The Political Economy of COVID-19 Pandemic Mitigation Policies: theory and evidence from Brazil

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Abstract

We build a signaling model in which mayors seeking reelection have to decide whether or not to implement non-pharmaceutical interventions (NPIs) to combat the COVID-19 pandemic. Mayors are office-seekers but also have preferences over policies (ideology). Municipalities' voters are heterogeneous: an (uncertain) share cares only about the implementation of NPIs, while the other is ideological and wants to reelect the incumbent only if she shares their ideology. We test the main predictions of our model using data from the 2020 Brazilian mayoral elections. By analyzing close-race elections, we show that electoral incentives played an important role in incumbent mayors' decisions about implementing NPIs. When we run separate regressions according to mayors' and municipalities' ideology, we find that the results are mostly driven by right-wing politicians in right-leaning municipalities. Yet, even left-wing mayors are affected by electoral incentives when one considers the municipality's share of elderly people – as a proxy for voters who only care about NPIs.

Keywords: COVID-19, NPIs, political economy, electoral incentives, Brazil
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1 Introduction

Multiple studies have shown that incumbents running for re-election have incentives to implement policies that increase their chances of winning the contest (Besley and Case, 1992; Franzese-Jr, 2002; Lizzeri and Persico, 2001). Examples go beyond increasing public spending or reducing taxes in periods close to elections (Drazen, 2000): they include visible and immediate impact policies, such as infrastructure projects (squares, avenues, monuments) (Drazen and Eslava, 2005), manipulation of participation rules in social programs (Brollo et al., 2015), and the allocation of public funds in general (Finan and Mazzocco, 2021). The choice of a suboptimal policy may have immediate impacts on voters' lives, but in most examples studied in the literature, the largest share of its cost occurs in the long term. This is one of the main reasons why such a strategy works electorally: voters can be myopic and not anticipate the future welfare loss.

It is not clear, however, if in an environment where the costs of a suboptimal policy are high and immediate, incumbent politicians would choose their actions based on electoral effects. This is the case with policies to combat the effects of the COVID-19 pandemic. Consider the example of an incumbent mayor in a municipality where the majority of the electorate is against stricter measures – e.g., for ideological reasons – such as the closure of businesses. Such a politician faces a dilemma: electoral incentives suggest that severe measures should not be adopted, but the cost in terms of lives and the burden on the healthcare system can be enormous. A similar dilemma would be faced by a mayor in a municipality where the population is in favor of business closures: by doing so, the mayor increases their chance of being re-elected, but the consequence may be a significant increase in unemployment and poverty.

In fact, the COVID-19 pandemic posed a significant challenge for governments, requiring policies aimed at reducing human and economic activity, along with limitations on civil freedoms, with clear but potentially unquantifiable trade-offs. Such situation claimed for multidisciplinary decision making (Norheim et al., 2021) whilst also opening avenues for populist responses (Lasco, 2020). Given the novelty of the virus and its correlated disease SARS-COV2, as well as the resulting uncertainty regarding the sub-

ject, reasonable levels of scientific disagreement were expected on proposals to allocate resources (Wasserman et al., 2020). Nonetheless, debate concerning COVID-19 related policies started to occupy mainstream avenues in politics and grew stronger as more information was catered to support divergent worldviews (Williams et al., 2020).

Given both the large domestic political polarization and its particular electoral systems, Brazil is ideal to analyze how electoral incentives have driven COVID-19 pandemic mitigation policies. In the early stages of the pandemic, during a period of intense political polarization (Justo et al., 2020), Brazil held mayor elections in November 2020. According to its legal and administrative framework, Brazilian municipalities bear responsibilities regarding public health and had to implement non-pharmaceutical interventions (NPIs) intended to reduce the circulation of the virus, alongside state level government (de Souza Santos et al., 2021). Considering the unwillingness from the federal government in adopting national social distance policies and mask mandates (Ferigato et al., 2020) and its consequences related to the spread of the virus (Castro et al., 2021), mayors and governors became important actors in tackling the pandemics in Brazil (Lancet, 2020).

In this paper, we answer the question whether incumbent mayors used COVID-19 pandemic mitigation policies electorally in Brazil. We do so by exploring close-races elections, which allow us to compare mayors who face electoral incentives (those in their first term) with those who cannot run for re-election (second term). Additionally, we can classify candidates and municipalities according to their ideology. The intense presidential election two years before the municipal elections created a clear dichotomy in the Brazilian society: supporters of then-President Jair Bolsonaro identified as right-wing and advocated for milder measures; opponents of the president identified as left-wing and demanded stricter measures. We classify candidates based on their party affiliation and we use the result of the 2018 presidential election at municipal level as a proxy for the municipality's ideology.

The empirical exercise we conduct tests propositions derived from a signaling model we constructed. We assume that the incumbent mayor aims to be re-elected but is also ideologically motivated. Right-wing politicians believe that NPIs are not the right policy,

while the opposite is true for left-wing mayors. Voters do not observe the incumbent's ideology (her type) and are composed of COVID-sensitive citizens, who vote for the incumbent if and only if NPIs are implemented, and ideological voters, who want to re-elect the mayor if she shares their ideology. Furthermore, we add uncertainty to the model by assuming that the mayor does not know the exact share of COVID-sensitive voters. We find a rich set of equilibria depending on the municipality's characteristics. The set of parameters we believe best describes the Brazilian political scenario yields the following hypotheses: (i) regardless their political stance, mayors are motivated to satisfy their electorate to secure reelection; (ii) right-wing mayors aiming for reelection are more likely to adopt policies that align with the voters' ideological preferences; (iii) this tendency diminishes for lower numbers of COVID-sensitive voters; (iv) for left-wing incumbents, the electoral incentives intensify with the increase in the proportion of COVID-sensitive constituents; and (v) these incentives are influenced by both the mayor's ideology and the predominant ideology of the local electorate.

Our Regression Discontinuity Design (RDD) estimates suggest that electoral incentives played an important role in incumbent mayors' decisions about implementing NPIs. When we compare mayors of all ideologies seeking reelection (first term) with their counterparts who are not running (second term) in close races, we find that the former implement milder measures (lower NPI index) than the latter. We also find an effect on social protection measures: electoral incentives make mayors seeking reelection provide more social protection. One possible explanation for this result is that mayors knew their milder measures could have negative impacts on citizens' welfare and tried to offset them by providing more social protection.

When we run separate regressions according to mayors' and municipalities' ideology, we find that right-wing politicians are the ones driving the result. The effect is particularly strong for right-leaning municipalities. We initially find no difference between the policies implemented by first-mandate and second-mandate left-wing mayors, regardless of the municipality's ideology. There is also no effect for right-wing mayors in left-leaning municipalities when it comes to NPI implementation – with one exception, when they

implement stronger measures. Interestingly, when the outcome variable is a social protection index, we find that right-wing mayors are more prone to providing social protection measures in municipalities regardless of their ideology.

Another empirical result that corroborates the theoretical predictions is that the incentive to adopt more severe measures is stronger the larger the share of elderly people in the municipality – used as a proxy for COVID-sensitive voters. When one interacts the margin of victory with the proportion of elderly people, there is an electoral effect even for left-wing mayors. In fact, we find that left-wing mayors seeking reelection in left-leaning municipalities implement stronger measures than their counterparts who are not running. These findings are in line with the hypothesis of the theoretical model.

We conduct a series of robustness checks (different margins of victory, inclusion of covariates, among others) and placebo tests in our regressions that corroborate the presence of electoral effects in the implementation of COVID-19 pandemic mitigation policies. In particular, we find statistically significant coefficients in all possible combinations of mayor and municipality ideologies. These findings are in line with the hypothesis of the theoretical model. We are thus sufficiently confident to consider our theoretical framework a plausible representation of the Brazilian political scenario. More importantly, the model is flexible enough to allow for applications in different contexts.

We interpret the result that mainly right-wing mayors in right-leaning municipalities are affected by electoral incentives as evidence that those politicians assign smaller weight to ideology.[1] Moreover, as the municipalities could not implement policies milder than the upper-level governments and there were already a large number of measures imposed by federal and state levels, it was harder for a politician to signal being left-wing than right-wing. In other words, simply closing workplaces was probably not enough for a mayor in a left-leaning municipality to signal that she was left-wing. A similar argument can be used to explain why we do not find an effect for left-wing mayors (except when interacting with the share of elderly people). Yet, left-wing parties are considerably more ideological than their right-wing counterparts in Brazil (DeMagalhaes, 2015), which helps

[1] According to the model's equillibria 3.4, the higher the relative weight an incumbent gives to ideology in comparison to the utility of being in office, the less she will be influenced by electoral incentives.

to explain the result.

1.1 Related literature

The main contribution of this paper is to provide evidence that COVID-19 pandemic mitigation policies are driven by electoral interests in Brazil. Accordingly, we contribute to the vast literature on how electoral incentives affect incumbents' decisions (e.g. Besley and Case, 1995; Drazen, 2000; Ferraz and Finan, 2011). In particular, our findings relate to evidence that Brazilian mayors change their policies when they run for re-election (e.g. Brollo et al., 2015; Finan and Mazzocco, 2021; Kresch and Schneider, 2020). The novelty of our results lies in showing that the same effects found in other policies hold for one in which the costs are high and immediate. Additionally, by demonstrating that politicians' choices change according to both their ideology and their municipality, we provide novel evidence on how the characteristics of politicians and municipalities interact with electoral incentives.

The literature on the political ramifications of both COVID-19 and the policies implemented to mitigate the pandemic is closely related to our paper. For instance, Chmel et al. (2023) conducted two experiments in Russia exploring the trade-off between "saving lives and saving the economy," finding that both healthcare-driven and economy-driven policies increase electoral support, with healthcare-driven policies having a larger effect on voting. Other studies examine the effects of COVID-19 and government responses on voting behavior, such as Leininger and Schaub (2020) for Germany, Giommoni and Loumeau (2020) for France, Bol et al. (2021) (2021) for countries in Western Europe, and Baccini et al. (2021) (2021) for the US. De Vries et al. (2021), on the other hand, examine how the response to the COVID-19 outbreak in Italy affected incumbent support in other countries, including France, Germany, Poland, and Spain.

Closer to our paper, however, is the work by Pulejo and Querubín (2021), which utilizes cross-country data to document how incumbents who can run for re-election implement less stringent restrictions as the election approaches. We find a similar result for Brazil, albeit only among right-wing mayors in right-leaning municipalities. In fact,

like ours, other studies investigate how politicians' ideologies affect COVID-19 pandemic mitigation policies. For example, Kavakli (2020) examine the relationship between government ideology and the response to the COVID-19 pandemic in 100 countries, finding that strongly populist governments implemented fewer health measures against COVID-19 and imposed fewer mobility restrictions. Additionally, akin to our findings, a weaker but statistically significant relationship between right-wing governments and COVID-19 policies is also observed.

When examining the literature on Brazil, Menezes-Filho and Komatsu (2021) find no incumbency effect on the adoption of Non-Pharmaceutical Interventions (NPIs) by incumbent mayors in response to COVID-19. However, unlike our study, their research assumes that both right-wing and left-wing incumbents face the same trade-off, without considering the possibility of differing voter compositions, such as right-leaning and left-leaning municipalities. This distinction is crucial as it may help elucidate why their findings differ from ours. Another study examining COVID-19 pandemic mitigation policies in Brazil is Bruce et al. (2022), which suggests that female incumbents outperformed their male counterparts in terms of total cases and deaths.

