.078	0.135	0.141	0.086	0.129	0.146	0.136
Kernel	Uniform	Uniform	Triangular	Triangular	Uniform	Uniform	Uniform	Uniform

The dependent variable is the 2000-2010 change in the share of households in the municipality that live in a certain type of tract. Columns 1 to 4 consider all slums, and thus have as dependent variable the proportion of the households of the municipality who live in slums in 2010 versus 2000. The rest of the columns have as dependent variables the same type of difference in shares but counting in the numerator of those shares only the households in a given type of tract. "New slum" counts households in tracts classified as slums in 2010 and not in 2000, "Was slum" in those are classified as slums in 2000 but not in 2010, "Stayed slum" in those classified as slums in both censuses and "Never slum" in those classified as slums in both censuses. By construction, the dependent variables in columns 5 to 7 add up to the one in columns 1 to 4. The corresponding RD coefficients in the table do not add up exactly because they are estimated with different sets of municipalities due to each regression having a specific data-driven optimal bandwidth. Regression discontinuity estimates are obtained with software provided by [Calonico et al. \(2017\)](#) and using a first-degree polynomial estimated separately for each side of the discontinuity. In columns 1, 3, and 5 to 8, the MSE-optimal bandwidth is required to be the same on both sides of the discontinuity. In the remaining columns this bandwidth is allowed to vary between both sides. All regressions control for the 2000 population and poverty rate. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A4 in the Appendix shows that PT mayors winning the 2004 election did not impact the change in the share of households in slums between 2000 and 2010.¹² This contrasting result can be explained by the substantial change in the political status of PT during the 2000s. The PT reached the federal government for the first time in 2002, and then became the dominant player in Brazilian politics, winning four presidential elections in a row, the first two with a difference of more than 20 percentage points. As noted by [Zucco \(2008\)](#), by the 2006 presidential election the PT had already consolidated its electoral support among the poor. This rapid change in the political position of the party muted the two critical "pro-slum" elements of PT, discussed in Section 2. First, once the party reached a dominant position with strong support among the poor, this reduced its need to implement aggressive pro-poor policies at the local level. Second, the national ascension of PT coincided with a strong ideological moderation of the party, which distanced it from social movements, particularly from those promoting rural and urban squatting ([Samuels, 2004](#); [Hunter, 2010](#)).

5.2 | Mechanisms

The previous subsection presented robust evidence that the PT mayors who won the 2000 election strongly increased the share of households in slums in their municipalities. This result opens the question of what these mayors did differently that caused slum growth. I examine this question with a typology of three mechanisms structured around a simple supply and demand framework for slum and non-slum housing ([Brueckner and Selod, 2009](#); [Cavalcanti et al., 2018](#); [Alves, 2021](#)). The first mechanism refers to changes in the

¹²I further find no effect of PT winning the 2000 election on PT winning the 2004 elections. This result, available upon request, is consistent with the absence of a party incumbent effect found by [Fowler and Hall \(2014\)](#) for the US and [Klasnja and Titiunik \(2017\)](#) for PT in Brazil, and it limits the scope of dynamic effects of the types analyzed by [Cellini et al. \(2010\)](#).

supply of slum housing, the second to changes in the supply of non-slum housing, and the third to changes in the demand of slum relative to non-slum housing. I evaluate these three mechanisms using the panel of census tracts and data on municipalities' policies, expenditures, and demographics.

5.2.1 | Slum policies

Policies impacting the supply of slum housing can be divided into two groups depending on them being more or less friendly towards slums (Marx et al., 2013). On the one hand, slum upgrading and titling policies constitute the "friendly" approach to slums, with its benefits for slum residents being well documented (Field, 2005, 2007; Galiani and Schargrodsky, 2010; Galiani et al., 2017). These policies mechanically reduce the share of households in a city who live in slums by transforming these areas into non-slum areas. On the other hand, a group of "less friendly" policies includes evictions and policing efforts against squatting. Because slums are hard to evict after they have formed and consolidated (World Bank, 1993), enforcement efforts are more relevant in the extensive margin of slum growth given by new slum creation.

I evaluate whether lower slum upgrading or enforcement efforts explain the effect of PT on the share of households in slums using the panel of census tracts. Slum upgrading interventions can be identified in the panel with those tracts that changed from slum to non-slum status. If lower slum upgrading efforts explain the result, we should see a negative discontinuity in the share of slums converted into non-slums. Lower enforcement efforts are harder to measure and the evidence is more indirect. As noted above, these efforts are particularly critical for preventing the formation of new slums. I thus take a higher rate of creation of new slums in PT municipalities as suggestive of lower enforcement efforts.