Finally, this paper contributes to the theoretical literature that models government responses to the COVID-19 pandemic and its political effects. The work by Bel et al. (2021) is one of the few studies to employ Game Theory to examine the strategic interaction between politicians and voters in this context. However, their study focuses on analyzing the drivers of policy-response agility during the outbreak rather than exploring the electoral incentives faced by incumbents. More broadly, we also contribute to signaling models a la Besley and Case (1995) by introducing an additional source of uncertainty for politicians. Our framework, albeit simple, is rich enough to allow applications where the electorate is heterogeneous (comprising several different groups) and politicians do not know the share of each group.

1.2 Outline

The rest of the paper is organized as follows. In the following section, we present the context that inspires our model and the object of our empirical exercise. In particular, we discuss the political polarization in Brazil during the pandemic and the legal framework associated with the COVID-19 pandemic mitigation policies. Section 3 builds the signaling game that analyzes mayors' best choices regarding COVID-19 policies, taking into account their ideologies as well as municipalities' ideologies and the electorate profile. Our empirical strategy is presented in section 4. Results are discussed in section 5. Finally, section 6 concludes. The omitted proofs of the propositions are presented in Appendix A. Appendices B, D, and C present some omitted results, placebo tests, and a series of other robustness checks, respectively.

2 Background

2.1 Political polarization in Brazil and the role of the pandemic

Political polarization in Brazil has intensified significantly over the past few years, reflecting deep divides within the country's society. This polarization became particularly pronounced with the election of President Jair Bolsonaro in 2018, a figure known for his far-right stance, which sharply contrasted with the preceding leftist governments led by the Workers' Party (PT). Bolsonaro's presidency has been marked by contentious rhetoric and policies that have further entrenched divisions, especially on issues such as social welfare, corruption, and environmental policies.

The COVID-19 pandemic exacerbated these existing political tensions. Bolsonaro's handling of the pandemic was controversial; he downplayed the severity of the virus, opposed lockdowns, and promoted unproven treatments, which clashed with the advice of health experts and international bodies. This approach sparked significant criticism from opposition leaders, scientists, and a portion of the public, who accused his government of mishandling the crisis and contributing to the high death toll. Supporters of Bolsonaro, on the other hand, often echoed his sentiments, viewing the restrictions as economically

damaging and an infringement on personal freedoms.

Social media has played a critical role in this polarization, acting as a battleground for competing narratives. During the pandemic, misinformation and conspiracy theories proliferated online, often spread by political factions to discredit opponents. This digital warfare intensified mistrust in official information and fueled anger and fear among different segments of the population. Consequently, public health measures became politicized, with compliance often reflecting political allegiance rather than a unified national response.

The economic impact of the pandemic also deepened the divide. Brazil, already grappling with economic challenges, faced worsening conditions as the pandemic led to increased unemployment and poverty. Bolsonaro's government implemented emergency financial aid, which garnered support among some of the poorest communities. However, critics argued that these measures were insufficient and poorly managed. The economic distress highlighted and sometimes exacerbated the socioeconomic disparities, contributing to the political divide.

The municipal elections of 2020 in Brazil underscored the deepening political polarization within the country. These elections were seen as a barometer of President Jair Bolsonaro's influence and the public's reaction to his handling of the COVID-19 pandemic. The polarization was evident in the sharp ideological divides between candidates, with many races characterized by a stark contrast between left-wing and right-wing contenders. In municipalities like São Paulo and Rio de Janeiro, the polarization was palpable. The elections saw the rise of candidates who either strongly supported Bolsonaro's policies or vehemently opposed them. This division was mirrored in the political strategies and campaign rhetoric, which often focused more on national issues and ideological loyalty rather than local governance and practical solutions.

2.2 Legal framework

Brazil is a federation with three levels of government: federal, state, and municipal. The Federal Constitution delineates general regulations for each level, encompassing their legal

and policy competencies, tax systems, administrative structures, and other areas. Elections in Brazil are overseen by Regional Electoral Courts (TREs), which operate under the authority of the Superior Electoral Court (TSE) and adhere to national regulations. Mayoral elections in Brazil are governed by two sets of rules: plurality for municipalities with fewer than 200,000 voters, and a two-round majority system for municipalities with more than 200,000 voters. In the latter case, a second round occurs when the leading candidate in the first round fails to secure over half of the valid votes (excluding blank and null ballots).

In terms of public health, the Federal Constitution stipulates that health is a fundamental right of all citizens and a responsibility of every State's branch. This right is to be ensured through social and economic policies aimed at mitigating health risks and ensuring universal and equitable access to health services and interventions for promotion, protection, and recovery (Article 196). Despite the distribution of responsibilities across the three levels of government, their roles are designed to be complementary and coordinated, forming a unified and universal healthcare system known as the Unified Health System (Sistema Único de Saúde, SUS). While municipalities bear primary responsibility for basic healthcare, they can also engage in more complex healthcare activities in collaboration with state and federal authorities.

In response to the COVID-19 pandemic, the Brazilian Supreme Court established that each level of government could implement more stringent measures than those imposed by higher authorities but could not relax restrictions. This ruling aimed to provide flexibility for regional authorities to address the pandemic's evolving situation while ensuring a cohesive national response. For instance, while the federal government could mandate business closures and other measures, these directives would need to be enforced by state and local governments, which often have a more immediate impact on public health enforcement and resources allocation. Conversely, if a state government imposed restrictions, the federal government could not override these measures, and municipalities would be required to adhere to them, fostering a coordinated approach to pandemic

management across different administrative levels (Abboud et al., 2020).[2]

This ruling bore significant weight, given then-President Jair Bolsonaro's outspoken opposition to non-pharmaceutical interventions like stay-at-home orders and business closures, which sowed uncertainty regarding Brazil's unified stance on pandemic response measures (Peci et al., 2023). Despite Bolsonaro's rhetoric, the Brazilian government pressed forward with diverse policies to combat the virus. However, this dichotomy between the President's public discourse and the government's actions underscored a discordance, culminating in the dismissal of two health ministers in the crisis's nascent stages. These ministerial turnovers not only increased public apprehension but also cast doubts on the government's crisis management efficacy. Additionally, Bolsonaro's resistance to certain measures, such as mask mandates and social distancing, further complicated the pandemic response efforts, exacerbating skepticism among the populace.

Despite initial discrepancies, all states in Brazil ultimately implemented legislation mandating mask-wearing and business closures (Touchton et al., 2021). However, the efficacy of municipal-level interventions was limited by the challenges in influencing citizen behavior effectively. This limitation stemmed from various factors, including inconsistent enforcement mechanisms and divergent levels of public compliance. Consequently, the impact of stricter rules at the municipality level on curtailing the virus spread was potentially mitigated. Moreover, attempts to enact regulations overriding state-level restrictions proved futile, as the judiciary swiftly overturned such measures following the landmark Supreme Court ruling. This legal precedent reinforced the autonomy of state and municipal governments in pandemic response while emphasizing the need for coordinated, cohesive measures across all levels of governance to effectively combat public health crises.

[2]The Supreme Court was asked to rule on the matter after Brazilian President Jair Bolsonaro issued executive orders with the intention of nullifying state government competencies to impose restrictions and mask mandates. The court's ruling affirmed the autonomy of state and municipal authorities to enact measures to combat the pandemic within their jurisdictions: https://portal.stf.jus.br/noticias/verNoticiaDetalhe.asp?idConteudo=440055&ori=1

3 Model

Our model is a simple signaling game that explores the interaction between electoral incentives and the political preferences of mayors seeking reelection in the context of their efforts to combat the effects of the COVID-19 pandemic. In this context, we have two groups of players: politicians and voters. We describe each of them below.

3.1 Voters

Consider a municipality where two politicians are running for mayor's office, namely an incumbent and a challenger. The type of each politician is private information: voters do not observe whether a particular candidate is left-wing or right-wing, but they do know the distribution of this random variable. Formally, let $\theta \in \{L, R\}$ denote the politician's type; then the prior probability of being right-wing is given by $Pr(R) = p \in (0, 1)$. Voters are divided into two groups: ideological voters, who re-elect the incumbent if and only if they believe the incumbent aligns with their ideological spectrum; and COVID-sensitive voters, who vote for the incumbent whenever the incumbent adopts NPIs. The exact share of COVID-sensitive voters is unknown to politicians, making it a random variable χ, whose distribution function is $F : [0, 1] \to [0, 1]$, with median $m \in (0, 1)$.

COVID-sensitive voters may consist of individuals who are more susceptible to the disease (e.g., older adults, those with underlying health conditions like respiratory and cardiovascular diseases, diabetes, and obesity, and individuals with limited access to healthcare and lower socioeconomic status). They may also include citizens whose belief that NPIs are the right policies to adopt is sufficiently strong to overcome ideological issues. While the number of older adults and people with specific health conditions may be common knowledge, a precise estimate of the total share of people sensitive to the disease is unlikely to be obtained.

Ideological voters, in turn, may be left-leaning or right-leaning. Before the incumbent's decision to adopt NPIs, they know that both the incumbent and the challenger are right-wing with probability p. After observing the incumbent's choice, they update their

beliefs about the incumbent's type, resulting in an updated probability $\hat{p}(x)$, where x indicates whether NPIs were adopted (see the precise definition below). This implies that left-wing (respectively, right-wing) voters vote for the incumbent if and only if $\hat{p}(x) < p$ ($\hat{p}(x) \geq p$). The share of right-leaning voters among the ideological voters is $\mu \in (0,1)$, which we assume to be common knowledge. In particular, politicians know whether the municipality is more or less right-leaning. One can argue in favor of this assumption by observing that last elections' results can be used as a proxy for the share of the electorate who aligns with each ideology.

To sum up, COVID-sensitive voters are not strategic players, so we only take into account the strategies of ideological voters when analyzing equilibria. However, even for those voters, we choose to omit their strategies when formally presenting the equilibria (see section 3.4) for the sake of notation simplicity.

3.2 Politicians

Politicians are concerned not only with securing election but also with implementing the policies they consider appropriate. Formally, the utility function of an incumbent of type $\theta \in \{L, R\}$ is

$$U(x,\theta) = \begin{cases} A_R(1-x) + W\mathbb{I}_{office}, & \text{if } \theta = R \\ A_L x + W\mathbb{I}_{office}, & \text{if } \theta = L, \end{cases}$$

where $A_\theta > 0$ is the benefit from following politician's own ideology, $W > 0$ is the benefit from winning the election and $\mathbb{I}_{office} \in \{0,1\}$ indicates whether the incumbent is reelected – and therefore is in office in the next period. The main variable is the adoption or not of NPIs, which we denote by $x \in \{0,1\}$. Note that, inspired by the Brazilian political scenario, we assume that right-wing ideology is contrary to NPIs whereas left-wing ideology considers their adoption as good policy (see discussion in section XX).

The above functional form allows for an important trade-off we want to explore in the empirical exercise. As an example, consider the case of a right-wing incumbent in a municipality where most of the ideological electorate is left-wing (μ is low). In addition, assume that politician believes that the share of COVID-sensitive voters is large (this

is the case when m is large, for example). In such circumstances, the incumbent will probably need to get support from the left-leaning voters to be reelected. Thus she needs to send a signal that she is left-wing, which can be done by adopting NPIs. This strategy's price, however, is to choose a policy contrary to her ideology.