The row with the municipality-level averages in Table 1 indicates that 51% of households in 2010 lived in tracts not classified as slums in both years ("never slum"), 28% in tracts that were slums in both years ("stayed slum"), 12% in tracts that went from non-slum to slum status ("new slum"), and 9% that went from slum to non-slum status ("was slum"). The change in the share of households in slums, the main outcome of the paper, can be decomposed exactly as the share of households in 2010 living in "new slums" (column 5), plus the change between 2010 and 2000 in the share of households in "stayed slum" tracts (column 6), minus the share of households in 2000 in "was slum" tracts (column 7). The regression discontinuity estimates in columns 5, 6, and 7 show that the impact of PT mayors on the share of households in slums is entirely driven by the creation of new slums and that there is no effect on the other two components.¹³

The decomposition exercise in Table 1 thus shows no signs of lower slum upgrading efforts by PT mayors. Instead, the higher share of households in new slums is the main driver. This higher share could be due to new slums forming but also larger new slums. Table A5 in the Appendix separately examines these extensive and intensive margins of slum growth. Columns 1 to 4 look at the first margin by examining the effect on the share of all tracts in the municipality classified in each of the four types of tract evolution. Columns 5 to 8 look at the second margin by examining the change in the average number of households in each type of tract.

The results in Table A5 reveal that the increase in the share of households residing in new slums under PT mayors was effectively driven by a higher rate of creation of new slums and not larger new slums. PT mayors increased by 9 points the probability of a tract being

¹³Since the proportion of households in slum and non-slum tracts must add to one in both census years, arithmetical consistency requires a negative point estimate in the change in the proportion of households not living in slums. This is shown in column 8 of Table 1.

classified as a new slum. Column 7 further reveals a positive effect on the intensive margin of slum growth given by the size of existing slums. This result on the intensive margin is consistent with an overall pro-slum role by these mayors.

The impact of PT mayors on the creation of new slums also appears very clearly when estimating regressions with tracts as units of observation instead of municipalities. Table A7 in the Appendix presents the impact of PT on the probability that a non-slum tract in 2000 became a slum tract in 2010. Standard errors in this table are clustered at the municipality level. Because a few very large municipalities have many more tracts than the rest, in these regressions the tracts are weighted such that all municipalities have the same weight. Columns 1 to 8 show, for different combinations of kernel, bandwidths, and polynomial order, a positive impact of PT mayors on the probability that a non-slum tract transitioned into a slum.

The evidence in the previous paragraphs shows a consistent picture of PT mayors causing new slums to form and not affecting the conversion of slums into non-slums. This evidence discards lower upgrading efforts as the mechanism behind the impact of these mayors on the share of households in slums. Additional evidence from the MUNIC survey and the expenditure data also point to a null effect on slum upgrading efforts. The 2004 version of the MUNIC survey asked municipalities if they had implemented slum upgrading and titling policies between 2001 and 2004. Columns 5 and 6 in Table 2 show no discontinuities in these two variables capturing public-sector interventions in slums. I further use the expenditure data to evaluate if PT mayors spent more or less in categories related to slum upgrading policies, such as urban infrastructure, housing, and sanitation. Table A8 in the Appendix shows that PT increased social expenditure, driven by health, a result reported by Gouvêa and Girardi (2021) for later elections. However, there is no effect on expenditures in the urban infrastructure categories.

5.2.2 | Housing policies

The second mechanism that could explain the impact of PT mayors on slum growth is the implementation of policies that restricted the supply of non-slum housing. PT mayors could have impacted this supply directly, by constructing fewer houses or providing less formal land for housing construction, or indirectly, by implementing more strict land use regulations (Quigley and Raphael, 2005; Saiz, 2010). The first two columns in Table 2 evaluate the direct channel and show that PT municipalities did not report building less public housing or giving away less formal urban land for housing construction between 2001 and 2004. This finding aligns with the lack of action by these mayors in the expenditure categories associated with the supply of non-slum housing, such as sanitation and urban infrastructure (Table A8 in the Appendix). Columns 3 and 4 of Table 2 evaluate the indirect channel of urban regulation and show that PT mayors did not differentially change the rules for dividing parcels and zoning laws.

TABLE 2 Impact of PT victories in 2000 on urban and housing policies.

	(1) Construction	(2) Land	(3) Subdivisions	(4) Zoning	(5) Slum Upgrading	(6) Titling
PT wins	0.164 (0.147)	0.257 (0.262)	0.190 (0.125)	0.071 (0.197)	0.124 (0.184)	0.153 (0.263)
Observations	54	44	66	54	58	49
Optimal Bandw.	0.121	0.089	0.148	0.119	0.131	0.099
Average	0.852	0.493	0.852	0.804	0.570	0.574

Dependent variables are binary variables from the 2004 MUNIC survey indicating (1) Construction of new houses (2) Giving free urban land for construction of new houses (3) Existence of a law regulating urban land subdivisions (4) Existence of zoning law (5) Existence of slum upgrading policies (“Urbanização de assentamentos”) (6) existence of titling policies (“Regularização fundiária”). Regression discontinuity estimates are obtained with the `rdrobust` stata command using a first-degree polynomial, a uniform kernel, the same MSE-optimal bandwidth estimated on both sides of the discontinuity, and controls for population and poverty rate in 2000 (Calonico et al., 2017).

5.2.3 | Changes in municipalities’ sociodemographics

A third and final mechanism refers to the demand-side explanation for slum growth. The demand for slum housing originates in the housing needs of low-income households, including migrant ones (World Bank, 2009; Alves, 2021; Gonzalez-Navarro and Undurraga, 2023). The context of extreme inequality in Latin America implies that the potential demand for slum housing is always present. I evaluate whether local changes in that demand explain the higher slum growth observed in PT municipalities.