As we have a standard signaling game, players' strategies are functions $x : \{R, L\} \to \{0, 1\}$ that map types into messages. In this context, the message sent by politicians and received by voters is whether or not NPIs are adopted

3.3 Timing

Before analyzing the existing equilibria, let us present the timing of the model. First, the incumbent mayor's type is randomly assigned. Then, each type, whether right-wing or left-wing, chooses whether or not adopt NPIs. Voters observe incumbent's action, update their belief about her type and then chooses whether to reelect her. Finally, payoffs are paid. A summary of our signaling game is presented through its extensive form in figure 1.

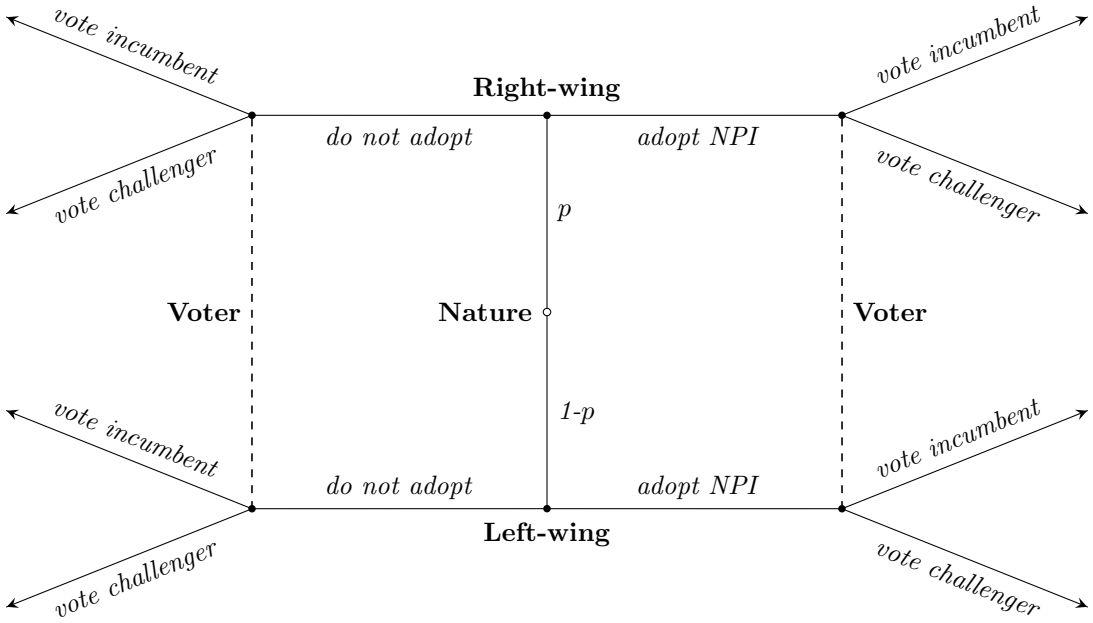

Figure 1: Signaling game in its extensive form.

3.4 Equilibria

The equilibrium concept we use is that of Bayesian-Nash equilibrium. As mentioned above, we choose to omit the voters' strategies in the equilibrium presentation for the sake of notation simplicity. Thus, an equilibrium is a 4-tuple $\{x(R), x(L), \hat{p}(0), \hat{p}(1)\}$.

Consider first the separating equilibrium in which the right-wing incumbent chooses not to adopt NPIs whereas the left-wing one does adopt them. Voter's belief are, therefore, $\hat{p}(0) = 1$ and $\hat{p}(1) = 0$. The expected share of votes received by the right-wing and left-wing incumbents are

$$\begin{aligned} v(R|0,1) &= \mu(1-\chi), \\ v(L|0,1) &= \mu(1-\chi)+\chi, \end{aligned}$$

respectively. This implies that the probabilities of victory are

$$\begin{aligned} Pr\left(v(R|0,1) \geq \frac{1}{2}\right) &= F\left(\frac{2\mu-1}{2\mu}\right) \\ Pr\left(v(L|0,1) \geq \frac{1}{2}\right) &= 1-F\left(\frac{2\mu-1}{2\mu}\right). \end{aligned}$$

As expected, while the probability of the right-wing incumbent being reelected increases with μ, a higher share of right-leaning citizens among the ideological voters decreases the chances of the left-wing incumbent winning. Moreover, if $\mu \leq \frac{1}{2}$, the right-wing politician loses, and the left-wing politician wins with certainty.

Right-wing incumbent adopts NPIs – and thus does not deviate – if and only if $\mathbb{E}[U(R,0)] \geq \mathbb{E}[U(R,1)]$, which is equivalent to

$$\frac{A_R}{W} \geq 1-2F\left(\frac{2\mu-1}{2\mu}\right). \tag{3.1}$$

The similar condition for the left-wing not to deviate is

$$\frac{A_L}{W} \geq 2F\left(\frac{2\mu-1}{2\mu}\right)-1. \tag{3.2}$$

As both types are following their ideology in this equilibrium, the above conditions state that the ideology must be relatively more important than the victory to ensure existence. The next proposition explores in detail the conditions under such a separating equilibrium exists.

Proposition 1. *The separating equilibrium* $\{x(R), x(L), \hat{p}(0), \hat{p}(1)\} = \{0, 1, 1, 0\}$ *exists if and only if:*

(i) $\mu \leq \frac{1}{2}$ *and* (3.1) *is satisfied;*

(ii) $\mu > \frac{1}{2}$, $m = \frac{2\mu - 1}{2\mu}$;

(iii) $\mu > \frac{1}{2}$, $m < \frac{2\mu - 1}{2\mu}$ *and* (3.2) *is satisfied; and*

(iv) $\mu > \frac{1}{2}$, $m > \frac{2\mu - 1}{2\mu}$ *and* (3.1) *is satisfied.*

When more than half of the ideological voters are left-wing, the left-wing incumbent has nothing to gain by not adopting NPIs: she loses votes and does not benefit from following her ideology. However, when more than half of the voters are right-wing, the expected size of the COVID-sensitive voters becomes important. If the median m is sufficiently low – such that the probability of the COVID-sensitive voters being lower than half of the electorate is large – there may exist incentives for the left-wing incumbent to deviate. The opposite occurs when m is sufficiently high: the right-wing type is the one who may benefit from adopting NPIs, as there exists a non-negligible share of the electorate to be attracted.

The voters' beliefs that are consistent with the other separating equilibrium, in which the right-wing incumbent adopts NPIs while the left-wing incumbent does not, are $\hat{p}(1) = 1$ and $\hat{p}(0) = 0$. The expected share of votes received by the right-wing and left-wing incumbents now are

$$\begin{aligned} v(R|1,0) &= \mu(1-\chi) + \chi, \\ v(L|1,0) &= \mu(1-\chi), \end{aligned}$$

respectively. This implies that the probabilities of victory are

$$\begin{aligned} Pr\left(v(R|1,0) \geq \frac{1}{2}\right) &= 1 - F\left(\frac{1-2\mu}{2(1-\mu)}\right) \\ Pr\left(v(L|1,0) \geq \frac{1}{2}\right) &= F\left(\frac{1-2\mu}{2(1-\mu)}\right). \end{aligned}$$

Like in the previous case, the probability of the right-wing incumbent being reelected increases with μ, while it decreases for the left-wing incumbent. In addition, if $\mu \geq \frac{1}{2}$, the right-wing politician wins, and the left-wing politician loses with certainty.

It is straightforward to show that the conditions for the right-wing incumbent and the left-wing incumbent not to deviate from the equilibrium path are

$$\frac{A_R}{W} \leq 1 - 2F\left(\frac{1-2\mu}{2(1-\mu)}\right) \tag{3.3}$$

and

$$\frac{A_L}{W} \leq 2F\left(\frac{1-2\mu}{2(1-\mu)}\right) - 1, \tag{3.4}$$

respectively. Since both types are choosing policies contrary to their ideologies, it's unsurprising that both inequalities will never be simultaneously satisfied. Indeed, depending on the electorate they aim to attract, either the right-wing incumbent or the left-wing incumbent wants to deviate from the equilibrium path. For instance, if μ is sufficiently large (or low), the left-wing (or right-wing) incumbent benefits from deviating as she attracts a large share of voters who align with her ideology.

Proposition 2. *A separating equilibrium* $\{x(R), x(L), \hat{p}(0), \hat{p}(1)\} = \{1, 0, 0, 1\}$ *does not exist.*

Consider now the pooling equilibrium in which both the right-wing and the left-wing incumbents do not adopt NPIs. In this case, voters' beliefs are $\hat{p}(0) = p$ and $\hat{p}(1) = z$, where $z \in [0, 1]$ represents the off-the-equilibrium-path beliefs. The expected share of votes received by the right-wing and left-wing incumbents is now the same:

$$v(R|0,0) = v(L|0,0) = (1-\chi)\left[p\mu + (1-p)(1-\mu)\right].$$

This implies that the probability of victory is the same as well:

$$\Pr\left(v(R|0,0) \geq \frac{1}{2}\right) = \Pr\left(v(L|0,0) \geq \frac{1}{2}\right) = F\left(\omega_p\right),$$

where $\omega_p \equiv \frac{2[p\mu+(1-p)(1-\mu)]-1}{2[p\mu+(1-p)(1-\mu)]}$. Now, the probability of the incumbent being reelected is no longer monotonic in μ. When $p > \frac{1}{2}$ (voters believe it is more likely that the incumbent is right-wing than left-wing), the probability of victory increases with μ. The opposite happens when $p < \frac{1}{2}$. Finally, when $p = \frac{1}{2}$, changes in μ have no effect on the probability.

Regardless of her type, whenever an incumbent deviates, her probability of winning is $1 - F(\omega_z)$, where $\omega_z \equiv \frac{2[z\mu+(1-z)(1-\mu)]-1}{2[z\mu+(1-z)(1-\mu)]}$. One can show that the right-wing type does not deviate if and only if

$$\frac{A_R}{W} \geq 1 - F(\omega_z) - F(\omega_p). \tag{3.5}$$

For the left-wing incumbent, the necessary and sufficient condition for she not to deviate is

$$\frac{A_L}{W} \leq F(\omega_z) + F(\omega_p) - 1. \tag{3.6}$$

For the polling equilibrium to exist, the weight given to ideology must be sufficiently large for the right-wing incumbent not to deviate. Similarly, it must be sufficiently low for the left-wing incumbent to choose not to adopt NPIs. The next proposition details this result.

Proposition 3. *If $m \geq \frac{1}{2}$, then the pooling equilibrium $\{x(R), x(L), \hat{p}(0), \hat{p}(1)\} = \{0, 0, p, z\}$ does not exist. If $m < \frac{1}{2}$, then such an equilibrium exists if both (3.5) and (3.6) are satisfied.*

Whenever the median of χ is large enough, there is a high probability that a substantial share of the electorate can be attracted by adopting NPIs. Moreover, left-wing politicians prefer to adopt NPIs. These two forces jointly make the left-wing incumbent deviate from the equilibrium path. When the median is sufficiently low, however, there is room for the existence of the pooling equilibrium. In this case, the left-wing incumbent does not deviate if she assigns low weight to ideology relative to the benefits from being in office

in the next period. The right-wing incumbent, in turn, does not deviate if ideology is relatively more important than what she gets by winning the election.