PT mayors could have increased the demand for slum housing if their policies attracted low-income migrants or had a worse economic performance that increased the poverty rate in the municipality. Table 3 uses census data to evaluate whether municipalities’ sociodemographics changed in a way that indicates an increased demand for slum housing. The outcomes in that table include the growth in the total urban population, the poverty rate, the number of migrants, and the number of poor migrants. Importantly, the 2010 census asked households for how long they have lived in the municipality. This allows one to quantify migration during the exact years of these mayors’ term. The table shows no discontinuities in all of these variables.

The results in Table 3 not only reject changes in housing demand as the primary mechanism behind the paper’s results but also suggest that slum growth in this context is primarily a within-city phenomenon. This pattern of slum growth, which does not involve a surge in low-income immigration, differs from the reality of low-income countries in Africa and Asia experiencing rapid urbanization. The overall results of the paper on the relevance of local institutional conditions thus contribute to understanding the causes of slum growth in the highly urbanized middle-income countries of Latin America.

TABLE 3 Impact of PT victories in 2000 on demographic outcomes between 2000 and 2010.

	(1)	(2)	(3)	(4)	(5)	(6)
PT wins	-0.135 (0.141)	-0.003 (0.013)	11,005 (10,009)	2,681 (2,997)	-183 (1,344)	74 (395)
Observations	157	53	71	70	51	49
Optimal Bandw.	0.345	0.118	0.158	0.156	0.105	0.101
Average	0.210	-0.018	60,365	11,900	7,395	1,708

Dependent variables are (1) the log-growth rate in the number of urban households (2) the 2000-2010 change in the proportion of poor households (3) the number of migrants households in 2010 (4) the number of migrant households in 2010 with between 5 and 10 years of residence in the municipality (i.e. who arrived between 2001 and 2004) (5) the number of poor migrant households in 2010 (6) the number of poor migrant households in 2010 with between 5 and 10 years of residence in the municipality. Poverty is measured with a relative poverty line of half of Brazil's median per capita household income. Migrant households are those with at least one member who has not always lived in the municipality. All the regression discontinuity estimates are obtained with the `rdrobust` command, using a first-degree polynomial, a uniform kernel, the same MSE-optimal bandwidth estimated on both sides of the discontinuity, and controls by the poverty rate and the population in 2000 (Calónico et al., 2017).

5.2.4 | Joint consideration of mechanisms

The previous analysis of the three possible mechanisms behind the paper's main result discards a reduction in the supply of non-slum housing as well as an increase in the relative demand for slum housing due to higher poverty or immigration. This leaves changes in the supply of slum housing as the main candidate. The analysis with the panel of census tracts and the MUNIC survey showed that slum growth can not be attributed to PT mayors transforming slums into non-slums less frequently. Instead, the entirety of the growth in the share of households in slums is due to the creation of new slums, suggesting that a more lenient approach towards the formation of slums could be the main mechanism.

As discussed previously, the plausibility of the lower enforcement or forbearance explanation is supported by ruling out other potential mechanisms and also by the political context and previous evidence. In terms of the political context, the more lenient approach towards slum formation could have been functional to the party's need to expand its base among the urban poor and its close ties with squatting movements. The relevance of these two political elements could have been particularly intense in the highly competitive electoral context captured by the regression discontinuity design. In terms of previous evidence, research has demonstrated that the PT enforces regulations less stringently at the municipal level in two other critical areas of public policy (Brollo et al., 2020; Feierherd, 2022).

6 | CONCLUSION

This paper provides new evidence on the impact of local politics and policies on the evolution of slums. The proportion of slum-dwelling households grew after a center-left, pro-poor political party gained power at the local level in Brazil. These findings highlight the role of local political economy forces and institutions in understanding slum dynamics, a topic that has been previously studied in the sociology and political science literature but has not received much attention in the empirical literature in economics (Gay, 1994; Alvarez Rivadulla, 2017; Holland, 2017).

The regression discontinuity estimates of the paper are local in nature and this deserves a special note in terms of the internal and external validity of this paper's findings. With regards to internal validity, the local nature of the estimates corresponds to a highly competi-

tive electoral environment, where candidates have strong incentives to target special interest groups (Persson and Tabellini, 2002). In terms of external validity, the findings suggest that researchers and policymakers should give greater consideration to local political conditions to gain a better understanding of the circumstances under which slums are more likely to emerge. This challenges the conventional view that slums are solely a consequence of rural-urban migration and poverty. Of particular importance are contexts where there is intense political competition for low-income voters. While such conditions may not exist most of the time, the sizable effects I identify suggest that brief periods of intense political competition can lead to significant changes in the slum landscape of a city. As is well-known in urban economics, changes to a city's landscape tend to be long-lasting. Therefore, the effects of a single political term could shape the incidence of slums in a city for decades to come.