Finally, we must consider the pooling equilibrium in which both types of incumbent adopt NPIs. Now, voters' beliefs are $\hat{p}(1) = p$ and $\hat{p}(0) = q$, where $q \in [0,1]$ represents the off-the-equilibrium-path beliefs. Like the previous case, the expected share of votes received by the right-wing and left-wing incumbents is the same:

$$v(R|1,1) = v(L|1,1) = (1-\chi)\left[p\mu + (1-p)(1-\mu)\right] + \chi.$$

This implies that the probability of victory is the same as well:

$$\Pr\left(v(R|1,1) \geq \frac{1}{2}\right) = \Pr\left(v(L|1,1) \geq \frac{1}{2}\right) = 1 - F\left(\psi_p\right),$$

where $\psi_p \equiv \frac{1/2-[p\mu+(1-p)(1-\mu)]}{1-[p\mu+(1-p)(1-\mu)]}$. Contrary to the previous case, the probability of the incumbent being reelected now increases with μ whenever $p < \frac{1}{2}$ and decreases with μ whenever $p > \frac{1}{2}$. Again, there is no effect when $\mu = \frac{1}{2}$.

As expected, the conditions for the existence of this equilibrium require that the weight given by the right-wing (left-wing, respectively) incumbent to ideology relative to benefits from winning the election be sufficiently low (high). Formally, we have

$$\frac{A_R}{W} \leq 1 - F(\psi_q) - F(\psi_p) \tag{3.7}$$

and

$$\frac{A_L}{W} \geq F(\psi_q) + F(\psi_p) - 1, \tag{3.8}$$

respectively. The precise conditions for the existence are presented in the next proposition.

Proposition 4. *If $m \geq \frac{1}{2}$, then the pooling equilibrium $\{x(R), x(L), \hat{p}(0), \hat{p}(1)\} = \{1, 1, p, q\}$ exists if (3.7) is satisfied. If $m < \frac{1}{2}$, then such an equilibrium exists if both (3.7) and (3.8) are satisfied.*

In this case, a sufficiently large expected share of COVID-sensitive voters – resulting from $m \geq \frac{1}{2}$ – implies that there is no incentive for the left-wing incumbent to deviate. By adopting NPIs, left-wing politicians secure both A_L and a high probability of victory. When $m < \frac{1}{2}$, both types might deviate from the equilibrium path. The right-wing incumbent does not deviate if her ideology is relatively less important than the benefits of being in office. Symmetrically, the left-wing incumbent does not deviate if her ideology is relatively more important than the benefits of being in office.

3.5 Discussion

What are the predictions that the theoretical model provides us and that we must test in the empirical exercise? On one hand, we see that, when equilibrium exists, the smaller the μ, the greater the chance of having a left-wing politician implementing NPIs in equilibrium. On the other hand, the larger the expected share of COVID-sensitive voters, the greater the incentive to adopt NPIs. These two forces together imply that in municipalities with a predominantly left-wing electorate and a large number of elderly and other people susceptible to the disease, the incentive to adopt NPIs is strong. The opposite occurs in municipalities with a right-wing electorate and a small expected share of COVID-sensitive voters.

Historically, the left is more ideological than the right in Brazil (DeMagalhaes, 2015). This is particularly true at the municipal level, where ideology may have a negligible role. In small municipalities – and the majority of our sample is composed of small municipalities, whereas the average city population in the sample was 40.546 – it is well known that politicians in general are not attached to ideology. Thus, we confidently assume that $A_L > A_R = \varepsilon$, where $\varepsilon > 0$ is a small constant. This implies that we expect electoral incentives for both types, but they must be stronger for the right. To sum up, our hypotheses are: (i) regardless of ideology, mayors have incentives to satisfy their voters in order to be reelected; (ii) right-wing mayors seeking reelection are more prone to choosing policies that please the voters' ideology; (iii) this effect is weaker the lower the expected number of COVID-sensitive voters; (iv) regarding left-wing incumbents, the electoral

incentives are stronger the greater the proportion of COVID-sensitive constituents; and (v) these incentives depend both on the mayor's ideology and that of the majority of local voters.

4 Empirical Strategy

4.1 Data Description

The study was performed using public data from Brazil and information from publicly available scientific data paper (de Souza Santos et al., 2021). The data on the adoption of NPIs was complemented with election results, information on cadidates, and a set of socioeconomic and demographic variables.

In the country, mayors serve a four-year term and they can be reelected once for another same-length term. Data on election final results were collected from Superior Electoral Court (TSE) database. In municipalities where a run off happened, solely second round results were considered. Information on whether the candidate was running for reelection were presented in the candidates profiles and was combined with 2016 and 2020 results. Further data about the candidates – i.e. education level, former profession, skin color, age – were gathered from the same source. Additionally, the results of the 2018 presidential elections at municipality level were also collected and used as a proxy of the constituents' ideology. We utilized the final valid share of votes received in the second round run-off by right-wing and eventual President Jair Bolsonaro and subtracted the share of ballots for left-wing opponent Fernando Haddad.

Pertaining to municipal measures against COVID-19, data surveyed and arranged by de Souza Santos et al. (2021) was utilized as well as information collected by Brazilian Bureau of Geography and Statistics (IBGE). Both relate to surveys comprising prohibition of social gatherings and mandatory use of face masks, while only the first possesses a dummy indicating the closure of non-essential services. The IBGE database also indicates social protection measures enacted by local governments against health risks and economic downturns related to the pandemics, such as distributing masks and personal

hygiene products, as well as the creation of cash transfer programs and food banks.

With these information, we created three main variables of interest which will constitute the target of the empirical evaluation: (i) $NPI\_index \in \{0, 1, 2, 3\}$, representing the sum of dummy variables that indicate whether the municipality implemented mask mandates, social distancing and/or non-essential business closures according to de Souza Santos et al. (2021); (ii) $NPI\_IBGE \in \{0, 1, \cdots, 5\}$, denoting the adoption of mask mandates, social distancing, stay-at-home orders, and/or fines against private citizens or business that did not follow the rules; and (iii) $social\_protection \in \{0, 1, \cdots, 22\}$ indicating the sum of 22 dummies[3] where each represents social protection policy to alleviate the health and economic burden exerted by the pandemics.

The ideological classification of political parties followed the survey executed by Tarouco and Madeira (2015). One possible concern in identifying political ideology in Brazil is that its multiparty system favors heterogeneity among parties and politicians (Scheeffer, 2018) and make it difficult for governments to execute policies related to their core ideas (Carey, 2007).[4]

The descriptive statistics of the target variables is presented in Table 1. The data displays separate statistics for municipalities where the incumbent is center, right- or left-wing, according to his party's ideology. It also presents the data sorted by left- and

[3]The measures consisted of maintaining school cafeterias opened while schools were closed (Mcov0511); the distribution of: personal hygiene kits (Mcov061), general hygiene kits (Mcov062), masks (Mcov063), basic-needs groceries for "Bolsa Família" recipients (Mcov064), basic-need groceries for other families in need (Mcov066); the creation of: shelters for homeless population (Mcov066), hygiene locations for homeless population (Mcov067), general host spaces for homeless population (Mcov068), and food banks (Mcov069); registration of: families to receive "Bolsa Família" (Mcov0610), individuals to receive the federal government financial aid (Mcov0611), individuals in a local cash transfer program (Mcov0612); enlarged (Mcov0613) and enabled (Mcov0614) specific benefits regarding the COVID-19 pandemics; hept open: social assistance centers (Mcov0615), previously existing shelters (Mcov0616), elderly facilities (Mcov0617), health facilities focused on cronic diseases (Mcov0618); monitored domestic violence (Mcov0619); kept psicosocial facilities open (Mcov0620); and adopted other policies (Mcov0621). The codes in parentheses indicate the variable name in IBGE database.

[4]It is important to consider the complexities of party ideology and its influence on political behavior in Brazil. Previous studies have highlighted the pressures politicians face due to institutional factors, which affect their commitment to party policies. While assuming a right-wing politician would follow then-President Bolsonaro's COVID-19 stance might be strong, relevant studies support this assumption. Hicken and Stoll (2011) argue that presidential elections influence candidates to coordinate across districts under a common party banner. Borges and Lloyd (2016) empirically test a similar hypothesis for Brazil, finding that electoral congruence occurs when there are fewer effective presidential candidates. The political polarization in Brazil before and during the pandemic reduced relevant candidates, supporting the likelihood of such congruence.

Table 1: Descriptive statistics

	Observations	Mean	St. Dev.	Min	Max
Incumbent: left-wing					
Social distancing	924	0.979	0.142	0.0	1.0
Business closures	923	0.775	0.418	0.0	1.0
Mask mandates	920	0.964	0.186	0.0	1.0
NPI index	920	2.718	0.505	0.0	3.0
Mask mandates (IBGE)	1309	0.945	0.228	0.0	1.0
Social distancing (IBGE)	1309	1.785	0.448	0.0	2.0
Sanctions (IBGE)	1308	1.153	0.848	0.0	2.0
NPI IBGE	1308	3.883	1.071	0.0	5.0
Incumbent: right-wing					
Social distancing	1583	0.978	0.147	0.0	1.0
Business closures	1579	0.782	0.413	0.0	1.0
Mask mandates	1582	0.958	0.200	0.0	1.0
NPI index	1578	2.718	0.498	1.0	3.0
Mask mandates (IBGE)	2142	0.940	0.237	0.0	1.0
Social distancing (IBGE)	2143	1.787	0.443	0.0	2.0
Sanctions (IBGE)	2141	1.171	0.844	0.0	2.0
NPI IBGE	2141	3.898	1.041	0.0	5.0
Incumbent: center					
Social distancing	1407	0.979	0.142	0.0	1.0
Business closures	1408	0.766	0.424	0.0	1.0
Mask mandates	1402	0.956	0.204	0.0	1.0
NPI index	1401	2.702	0.507	0.0	3.0
Mask mandates (IBGE)	1941	0.949	0.220	0.0	1.0
Social distancing (IBGE)	1941	1.790	0.437	0.0	2.0
Sanctions (IBGE)	1939	1.163	0.854	0.0	2.0
NPI IBGE	1939	3.903	1.045	0.0	5.0
municipality: left-leaning					
Social distancing	1612	0.987	0.113	0.0	1.0
Business closures	1612	0.803	0.398	0.0	1.0
Mask mandates	1606	0.968	0.177	0.0	1.0
NPI index	1606	2.758	0.463	0.0	3.0
Mask mandates (IBGE)	2700	0.937	0.242	0.0	1.0
Social distancing (IBGE)	2701	1.797	0.435	0.0	2.0
Sanctions (IBGE)	2698	1.102	0.854	0.0	2.0
NPI IBGE	2698	3.837	1.060	0.0	5.0
municipality: right-leaning					
Social distancing	2302	0.973	0.162	0.0	1.0
Business closures	2298	0.754	0.431	0.0	1.0
Mask mandates	2298	0.953	0.212	0.0	1.0
NPI index	2293	2.680	0.526	0.0	3.0
Mask mandates (IBGE)	2692	0.952	0.214	0.0	1.0
Social distancing (IBGE)	2692	1.778	0.448	0.0	2.0
Sanctions (IBGE)	2690	1.226	0.838	0.0	2.0
NPI IBGE	2690	3.955	1.036	0.0	5.0

Notes: (*i*) Social distancing (IBGE) $\in \{0, 1, 2\}$, where 1 denotes prohibition of social gatherings and 2, stay-at-home orders. (*ii*) Sanctions (IBGE) $\in \{0, 1, 2\}$, where sanctions for individuals and/or business from breaking isolation orders are added to form the variable. (*iii*) Mayors' ideology according to their parties. (*iv*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off (municipalities where Jair Bolsonaro got more than 50% of the votes were labeled as right-leaning.

right-leaning municipalities, based on the 2018 presidential run-off results.