ACKNOWLEDGEMENTS

I thank Nathaniel Baum-Snow, Matías Brum, Vernon Henderson, Clara Irazabal, Brian Knight, Juan Moratorio, Heitor Pellegrina, Aurora Ramírez, and participants at seminars at Brown University, Lincoln Institute, CAF Development Bank of Latin America and the Caribbean, Iecon-Udelar, Decon-Udelar, LACEA, LACEA Urban Network, and Universidad Católica del Uruguay for helpful comments and suggestions. I am grateful to Enrique Carreras, Mauro Castiella, and Emilia Chocobar for their excellent research assistantship. Early work on this paper received support from the Lincoln Institute of Land Policy. The views expressed in this paper are solely those of the author and do not necessarily reflect those of CAF Development Bank of Latin America and the Caribbean. Any errors or omissions are the responsibility of the author.

REFERENCES

- Akhtari, M., Moreira, D. and Trucco, L. (2022) Political Turnover, Bureaucratic Turnover, and the Quality of Public Services. *American Economic Review*, **112**, 442–493. URL: <https://www.aeaweb.org/articles?id=10.1257/aer.20171867>.
- Albert, V. A. (2021) Mobilising the Periphery: Brazil's My House My Life Programme and the Homeless Workers' Movement. *Bulletin of Latin American Research*, **40**, 84–99.
- Alvarez Rivadulla, M. J. (2017) *Squatters and the Politics of Marginality in Uruguay*. Palgrave. URL: <https://www.palgrave.com/de/book/9783319545332>.
- Alves, G. (2021) Slum growth in Brazilian cities. *Journal of Urban Economics*, **122**, 103327. URL: <https://www.sciencedirect.com/science/article/pii/S0094119021000097>.
- Anagol, S., Ferreira, F. and Rexer, J. (2021) Estimating the Economic Value of Zoning Reform. URL: <https://www.nber.org/papers/w29440>.
- Baum-Snow, N. and Han, L. (2023) The microgeography of housing supply. *Journal of Political Economy*.
- Bonelli, R. and Ramos, L. R. A. (1992) Income distribution in Brazil: an evaluation of long term trends and changes in inequality since de Mid-1970s. URL: https://repositorio.ipea.gov.br/bitstream/11058/13696/1/income_distribution_in_brazil_an_evaluation_of_long_term_trends_and_changes_in_inequality_since_the_mid_1970s.pdf. Publisher: Instituto de Pesquisa Econômica Aplicada (Ipea).
- Brollo, F., Kaufmann, K. and La Ferrara, E. (2020) The Political Economy of Program Enforcement: Evidence from Brazil. *Journal of the European Economic Association*, **18**, 750–791. URL: <https://doi.org/10.1093/jeea/jvz024>.

- Brollo, F. and Nannicini, T. (2012) Tying Your Enemy's Hands in Close Races: The Politics of Federal Transfers in Brazil. *American Political Science Review*, **106**, 742–761.
- Brueckner, J. K. (2013) Urban squatting with rent-seeking organizers. *Regional Science and Urban Economics*, **43**, 561–569. URL: <http://www.sciencedirect.com/science/article/pii/S0166046213000306>.
- Brueckner, J. K. and Selod, H. (2009) A Theory of Urban Squatting and Land-Tenure Formalization in Developing Countries. *American Economic Journal: Economic Policy*, **1**, 28–51. URL: <http://ideas.repec.org/a/aea/aejpol/v1y2009i1p28-51.html>.
- Cai, Y., Selod, H. and Steinbuks, J. (2018) Urbanization and land property rights. *Regional Science and Urban Economics*, **70**, 246–257. URL: <http://www.sciencedirect.com/science/article/pii/S0166046217301655>.
- Calonico, S., Cattaneo, M. D., Farrell, M. H. and Titiunik, R. (2017) rdrobust: Software for regression-discontinuity designs. *Stata Journal*, **17**, 372–404. URL: <https://ideas.repec.org/a/tsj/stataj/v17y2017i2p372-404.html>.
- Casaburi, L. and Troiano, U. (2016) Ghost-House Busters: The Electoral Response to a Large Anti-Tax Evasion Program. *The Quarterly Journal of Economics*, **131**, 273–314. URL: <https://doi.org/10.1093/qje/qjv041>.
- Cattaneo, M., Idrobo, N. and Titiunik, R. (2019) A Practical Introduction to Regression Discontinuity Designs. In *Cambridge Elements: Quantitative and Computational Methods for Social Science* (eds. M. Alvarez and N. Beck). Cambridge University Press.
- Cattaneo, M. D., Jansson, M. and Ma, X. (2020) Simple Local Polynomial Density Estimators. *Journal of the American Statistical Association*, **115**, 1449–1455. URL: <https://doi.org/10.1080/01621459.2019.1635480>.
- Cattaneo, M. D., Titiunik, R. and Vazquez-Bare, G. (2016) Inference in regression discontinuity designs under local randomization. *The Stata Journal*, **16**, 331–367.
- Cavalcanti, T., da Mata, D. and dos Santos, M. (2018) On the causes of slum formation. *Economic Journal*.
- Cellini, S., Ferreira, F. and Rothstein, J. (2010) The Value of School Facility Investments: Evidence from a Dynamic Regression Discontinuity Design. *The Quarterly Journal of Economics*, **125**, 215–261. URL: <https://www.jstor.org/stable/40506281>. Publisher: Oxford University Press.
- Eggers, A. C., Fowler, A., Hainmueller, J., Hall, A. B. and Snyder, J. M. (2015) On the Validity of the Regression Discontinuity Design for Estimating Electoral Effects: New Evidence from Over 40,000 Close Races. *American Journal of Political Science*, **59**, 259–274. URL: <https://www.jstor.org/stable/24363608>.
- Feierherd, G. (2022) Courting Informal Workers: Exclusion, Forbearance, and the Left. *American Journal of Political Science*, **66**, 418–433.
- Feler, L. and Henderson, J. V. (2011) Exclusionary policies in urban development: Under-servicing migrant households in Brazilian cities. *Journal of Urban Economics*, **69**, 253–272. URL: <http://ideas.repec.org/a/eee/juecon/v69y2011i3p253-272.html>.
- Field, E. (2005) Property Rights and Investment in Urban Slums. *Journal of the European Economic Association*, **3**, 279–290. URL: <http://ideas.repec.org/a/tpr/jeurec/v3y2005i2-3p279-290.html>.
- (2007) Entitled to Work: Urban Property Rights and Labor Supply in Peru. *The Quarterly Journal of Economics*, **122**, 1561–1602. URL: <http://ideas.repec.org/a/tpr/qjecon/v122y2007i4p1561-1602.html>.
- Fowler, A. and Hall, A. B. (2014) Disentangling the Personal and Partisan Incumbency Advantages: Evidence from Close Elections and Term Limits. *Quarterly Journal of Political Science*, **9**, 501–531.