In addition to the core data, we collected a set of geographic, demographic and socioeconomic data at municipal level, as well as candidates and mayors characteristics. IBGE is also responsible for the latter, while TSE once again is the source for the former. A validation test consists in comparing the distribution of other variables among the treated (second term mayors) and control groups (first term incumbents). It also serves as descriptive statistics for possible covariates. Table 2 shows which variables related to the municipality or the incumbent are well balanced.

Table 2: Balance Table

	Control			Treated			
Variable	N	Mean	SD	N	Mean	SD	Test
Bolsonaro_share	1173	0.44	0.22	1221	0.46	0.23	F= 8.273***
Mayor ideology	1173			1221			X2= 10.785***
... Center	442	38%		433	35%		
... Left-wing	257	22%		338	28%		
... Right-wing	474	40%		450	37%		
Age	1173	49	11	1221	49	9.8	F= 0.259
Gender	1173			1221			X2= 0.545
... Female	141	12%		134	11%		
... Male	1032	88%		1087	89%		
Skin color	1173			1221			X2= 1.271
... Yellow	9	1%		6	0%		
... White	829	71%		849	70%		
... Native	2	0%		2	0%		
... Brown	319	27%		348	29%		
... Black	14	1%		16	1%		
Instruction	1173			1221			X2= 5.982
... Bachelor degree	595	51%		661	54%		
... Higher	374	32%		386	32%		
... Incomplete primary	92	8%		70	6%		
... Primary	112	10%		104	9%		
GDP per capita	1173	31	33	1221	36	54	F= 9.376***
Net taxes p.c.	1173	2.5	4	1221	3.1	5.2	F= 10.71***
Agriculture value added pc	1173	8.6	17	1221	9	19	F= 0.454
Industry value added pc	1173	5.4	14	1221	8.2	37	F= 6.033**
services value added pc	1173	8.5	9.9	1221	10	12	F= 11.08***
Population	1173	38458	364380	1221	42552	170382	F= 0.126

Significance markers: *p<0.1; **p<0.05; ***p<0.01.

It is worth noting that even though there appears to be statically significant differences in the share of right-wing voters and ideology of incumbents, the discrepancies in means and standard deviations are not large. Also, as different specifications of the model separating the dataset according to ideology will be analysed, these facts are not supposed

to interfere with the results. Given that some of the variables presented statistically significant differences, a set of covariables will be added to strengthen the findings.

Final dataset, including information collection and data cleaning and wrangling steps, as well as full analyses and results, are available on GitHub.[5]

4.2 Data Analysis

The main issue pertaining empirical analyses of incumbent effects is the fact that second term mayors may not be comparable to first term ones. Once reelected officials might possess intrinsically different characteristics that lead to their political and electoral advantages, the main empirical strategy currently applied to infer causality between reelection status and public policy is utilizing regression discontinuity design (RDD) (Eggers et al., 2015; Erikson et al., 2015; Song, 2018). The strategy specified by Lee (2008) relies on comparing policies implemented by incumbents who were reelected by a small margin with those implemented by second term mayors[6]. The logic states that second term mayors elected in close contests are comparable to first time mayors in all characteristics except for the fact that, as they are in a second term and, they are not able to run for reelection[7].

Using the common terminology applied in these contexts, it will be assumed that a treatment status $\tau \in \{0, 1\}$ is assigned to a municipality i if the share of votes that the incumbent received v_i was above the cutoff c, which represents the voting margin in relation to the runner up in the election. That means that τ is a deterministic function where $\tau = 1$ if $v_i - c \geq 0$, $\tau = 0$ otherwise. Therefore, it represents a sharp RDD and the

[5] https://github.com/hssitja/PhD-Dissertation/tree/Chapter-1. For a direct link to the full python code to collect, clean, wrangle the data, and create the variables, see https://github.com/hssitja/PhD-Dissertation/blob/Chapter-1/Chapter1.ipynb.

[6] Which implies that they cannot run for another term according to Brazilian electoral rules.

[7] It is important to acknowledge the limitations of the research design and data. The study used a regression discontinuity design to assess the impact of incumbency on NPIs, providing strong internal validity but only for close elections. The analyses did not measure incumbency effects on virus spread directly. We avoided regressions on COVID-19 infections and casualties since the main wave hit in 2021. Therefore, results from the early pandemic months would be influenced by unaccounted factors, diminishing the explanatory power of the findings.

local average treatment effect ($LATE$) can be estimated through the following regression:

$$\Delta Y_i = \alpha + LATE(\tau_i) + f(v_i - c) + \gamma_s + \epsilon_i, \tag{4.1}$$

where $f(\cdot)$ is a polynomial function of the interactions between the margin of victory and the treatment status, γ_s is a vector of state fixed effects[8], and ϵ_i is an error term. As the causal effect identified by this method only refers to close elections, optimal bandwidth were selected following Calonico et al. (2020). Further specifications including covariates were performed based on Calonico et al. (2019).

Considering the hypothesis extracted from the model presented in section 3, the equation (4.1) will be estimated separately for incumbents according to their ideology – left or right-wing – once electoral incentives are expected to exert different effects across the political spectrum. Next section summarizes the main results, while descriptive statistics, balance, and robustness checks are found in the appendix A. Full regression results can be visualized online.[9] The following sections display the main empirical findings.

5 Results

Based on the specifications presented in section 4.2, Table 3 presents the mains results, comprising the NPI index obtained through data collected by de Souza Santos et al. (2021), NPI and social protection indices built from the official IBGE survey on measures to contain and relief the effects of the pandemics during 2020. The RDD estimation indicates that second term mayors adopted stricter policies in comparison to incumbents that could run for reelection regarding when the NPI index includes business closures. However, these results appear to be driven by right-wing mayor, once left-wing incumbents adopted the same level of NPIs regardless of their ability to run for another term. These results corroborate the hypothesis extracted from the model, showing that right-wing

[8] As state-level policies applied for the municipalities, this step is central to the empirical validity of the findings. But these dummies also intend to capture regional and cultural differences that could cause endogeinity problems.

[9] https://github.com/hssitja/PhD-Dissertation/blob/Chapter-1/Chapter1_empirical.ipynb

incumbents would possess the strongest electoral incentives to modulate their responses to the pandemics in order following their preferred policy.

On the other hand, the data collected by IBGE, which did not include the adoption of business closures in its survey, show no incumbency effect related to the adoption NPIs. Nonetheless, right-wing incumbents adopted a higher level of social relief measures when running for re-election. Once again, no electoral impact was estimated concerning the policies adopted by left-wing mayors.

Table 3: Main Results

	Dependent variable: NPI index					
	All ideologies		*Right-wing mayor*		*Left-wing mayor*	
Robust	0.144**	0.135**	0.259**	0.309***	0.195	0.204
SD	(0.068)	(0.065)	(0.118)	(0.112)	(0.143)	(0.143)
p-value	(0.036)	(0.039)	(0.028)	(0.006)	(0.172)	(0.154)
Covariates	no	yes	no	yes	no	yes
obs.left	503	549	187	177	87	86
obs.right	475	517	150	142	106	105
	Dependent variable: NPI IBGE					
	All ideologies		*Right-wing mayor*		*Left-wing mayor*	
Robust	-0.065	-0.037	-0.140	-0.093	-0.134	-0.136
SD	(0.142)	(0.145)	(0.232)	(0.221)	(0.329)	(0.321)
p-value	(0.648)	(0.800)	(0.545)	(0.674)	(0.683)	(0.672)
Covariates	no	yes	no	yes	no	yes
obs.left	615	596	243	242	131	129
obs.right	524	508	192	190	139	136
	Dependent variable: Social protection IBGE					
	All ideologies		*Right-wing mayor*		*Left-wing mayor*	
Robust	-1.414**	-1.280**	-2.794***	-2.382**	-1.037	-0.754
SD	(0.617)	(0.635)	(1.021)	(0.992)	(1.124)	(1.012)
p-value	(0.022)	(0.044)	(0.006)	(0.016)	(0.356)	(0.456)
Covariates	no	yes	no	yes	no	yes
obs.left	558	524	187	183	142	160
obs.right	467	440	140	133	153	174

i) Significance markers: *p<0.1; **p<0.05; ***p<0.01; *ii)* covariates representing state fixed-effects presented in all models, while a vector of covariates pertaining mayor (age, gender, education, and skin color) and municipality (population and GDP per capita) characteristics was added when informed; *iii)* optimal bandwith mserd, local linear estimator, triangular kernel. (*iv*) Mayors' ideology according to their parties. (*v*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off (municipalities where Jair Bolsonaro got more than 50% of the votes were labeled as right-leaning.

Table 4 presents the local average treatment effect for municipalities where the majority voted for right-wing candidate Jair Bolsonaro ($\equiv \mu > 0.5$) or left-wing Fernando

Haddad ($\equiv \mu \leq 0.5$) in the 2018 general elections. It also divides the sample according to the ideology of the incumbent. The results further corroborate the theoretical model[10]. Observe that right-wing mayors implemented less stringent NPIs only in municipalities where the majority of voters are right-leaning. Nonetheless, they also implemented a higher level of social protection measures regardless of the municipality's voting profile.

Table 5 presents the results of an analysis where the running variable interacts with the proportion of elderly individuals in each municipality. This adjustment may be seen as a proxy for the proportion of COVID-sensitive constituents, given the increased vulnerability of older adults to the disease. Consequently, municipalities with a higher proportion of elderly residents may have a higher expectation for the implementation of stringent pandemic policies. The findings indicate that left-wing incumbents are more likely to adopt stringent measures in municipalities with a higher proportion of elderly residents. Again, this result is in line with the theoretical predictions and with the fact that the "ideological cost" of implementing stricter measures is lower for the left.

The estimations were performed using a local linear estimator for discontinuity, employing a triangular kernel to weight observations around the cutoff. The coefficient was estimated with robust bias-corrected confidence intervals, and the optimal bandwidth was selected based on minimum squared errors (Calonico et al., 2020, 2019, 2014). The findings remained consistent when using different kernels and bandwidths, as shown in Table 13. Additionally, Table 15 presents placebo tests with alternative cutoff points, which resulted in non-significant coefficients for most estimations, further reinforcing the validity of the results.

This consistency is critically important because it strengthens the robustness and reliability of the findings. By demonstrating that the results hold true across different kernels, bandwidths, and placebo tests, we can confidently assert that the observed effects are not artifacts of specific methodological choices. This robustness enhances the credibility of the study and ensures that the conclusions drawn are based on solid, reproducible evidence, thereby providing a stronger foundation for future research and policy

[10]Other thresholds are evaluated in the Appendix C.

implications.