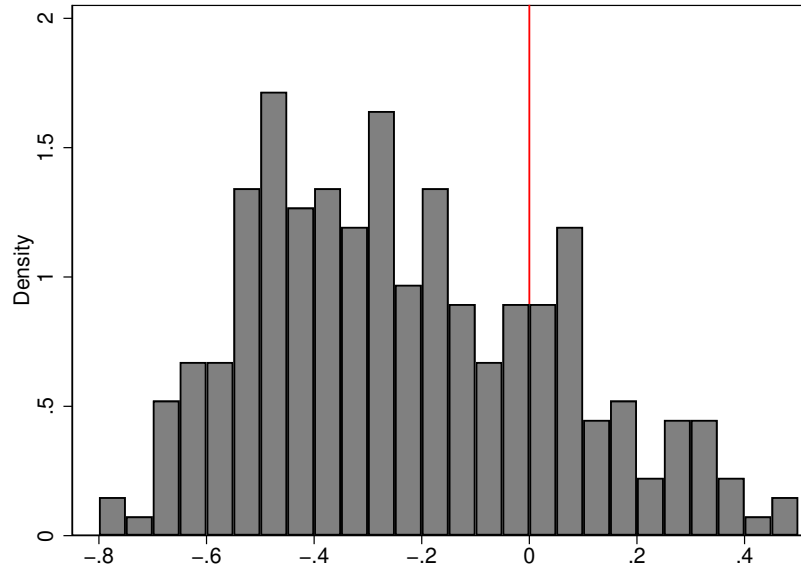
- Fujiwara, T. (2015) Voting technology, political responsiveness, and infant health: evidence from Brazil. *Econometrica*, **83**, 423–464.
- Galiani, S., Gertler, P. J., Undurraga, R., Cooper, R., Martínez, S. and Ross, A. (2017) Shelter from the storm: Upgrading housing infrastructure in Latin American slums. *Journal of Urban Economics*, **98**, 187–213. URL: <https://www.sciencedirect.com/science/article/pii/S0094119016300572>.
- Galiani, S. and Scharfrodsky, E. (2010) Property rights for the poor: Effects of land titling. *Journal of Public Economics*, **94**, 700–729. URL: <http://ideas.repec.org/a/eee/pubeco/v94y2010i9-10p700-729.html>.
- Garman, C., Haggard, S. and Willis, E. (2001) Fiscal Decentralization: A Political Theory with Latin American Cases. *World Politics*, **53**, 205–236.
- Gay, R. (1994) *Popular Organization and Democracy in Rio de Janeiro: A Tale of Two Favelas*. Temple University Press.
- Glaeser, E. L., Gyourko, J. and Saks, R. E. (2005) Why Have Housing Prices Gone Up? *American Economic Review*, **95**, 329–333. URL: <https://www.aeaweb.org/articles?id=10.1257/000282805774669961>.
- Gonzalez-Navarro, M. and Undurraga, R. (2023) Immigration and Slums.
- Gouvêa, R. and Girardi, D. (2021) Partisanship and local fiscal policy: Evidence from Brazilian cities. *Journal of Development Economics*, **150**, 102637. URL: <https://www.sciencedirect.com/science/article/pii/S030438782100016X>.
- Harari, M. and Wong, M. (2021) Slum Upgrading and Long-run Urban Development: Evidence from Indonesia. *Tech. rep.*, Society for Economic Dynamics. URL: <https://ideas.repec.org/p/red/sed018/367.html>.
- Henderson, J. V., Regan, T. and Venables, A. J. (2020) Building the city: from slums to a modern metropolis. *Review of Economic Studies*. URL: <http://www.lse.ac.uk/geography-and-environment/research/discussion-paper-series>.
- Hochstetler, K. (2000) Democratizing pressures from below? Social movements in the new Brazilian democracy. In *Democratic Brazil: Actors, institutions, and processes*, 167–184. Publisher: University of Pittsburgh Press Pittsburgh, PA.
- Holland, A. C. (2016) Forbearance. *American Political Science Review*, **110**, 232–246. URL: <https://www.cambridge.org/core/journals/american-political-science-review/article/abs/forbearance/3BE0D1D5085F962CE168D8891519AC60>.
- (2017) *Forbearance as Redistribution: The Politics of Informal Welfare in Latin America*. Cambridge University Press.
- Holland, A. C. and Schneider, B. R. (2017) Easy and Hard Redistribution: The Political Economy of Welfare States in Latin America. *Perspectives on Politics*, **15**, 988–1006. URL: <https://www.cambridge.org/core/journals/perspectives-on-politics/article/abs/easy-and-hard-redistribution-the-political-economy-of-welfare-states-in-latin-america/26C916EB0E05DC0C63D9B58D8B2C0E91>. Publisher: Cambridge University Press.
- Hunter, W. (2010) *The Transformation of the Workers' Party in Brazil, 1989–2009*. Cambridge: Cambridge University Press. URL: <https://www.cambridge.org/core/books/transformation-of-the-workers-party-in-brazil-19892009/A3FBA13256F7450735C5BB718856CB0B>.
- IBGE (2011) Censo Demográfico 2010. Aglomerados Subnormais. Primeiros Resultados. *Tech. rep.*, IBGE.
- of India, C. (2013) Primary Census Abstract for Slum. *Tech. rep.*, Census of India.