Table 4: Main Results - municipality Ideology

	Dependent variable: NPI index							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.504**	0.424**	0.401*	0.237	0.061	0.082	-0.181	-0.206
SD	(0.207)	(0.180)	(0.225)	(0.197)	(0.115)	(0.117)	(0.207)	(0.195)
p-value	(0.015)	(0.019)	(0.074)	(0.231)	(0.597)	(0.485)	(0.381)	(0.291)
Covariates	no	yes	no	yes	no	yes	no	yes
obs.left	82	80	26	29	114	110	53	60
obs. right	67	62	35	37	91	85	67	70
	Dependent variable: NPI IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.127	0.171	0.100	0.015	-0.427	-0.515*	-0.356	-0.321
SD	(0.318)	(0.321)	(0.530)	(0.537)	(0.281)	(0.273)	(0.438)	(0.374)
p-value	(0.689)	(0.594)	(0.851)	(0.978)	(0.129)	(0.059)	(0.417)	(0.390)
Covariates	no	yes	no	yes	no	yes	no	yes
obs.left	132	113	42	39	117	114	83	96
obs. right	105	93	49	47	83	74	81	99
	Dependent variable: Social protection IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	-3.557**	-2.870*	-0.931	-1.596	-2.479**	-1.811	-0.929	-1.040
SD	(1.644)	(1.560)	(1.597)	(1.513)	(1.142)	(1.121)	(1.585)	(1.278)
p-value	(0.031)	(0.066)	(0.560)	(0.291)	(0.030)	(0.106)	(0.558)	(0.416)
Covariates	no	yes	no	yes	no	yes	no	yes
obs.left	87	90	48	37	117	121	87	111
obs. right	67	72	58	44	83	86	90	114

i) Significance markers: *p<0.1; **p<0.05; ***p<0.01; *ii)* covariates representing state fixed-effects presented in all models, while a vector of covariates pertaining mayor (age, gender, education, and skin color) and municipality (population and GDP per capita) characteristics was added when informed; *iii)* optimal bandwith mserd, local linear estimator, triangular kernel. (*iv*) Mayors' ideology according to their parties. (*v*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off (municipalities where Jair Bolsonaro got more than 50% of the votes were labeled as right-leaning.

6 Conclusion

This study provides both a theory and empirical evidence on how electoral incentives influenced the policies adopted by incumbent mayors during the COVID-19 pandemic in Brazil. The main predictions of the theoretical model were corroborated by data, namely:

Table 5: Main Results - running variable multiplied by proportion of elderly ($\geq 65yo$)

	Dependent variable: NPI index							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.403*	0.449**	0.402*	0.255	0.122	0.077	-0.359*	-0.418**
	(0.243)	(0.186)	(0.211)	(0.204)	(0.130)	(0.111)	(0.202)	(0.191)
	(0.097)	(0.016)	(0.057)	(0.212)	(0.348)	(0.491)	(0.075)	(0.028)
p-value	(0.097)	(0.016)	(0.057)	(0.212)	(0.348)	(0.491)	(0.075)	(0.028)
Covariates	no	yes	no	yes	no	yes	no	yes
obs.left	68	89	36	27	96	121	49	47
obs. right	56	73	49	39	69	92	62	60
	Dependent variable: NPI IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.653*	0.665*	0.084	-0.234	0.044	-0.424*	-0.211	-0.157
SD	(0.365)	(0.351)	(0.534)	(0.506)	(0.302)	(0.255)	(0.334)	(0.386)
p-value	(0.074)	(0.058)	(0.875)	(0.644)	(0.884)	(0.096)	(0.527)	(0.683)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	83	87	33	33	59	129	115	95
obs. right	65	69	47	47	52	87	121	100
	Dependent variable: Social protection IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	-5.021***	-3.906***	-1.546	-1.395	-1.855*	-1.774*	-1.349	-1.558
SD	(1.549)	(1.478)	(1.584)	(1.525)	(1.049)	(0.938)	(1.594)	(1.529)
p-value	(0.001)	(0.008)	(0.329)	(0.360)	(0.077)	(0.059)	(0.397)	(0.308)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	74	75	33	36	108	162	90	86
obs. right	59	63	47	48	74	113	92	86

i) Significance markers: *p<0.1; **p<0.05; ***p<0.01; *ii)* covariates representing state fixed-effects presented in all models, while a vector of covariates pertaining mayor (age, gender, education, and skin color) and municipality (population and GDP per capita) characteristics was added when informed; *iii)* optimal bandwith mserd, local linear estimator, triangular kernel. (*iv*) Mayors' ideology according to their parties. (*v*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off (municipalities where Jair Bolsonaro got more than 50% of the votes were labeled as right-leaning.

(i) irrespective of ideology, mayors are driven to please their voters to enhance their odds of being reelected; (ii) right-wing mayors pursuing reelection are more inclined to implement policies that align with the voters' ideology; (iii) this inclination diminishes as the expected number of COVID-sensitive voters decreases; (iv) for left-wing incumbents, the electoral incentives strengthen with a higher proportion of COVID-sensitive constituents; and (v) these incentives are influenced by both the mayor's ideology and that of the majority of local voters. Fundamentally, our research enriches the understanding of the interaction between ideology and policy-making during the COVID-19 pandemic. By recognizing the potential impact of institutional factors, national and sub-national political dynamics, and mainly ideological differences, our analysis sheds light on how the policy-making process is affected by these factors in Brazil.

These findings underscore the necessity of considering political ideology alongside voter beliefs and preferences when analyzing political incentives during a crisis. This study contributes to the literature on incumbency's influence on public policy, providing valuable insights for future research in this field. However, subsequent studies should aim to address the current limitations and investigate additional factors that might affect the relationship between electoral incentives and public health policy. One potential avenue is the incorporation of social media political discourse as a proxy to determine whether a politician's actions are more ideological or pragmatic.

The results suggest that the pandemic response by incumbent mayors was shaped through two relevant channels: their own political ideology and the beliefs and preferences of voters. This study sheds new light on the political economy of health crises, highlighting the tendency of policymakers to consider electoral incentives when making public policy decisions in unforeseen circumstances. The insights gained here can inspire future research and policy discussions at the intersection of public health, politics, and health economics, ultimately promoting more effective policy outcomes in the face of public health crises and other imminent challenges. By deepening our understanding of these dynamics, we can better navigate the complexities of policy-making in times of crisis and improve the resilience of our public health systems.

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A Omitted proofs

A.1 Proposition 1

First, recall that $F : [0,1] \to [0,1]$, such that $F(y) = 0$ for $y \leq 0$ and $F(y) = 1$ for $y \geq 1$. Now, observe that if $\mu \leq \frac{1}{2}$, then $F\left(\frac{2\mu-1}{2\mu}\right) = 0$. This implies that (3.2) is automatically satisfied as it becomes $\frac{A_L}{W} \geq -1$. This proves item (i). When $\mu > \frac{1}{2}$, $F\left(\frac{2\mu-1}{2\mu}\right) > 0$. If $m = \frac{2\mu-1}{2\mu}$, then $F\left(\frac{2\mu-1}{2\mu}\right) = \frac{1}{2}$, such that both (3.1) and (3.2) are automatically satisfied as they become $\frac{A_R}{W} \geq 0$ and $\frac{A_L}{W} \geq 0$, respectively. This proves item (ii). For item (iii), continue to suppose that $\mu > \frac{1}{2}$ and $m < \frac{2\mu-1}{2\mu}$. In this case, $F\left(\frac{2\mu-1}{2\mu}\right) > \frac{1}{2}$, such that (3.1) is automatically satisfied as it becomes $\frac{A_R}{W} \geq \lambda$, where $\lambda_1 < 0$. Finally, for item (iv), suppose that $\mu > \frac{1}{2}$ and $m > \frac{2\mu-1}{2\mu}$. Now, we have $F\left(\frac{2\mu-1}{2\mu}\right) < \frac{1}{2}$, such that (3.2) is now automatically satisfied as it becomes $\frac{A_L}{W} \geq \lambda_2$, where $\lambda_2 < 0$. ■

A.2 Proposition 2

If $\mu \geq \frac{1}{2}$, then $F\left(\frac{1-2\mu}{2(1-\mu)}\right) = 0$, such that (3.4) is never satisfied as it becomes $\frac{A_L}{W} \leq -1$. If $\mu < \frac{1}{2}$, then two cases are possible. First, $\frac{1-2m}{2(1-m)} \leq \mu < \frac{1}{2}$ implies that $F\left(\frac{1-2\mu}{2(1-\mu)}\right) < \frac{1}{2}$, such that $F\left(\frac{1-2\mu}{2(1-\mu)}\right) < \frac{1}{2}$. Thus, (3.4) is again never satisfied. Second, if $\mu < \frac{1-2m}{2(1-m)} < \frac{1}{2}$, then $F\left(\frac{1-2\mu}{2(1-\mu)}\right) > \frac{1}{2}$, such that (3.3) is never satisfied as it becomes $\frac{A_R}{W} \leq -1$. ■

A.3 Proposition 3

One can easily show that both $\omega_p \leq \frac{1}{2}$ and $\omega_z \leq \frac{1}{2}$. Thus, if $m \geq \frac{1}{2}$, $F(\omega_p) + F(\omega_z) \leq 1$, such that (3.6) is automatically violated. ■

A.4 Proposition 4

One can easily show that both $\psi_p \leq \frac{1}{2}$ and $\psi_q \leq \frac{1}{2}$. Thus, if $m \geq \frac{1}{2}$, $F(\psi_p) + F(\psi_z) \leq 1$, such that (3.8) is automatically satisfied. ■

B Omitted statistics and results

B.1 Visual representation

The following figures present maps with descriptive statistics for Brazilian cities.

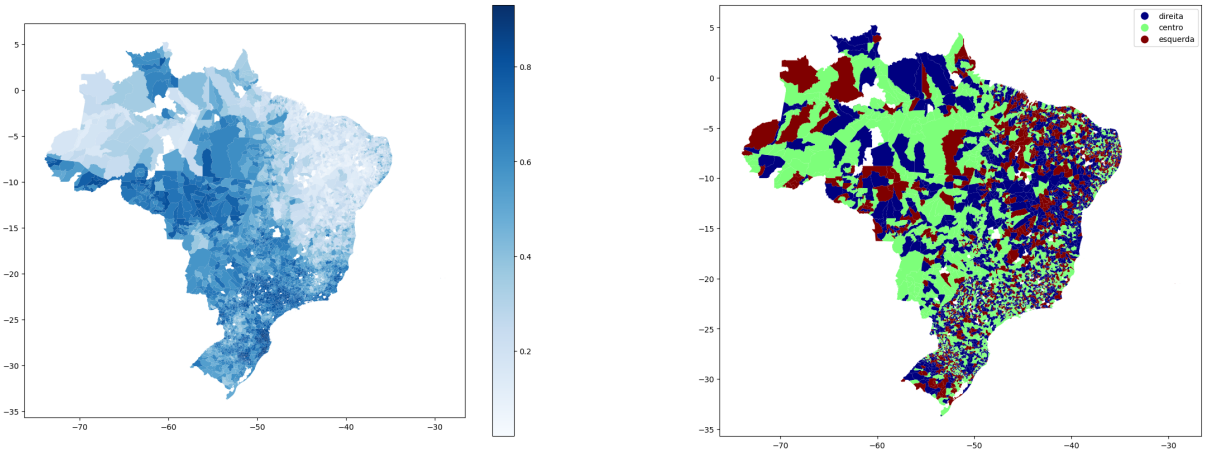

Figure 2: Percentage of votes for Bolosonaro (left) - Ideology of incumbent (right)