- Jimenez, E. (1985) Urban squatting and community organization in developing countries. *Journal of Public Economics*, **27**, 69–92. URL: <http://ideas.repec.org/a/eee/pubeco/v27y1985i1p69-92.html>.
- Klasnja, M. and Titunik, R. (2017) The Incumbency Curse: Weak Parties, Term Limits, and Unfulfilled Accountability. *American Political Science Review*, **111**, 129–148.
- La Porta, R. and Shleifer, A. (2014) Informality and Development. *Journal of Economic Perspectives*, **28**, 109–126. URL: <https://www.aeaweb.org/articles?id=10.1257/jep.28.3.109>.
- Lee, D. S. and Lemieux, T. (2010) Regression Discontinuity Designs in Economics. *Journal of Economic Literature*, **48**, 281–355. URL: <https://www.aeaweb.org/articles?id=10.1257/jel.48.2.281>.
- Lee, S. and Lin, J. (2018) Natural Amenities, Neighbourhood Dynamics, and Persistence in the Spatial Distribution of Income. *The Review of Economic Studies*, **85**, 663–694. URL: <https://doi.org/10.1093/restud/rdx018>.
- López-Cariboni, S. (2022) Political Regimes and Informal Social Insurance. *Comparative Political Studies*, 00104140221139378.
- Marx, B., Stoker, T. and Suri, T. (2013) The Economics of Slums in the Developing World. *Journal of Economic Perspectives*, **27**, 187–210. URL: <http://ideas.repec.org/a/aea/jecper/v27y2013i4p187-210.html>.
- Perlman, J. (1980) *Myth of Marginality: Urban Poverty and Politics in Rio de Janeiro*. University of California Press.
- Perry, G. E., Maloney, W. F., Arias, O. S., Fajnzylber, P., Mason, A. D. and Saavedra-Chanduvi, J. (2007) Informality : Exit and Exclusion. *Tech. rep.*, World Bank, Washington, DC.
- Persson, T. and Tabellini, G. (2002) *Political Economics: Explaining Economic Policy*. No. 0262661314 in MIT Press Books. The MIT Press. URL: <https://ideas.repec.org/b/mit/titles/0262661314.html>.
- Quigley, J. M. and Raphael, S. (2005) Regulation and the High Cost of Housing in California. *American Economic Review*, **95**, 323–328. URL: <http://ideas.repec.org/a/aea/aecrev/v95y2005i2p323-328.html>.
- Rojas Ampuero, F. C. and Carreras, F. (2022) Sent away: The long-term effects of slum clearance on children and families.
- Saiz, A. (2010) The Geographic Determinants of Housing Supply. *The Quarterly Journal of Economics*, **125**, 1253–1296. URL: <http://qje.oxfordjournals.org/content/125/3/1253>.
- Samuels, D. (2004) From Socialism to Social Democracy: Party Organization and the Transformation of the Workers' Party in Brazil. *Comparative Political Studies*, **37**, 999–1024. URL: <https://doi.org/10.1177/0010414004268856>.
- Samuels, D. and Zucco, C. (2014) The Power of Partisanship in Brazil: Evidence from Survey Experiments. *American Journal of Political Science*, **58**, 212–225. URL: <http://dx.doi.org/10.1111/ajps.12050>.
- Ulyssea, G. (2020) Informality: Causes and Consequences for Development. *Annual Review of Economics*, **12**, 525–546. URL: <https://doi.org/10.1146/annurev-economics-082119-121914>.
- UN (2021) *The Sustainable Development Goals Report 2021*. New York, USA.
- UN, U. N. H. S. (2003) *The Challenge of Slums: Global Report on Human Settlements 2003*. Routledge.
- World Bank (1993) *Housing: Enabling Markets to Work*. World Bank.