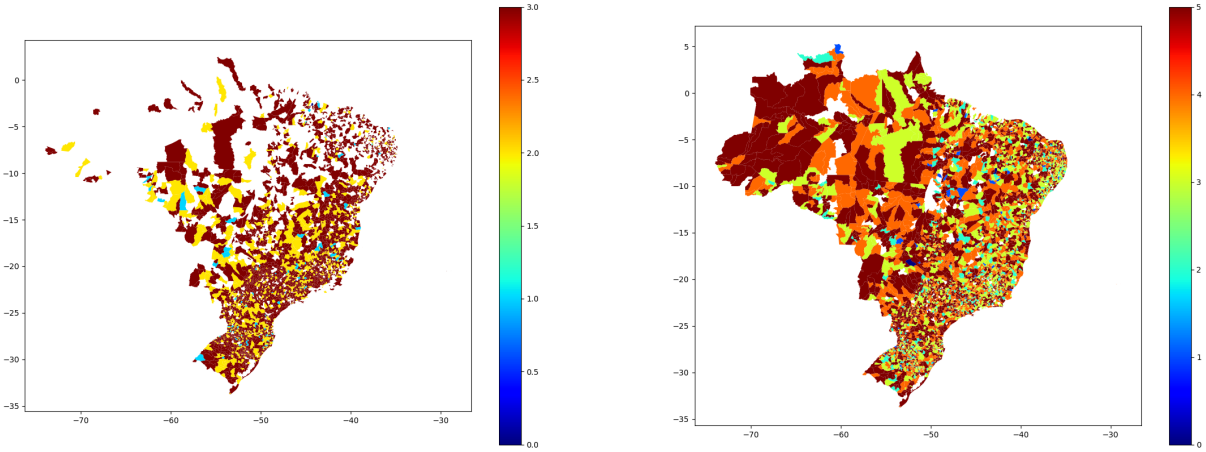

Figure 3: NPI Index (left) - NPI IBGE (right)

It is also important to verify whether the running variable runs smoothly around the cutoff point. It is essential that the assignment of the treatment status is similarly distributed for values just below and above the cutoff, otherwise it could indicate that the main assumption behind the regression discontinuity design would not be met. In the current study, if the mass of observation around zero was not continuous, it could mean, for instance, that incumbents may influence close elections or election official could purposely harm their odds of reelection. As figure 5 indicates, it is not the case for the

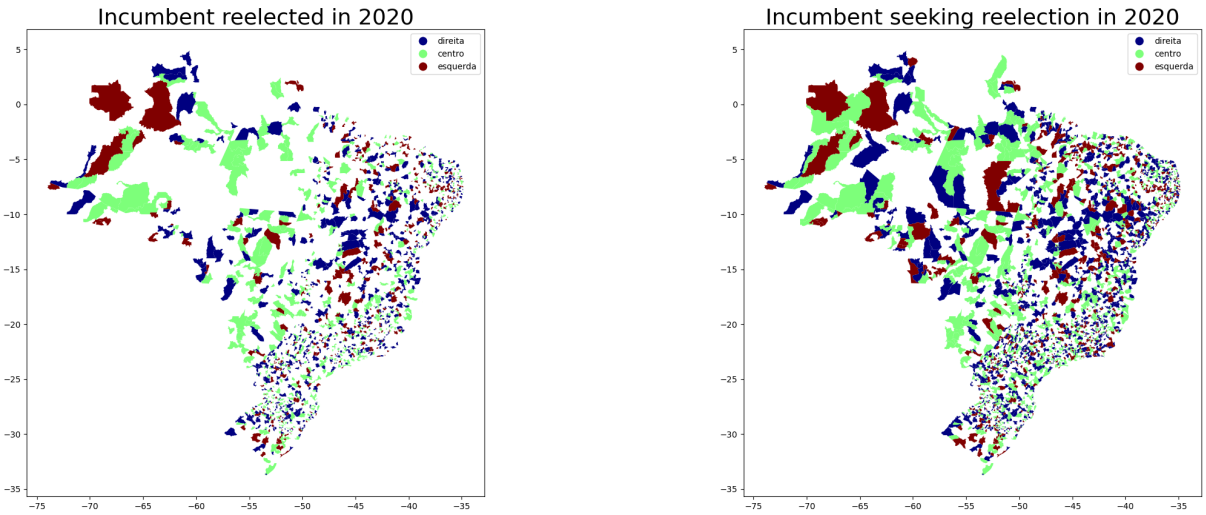

Figure 4: Mayors trying reelection (left) - Mayors reelected (right)

collected dataset.

Another indication on the validity of the RDD is the graphical representation of the variable of interest around the cutoff point. In this study, the first variable is the adoption on non-pharmaceutical interventions, which consisted of an index regarding whether the municipality adopted mask mandates, business closures and social distancing regulations. The variable can assume values from 0 to 3, where each of the policies counts as a dummy variable and the final index results from their sum. The visual representation in figure 6 indicates that right-wing incumbents, when facing reelection, adopt stricter policies than second term mayors. Pertaining left-wing and center mayors, no impact was observed.

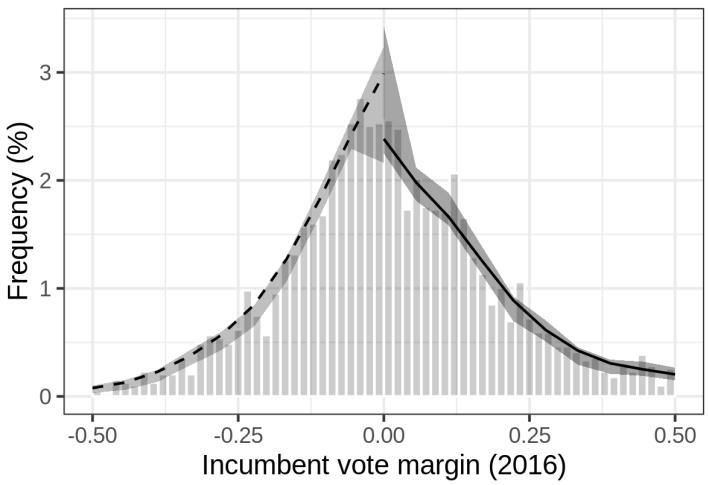

Figure 5: Mass of observations around the cutoff point

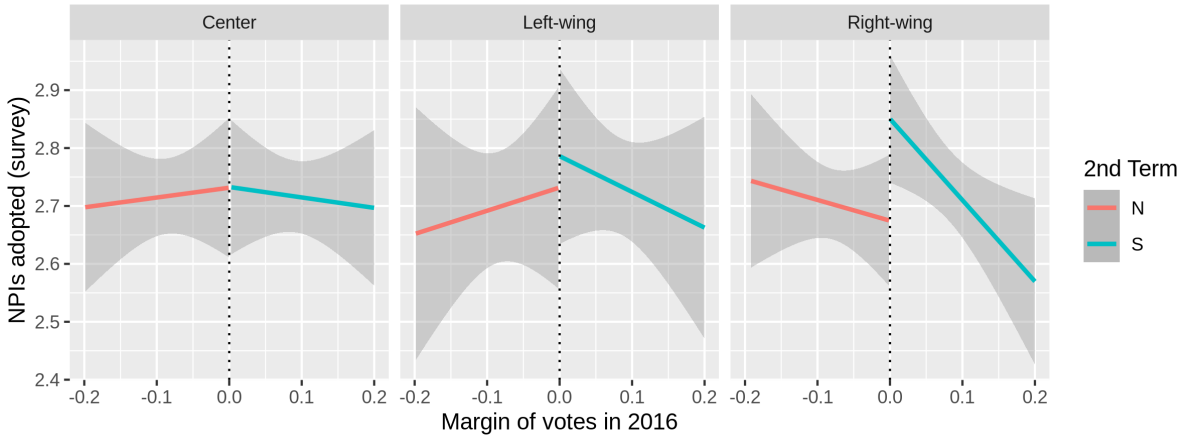

Figure 6: NPI index around discontinuity for different incumbent ideologies.

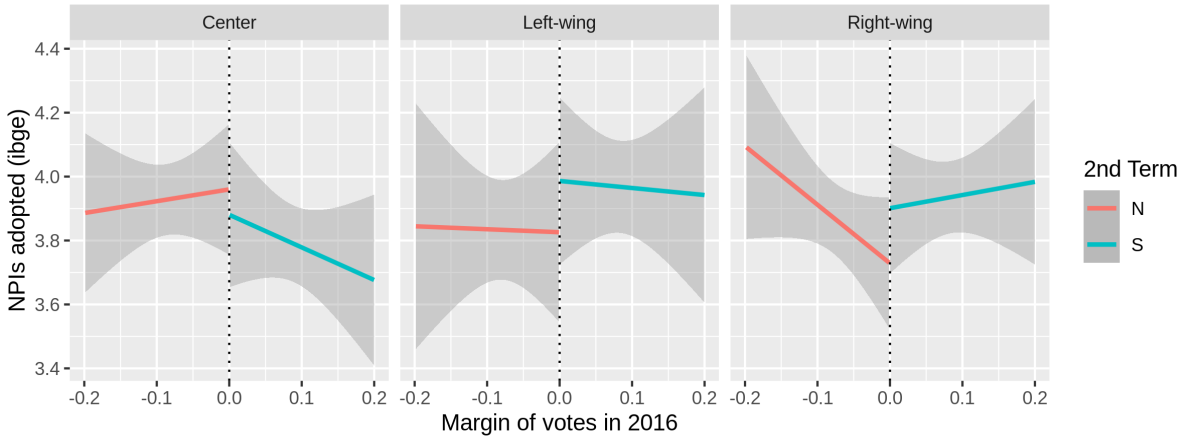

Figure 7: NPI IBGE index (no business closure mandates) around discontinuity.

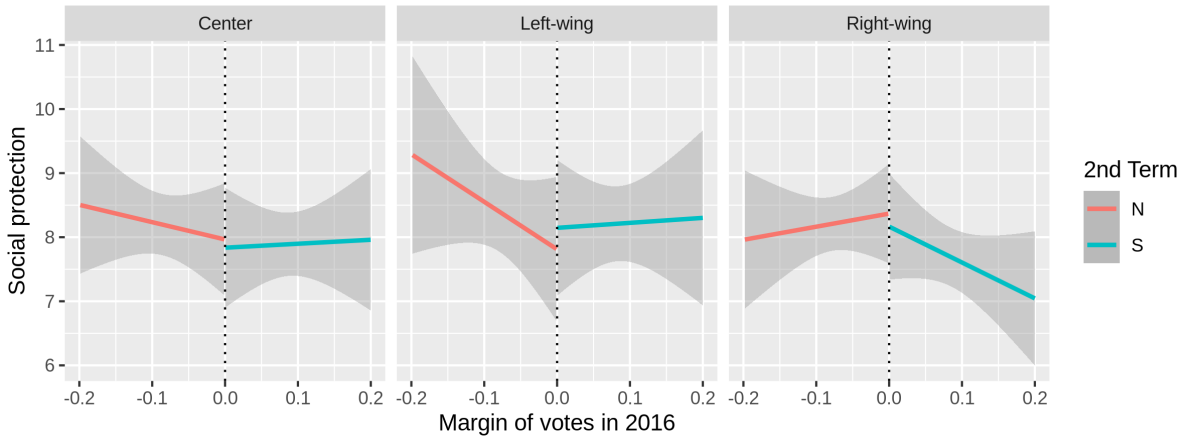

Figure 8: Social protection policies around discontinuity.

Figure 7, on its turn, show the discontinuity around the cut-off point pertaining NPIs measured by IBGE, among which there are no business closure mandates. No impact was observed. Finally, Figure 8 indicates that incumbency status does not appear to have impacted the adoption of social relief measures when the full sample is evaluated.