-
- (2009) *World Development Report 2009: Reshaping Economic Geography*. World Bank.
- (2011) *Country Partnership Strategy for the Federative Republic of Brazil for the period FY2012–2015*. Washington, DC.
- Zucco, C. (2008) The President's 'New' Constituency : Lula and the Pragmatic Vote in Brazil's 2006 Presidential Elections. *Journal of Latin American Studies*, **40**, 29–49.

A. APPENDIX OF TABLES AND FIGURES

FIGURE A1 Density of the running variable



The x-axis measures PT's vote difference in percentage points and the y-axis measures the number of municipalities by bins of 10 percentage points. The test proposed by [Cattaneo et al. \(2020\)](#) yields a p-value of 0.53 for the null hypothesis of continuity of the density at the threshold.

TABLE A1 Descriptive statistics for PT and non-PT urban municipalities.

PT participated in the 2000 election	2000			2010		
	No	Yes	All	No	Yes	All
Number of municipalities	194	270	464	194	270	464
Urban Population	131,968	250,811	201,123	160,695	289,811	235,827
Poverty Rate	0.21	0.17	0.19	0.19	0.15	0.17
Share of HHs in Slums	0.48	0.38	0.43	0.50	0.40	0.44

Source: own processing of 2010 Census data. Notes: Urban municipalities are those with at least 50,000 individuals living in an area classified as urban by the IBGE. Deprivation in each of the five dimensions is defined as the following. Water: not having piped connection or well or spring inside the property. Sanitation: not being connected to the local sewer system and not having a septic tank. Trash collection: not having trash collected by a trash company, thus burying or burning it on the property or throwing it into vacant land, a river, or the sea. Bathroom: absence of a bathroom for the exclusive use of the household. Property rights: does not own, rent, or have other type of legal permission from the owner to live in the house.

TABLE A2 Impact of PT victories on pre-election outcomes. 2000.

	% In slums (1)	Population (2)	HHs (3)	% Poor (4)	% Migrants (5)	% Poor Migrants (6)
PT wins	0.002 (0.102)	-597.5 (539.9)	-175 (166)	-0.046 (0.050)	0.057 (0.044)	-0.001 (0.008)
Observations	53	77	79	66	47	56
Optimal Bandw.	0.118	0.172	0.182	0.149	0.097	0.127
Averages	0.39	251	71	0.17	0.36	0.06

All dependent variables are measured in 2000. From columns 1 to 6, the dependent variables are the proportion of households in the municipality living in slums, the urban population in thousands, the number of households in thousands, the poverty rate, the proportion of households with a person not born in the municipality where they currently live, the proportion of households with a poor person not born in the municipality where they currently live. Poverty is measured with a relative poverty line of half of Brazil's median per capita household income. All regression discontinuity estimates are obtained with the `rdrobust` stata command (Calonico et al., 2017), using a first-degree polynomial, a uniform kernel, the same MSE-optimal bandwidth estimated on both sides of the discontinuity, and controlling for the poverty rate and the population in 2000 except when these variables are the dependent ones.

TABLE A3 Impact of PT victories on the 2000-2010 change in the share of households in slums. Alternative specifications.

	Change in the Share of HHs in Slum Tracts											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
PT wins	0.106** (0.049)	0.080* (0.045)	0.081* (0.046)	0.082* (0.044)	0.082 (0.058)	0.134*** (0.048)	0.059 (0.062)	0.080* (0.045)	0.123** (0.052)	0.134*** (0.048)	0.105** (0.053)	0.110** (0.043)
Pol Order	1	1	1	1	2	2	2	2	2	2	2	2
Controls	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Kernel	Uniform	Uniform	Triangular	Triangular	Uniform	Uniform	Triangular	Triangular	Uniform	Uniform	Triangular	Triangular
Left Bandw.	0.098	0.166	0.153	0.180	0.172	0.266	0.174	0.365	0.178	0.266	0.184	0.335
Right Bandw.	0.098	0.070	0.153	0.142	0.172	0.122	0.174	0.203	0.178	0.122	0.184	0.214
Obs	48	53	69	72	77	100	77	147	78	100	79	140
2010 Average	0.40											

The dependent variable is the difference in the share of households in the municipality that lived in slum tracts in 2010 with respect to 2000. The average share of households in slums in the first column of the last row corresponds to 2010. Point estimates with robust bias-corrected inference are obtained using the `rdrobust` stata command (Calonico et al. (2017) with first or second-order degree polynomials estimated separately on both sides with MSE-optimal bandwidth. The controls are the 2000 population and poverty rate. In columns (1) and (3) the bandwidth is required to be the same on both sides of the discontinuity and in columns (2) and (4) it is allowed to differ between the two sides. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

TABLE A4 Impact of PT victories in 2004 on slum growth between 2000 and 2010.

	Change in the Share of HHs in Slum Tracts							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PT wins	-0.031 (0.062)	0.028 (0.055)	-0.028 (0.056)	-0.002 (0.055)	0.073 (0.089)	0.053 (0.078)	0.010 (0.077)	-0.007 (0.069)
Observations	64	100	96	112	73	119	111	138
Kernel	Uniform	Uniform	Triangular	Triangular	Uniform	Uniform	Triangular	Triangular
Left Bandw.	0.0957	0.208	0.138	0.228	0.111	0.258	0.178	0.267
Right Bandw.	0.0957	0.0785	0.138	0.116	0.111	0.100	0.178	0.177

The dependent variable is the difference in the share of households in the municipality that lived in slum tracts in 2010 with respect to 2000. The average share of households in slums in the first column of the last row corresponds to 2010. Point estimates with robust bias-corrected inference are obtained using the `rdrobust` stata command [Calonico et al. \(2017\)](#) with first-degree polynomials estimated separately on both sides with MSE-optimal bandwidth and controls for the 2000 population and poverty rate. In columns (1) and (3) the bandwidth is required to be the same on both sides of the discontinuity and in columns (2) and (4) it is allowed to differ between the two sides.

TABLE A5 Impact of PT victories in 2000 on the extensive and intensive margins of 2000-2010 slum growth

	Share of tracts				HHs per tract			
	New slum (1)	Was Slum (2)	Stayed Slum (3)	Never Slum (4)	New slum (5)	Was Slum (6)	Stayed Slum (7)	Never Slum (8)
PT wins	0.094*** (0.035)	0.018 (0.039)	-0.046 (0.093)	-0.094 (0.117)	1.8 (53.6)	-1.4 (27.1)	113.7* (65.1)	1.0 (10.4)
Observations	54	54	52	54	47	76	41	54
Optimal Bandw.	0.119	0.123	0.112	0.120	0.115	0.185	0.094	0.121
Average	0.12	0.10	0.21	0.58	331.5	274.5	510.9	238.0

TABLE A6 In columns 1-4 the dependent variables are the share of tracts in a municipality that correspond to each of the four types of slum/non-slum evolution between the 2000 and 2010 censuses. In columns 5-8, the dependent variables are the change between 2000 and 2010 in the average number of households for each of the four types of tract evolution. The averages for these columns correspond to 2010. All regression discontinuity estimates are obtained with the `rdrobust` stata command ([Calonico et al., 2017](#)), using a first-degree polynomial, a uniform kernel, the same MSE-optimal bandwidth estimated on both sides of the discontinuity, and controls for 2000 population and poverty rate. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

TABLE A7 Impact of PT victories in 2000 on the transition of non-slum into slum tracts. Tract-level regressions.

	Probability that a Non-slum tract in 2000 becomes a Slum tract in 2010							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PT wins	0.079* (0.044)	0.069 (0.049)	0.087** (0.041)	0.088** (0.041)	0.096* (0.054)	0.142*** (0.050)	0.098** (0.046)	0.102** (0.048)
Left Bandw.	0.177	0.187	0.121	0.107	0.156	0.226	0.188	0.188
Right Bandw.	0.177	0.108	0.121	0.141	0.156	0.117	0.188	0.199
Obs.	22,222	20,918	17,260	18,295	20,583	23,279	24,679	25,226
Kernel	Uniform		Triangular		Uniform		Triangular	
Average	0.12							

All columns consider the 65,881 tracts classified as non-slums in 2000. The dependent variable in columns 1 to 4 is a binary variable that takes value 1 if a non-slum tract in 2000 became a slum in 2010 and 0 if the tract remained a non-slum tract. Columns 5 to 12 feature a similar dependent variable but that takes value 1 if the tract that became slum in 2010 was in non-urban (columns 5 to 8) or urban land (columns 9 to 12) in 2000. Regression discontinuity estimates are obtained with the `rdrobust` stata command (Calonico et al., 2017), using a first-degree polynomial, uniform kernel, and the same MSE-optimal bandwidth estimated on both sides of the discontinuity. Standard errors are clustered at the level of the municipality. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

TABLE A8 Impact of PT victories on average 2002-2004 per capita expenditure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PT wins	39.1 (46.5)	29.9* (17.5)	7.6 (7.2)	25.7* (13.2)	1.1 (2.1)	-11.5 (9.3)	-8.4 (11.0)	0.5 (0.9)
Observations	61	54	54	49	46	84	61	52
Optimal Bandw.	0.137	0.120	0.120	0.102	0.096	0.188	0.138	0.112
Average	293.8	142.7	71.3	62.7	8.8	37.8	9.9	1.6

The dependent variables are municipalities' per capita expenditure in Reais at 2000 prices for the average of the 2002-2004 period for the following categories: (1) total (2) social expenditure (education + health + social assistance) (3) education (4) health (5) social assistance (6) urban infrastructure (7) sanitation (8) housing. All the regression discontinuity estimates are obtained with the `rdrobust` stata command (Calonico et al., 2017), using a first-degree polynomial, uniform kernel, the same MSE-optimal bandwidth estimated on both sides of the discontinuity, and controls for the 2000 population and poverty rate. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.