B.2 Descriptive statistics

Table 6: Descriptive statistics

Municipality	*Right-leaning*			*Left-leaning*		
	Obs	Mean	SD	Obs	Mean	SD
Incumbent: left-wing						
Social distancing	471	0.981	0.137	453	0.978	0.147
Business closures	470	0.753	0.432	453	0.797	0.403
Mask mandates	470	0.966	0.182	450	0.962	0.191
NPI index	470	2.700	0.503	450	2.738	0.506
Mask mandates (IBGE)	551	0.949	0.220	758	0.942	0.234
Social distancing (IBGE)	551	1.775	0.459	758	1.793	0.440
Sanctions (IBGE)	550	1.235	0.844	758	1.094	0.846
NPI IBGE	550	3.958	1.052	758	3.828	1.082
Incumbent: right-wing						
Social distancing	858	0.971	0.168	725	0.986	0.117
Business closures	854	0.745	0.436	725	0.826	0.379
Mask mandates	857	0.950	0.218	725	0.968	0.175
NPI index	853	2.665	0.537	725	2.781	0.440
Mask mandates (IBGE)	982	0.949	0.220	1160	0.933	0.251
Social distancing (IBGE)	982	1.786	0.439	1161	1.787	0.446
Sanctions (IBGE)	982	1.233	0.836	1159	1.119	0.847
NPI IBGE	982	3.968	1.017	1159	3.839	1.058
Incumbent: center						
Social distancing	969	0.971	0.168	434	0.998	0.048
Business closures	970	0.763	0.426	434	0.772	0.420
Mask mandates	967	0.949	0.219	431	0.972	0.165
NPI index	966	2.683	0.528	431	2.742	0.453
Mask mandates (IBGE)	1154	0.955	0.208	782	0.940	0.238
Social distancing (IBGE)	1154	1.771	0.452	782	1.817	0.412
Sanctions (IBGE)	1153	1.216	0.837	781	1.086	0.872
NPI IBGE	1153	3.943	1.045	781	3.843	1.044

Notes: (*i*) Social distancing (IBGE) $\in \{0, 1, 2\}$, where 1 denotes prohibition of social gatherings and 2, stay-at-home orders. (*ii*) Sanctions (IBGE) $\in \{0, 1, 2\}$, where sanctions for individuals and/or business from breaking isolation orders are added to form the variable. (*iii*) Mayors' ideology according to their parties. (*iv*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off.

B.3 Results disregarding centrist mayors

Table 7: Results - only left and right-wing, and only centrist incumbents

	Dependent variable: NPI index							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*No centrist*		*Centrist only*		*No centrist*		*Centrist only*	
Robust	0.586***	0.426***	0.148	0.207*	-0.014	-0.016	0.039	-0.353
SD	(0.183)	(0.147)	(0.127)	(0.121)	(0.122)	(0.120)	(0.359)	(0.251)
p-value	(0.001)	(0.004)	(0.243)	(0.088)	(0.910)	(0.893)	(0.914)	(0.159)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	120	107	118	102	141	160	25	41
obs. right	112	98	132	104	133	151	21	32
	Dependent variable: NPI IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*No centrist*		*Centrist only*		*No centrist*		*Centrist only*	
Robust	0.150	0.173	-0.124	-0.245	-0.389	-0.386	-0.263	-0.059
SD	(0.302)	(0.259)	(0.266)	(0.281)	(0.253)	(0.239)	(0.348)	(0.309)
p-value	(0.618)	(0.505)	(0.641)	(0.382)	(0.124)	(0.106)	(0.449)	(0.848)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	162	191	122	114	186	194	59	85
obs. right	156	181	123	103	151	163	47	57
	Dependent variable: Social protection IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*No centrist*		*Centrist only*		*No centrist*		*Centrist only*	
Robust	-1.681	-1.488	-1.371	-1.103	-1.842*	-1.503*	-0.264	-0.254
SD	(1.098)	(0.990)	(1.391)	(1.439)	(1.012)	(0.850)	(1.249)	(1.636)
p-value	(0.126)	(0.133)	(0.324)	(0.444)	(0.069)	(0.077)	(0.833)	(0.876)
Covariates	no	yes	no	yes	no	yes	no	yes
obs.left	143	151	121	116	194	255	161	104
obs. right	131	138	115	105	164	223	100	67

i) Significance markers: *p<0.1; **p<0.05; ***p<0.01; *ii)* covariates representing state fixed-effects presented in all models, while a vector of covariates pertaining mayor (age, gender, education, and skin color) and municipality (population and GDP per capita) characteristics was added when informed; *iii)* optimal bandwith mserd, local linear estimator, triangular kernel. (*iv*) Mayors' ideology according to their parties. (*v*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off.

B.4 Individual dependent variables

The next tables present the results for the individual components that comprise each NPI index used as dependent variable in the main regressions.

Table 8: Results - individual variables instead of NPI index (de Souza Santos et al., 2021)

	Dependent variable: business closures dummy							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.306*	0.237	0.432*	0.276	0.020	0.024	-0.116	0.000
SD	(0.172)	(0.154)	(0.225)	(0.204)	(0.094)	(0.093)	(0.114)	(0.109)
p-value	(0.076)	(0.124)	(0.055)	(0.177)	(0.831)	(0.798)	(0.307)	(0.999)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	85	85	25	25	119	122	52	49
obs. right	70	69	34	33	93	101	65	57
	Dependent variable: mask mandate dummy							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.136*	0.126	0.029	0.036**	-0.008	0.009	-0.146	-0.262**
SD	(0.080)	(0.081)	(0.019)	(0.017)	(0.037)	(0.034)	(0.107)	(0.108)
p-value	(0.090)	(0.117)	(0.120)	(0.033)	(0.829)	(0.788)	(0.174)	(0.015)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	92	87	36	31	86	75	50	36
obs. right	73	69	44	40	64	54	61	46
	Dependent variable: social distancing dummy							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.068	0.061	0.006	0.012	0.058	0.095	0.023	0.012
SD	(0.066)	(0.063)	(0.007)	(0.011)	(0.059)	(0.064)	(0.073)	(0.077)
p-value	(0.303)	(0.333)	(0.340)	(0.271)	(0.329)	(0.137)	(0.752)	(0.878)
Covariates	no	yes	no	yes	no	yes	no	yes
obs.left	92	86	24	26	107	93	52	53
obs. right	75	68	32	35	80	70	65	66

i) Significance markers: *p<0.1; **p<0.05; ***p<0.01; *ii)* covariates representing state fixed-effects presented in all models, while a vector of covariates pertaining mayor (age, gender, education, and skin color) and municipality (population and GDP per capita) characteristics was added when informed; *iii)* optimal bandwith mserd, local linear estimator, triangular kernel. (*iv*) Mayors' ideology according to their parties. (*v*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off.

Table 9: Results - individual variables instead of NPI index (IBGE)

	Dependent variable: sanctions for non-compliance dummy							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.244	0.249	0.100	0.047	-0.198	-0.260	-0.220	-0.011
SD	(0.299)	(0.289)	(0.393)	(0.408)	(0.206)	(0.201)	(0.337)	(0.289)
p-value	(0.415)	(0.389)	(0.800)	(0.907)	(0.337)	(0.195)	(0.513)	(0.969)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	113	109	44	39	126	117	92	109
obs. right	92	88	50	46	95	83	95	113
	Dependent variable: mask mandate dummy							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.035	0.022	0.030	-0.018	-0.155**	-0.183***	0.082	0.073
SD	(0.092)	(0.085)	(0.096)	(0.097)	(0.065)	(0.060)	(0.092)	(0.071)
p-value	(0.706)	(0.801)	(0.752)	(0.852)	(0.018)	(0.002)	(0.370)	(0.301)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	117	122	47	42	119	123	83	96
obs. right	98	98	56	49	84	93	82	99
	Dependent variable: social distancing dummy							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	-0.121	-0.096	-0.042	-0.080	-0.040	-0.003	-0.161	-0.263*
SD	(0.137)	(0.128)	(0.129)	(0.130)	(0.113)	(0.105)	(0.166)	(0.139)
p-value	(0.378)	(0.454)	(0.744)	(0.536)	(0.723)	(0.976)	(0.333)	(0.058)
Covariates	no	yes	no	yes	no	yes	no	yes
obs.left	102	124	46	46	143	146	70	91
obs. right	82	99	52	52	101	105	72	92

i) Significance markers: *p<0.1; **p<0.05; ***p<0.01; *ii)* covariates representing state fixed-effects presented in all models, while a vector of covariates pertaining mayor (age, gender, education, and skin color) and municipality (population and GDP per capita) characteristics was added when informed; *iii)* optimal bandwith mserd, local linear estimator, triangular kernel. (*iv*) Mayors' ideology according to their parties. (*v*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off.

C Robustness checks

Table 10: Results - municipality ideology cutoffs at 60%

	Dependent variable: NPI index							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.318	0.319	0.453*	0.277*	0.049	0.050	0.101	0.290*
SD	(0.253)	(0.197)	(0.240)	(0.158)	(0.143)	(0.131)	(0.164)	(0.168)
p-value	(0.208)	(0.106)	(0.059)	(0.079)	(0.732)	(0.706)	(0.536)	(0.085)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	48	60	17	16	77	91	34	38
obs. right	38	51	26	24	52	60	39	43
	Dependent variable: NPI IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.575	0.347	-0.362	-0.389	-0.611**	-0.695***	-0.418	-0.426
SD	(0.490)	(0.428)	(0.547)	(0.515)	(0.265)	(0.268)	(0.490)	(0.360)
p-value	(0.241)	(0.417)	(0.508)	(0.450)	(0.021)	(0.010)	(0.393)	(0.236)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	67	77	22	20	101	98	66	88
obs. right	52	61	30	29	68	60	64	93
	Dependent variable: Social protection IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	-3.692**	-2.741	-1.514	-0.874	-1.994*	-1.159	-1.891	-2.252*
SD	(1.809)	(1.697)	(2.058)	(1.931)	(1.110)	(1.132)	(1.720)	(1.213)
p-value	(0.041)	(0.106)	(0.462)	(0.651)	(0.072)	(0.306)	(0.272)	(0.063)
Covariates	no	yes	no	yes	no	yes	no	yes
obs.left	67	70	22	25	124	119	73	89
obs. right	53	56	31	33	83	82	74	94

i) Significance markers: *p<0.1; **p<0.05; ***p<0.01; *ii)* covariates representing state fixed-effects presented in all models, while a vector of covariates pertaining mayor (age, gender, education, and skin color) and municipality (population and GDP per capita) characteristics was added when informed; *iii)* optimal bandwith mserd, local linear estimator, triangular kernel. (*iv*) Mayors' ideology according to their parties. (*v*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off (municipalities where Jair Bolsonaro got more than 60% of the votes were labeled as right-leaning, less than 40%, left-leaning.

Table 11: Results - municipality ideology based on 2018 first round results

	Dependent variable: NPI index							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.381	0.317	0.522*	0.497**	0.097	0.296*	-0.052	0.333*
SD	(0.268)	(0.248)	(0.280)	(0.194)	(0.168)	(0.157)	(0.206)	(0.189)
p- value	(0.156)	(0.200)	(0.063)	(0.011)	(0.563)	(0.058)	(0.802)	(0.078)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	49	49	14	13	70	69	31	34
obs. right	39	41	15	14	50	46	37	44
	Dependent variable: NPI IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.093	-0.112	-1.569**	-1.258**	-0.442	-0.483*	-0.543	-0.567
SD	(0.529)	(0.442)	(0.794)	(0.605)	(0.277)	(0.277)	(0.428)	(0.374)
p-value	(0.860)	(0.800)	(0.048)	(0.037)	(0.110)	(0.082)	(0.205)	(0.130)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	50	55	14	14	88	94	84	88
obs. right	41	48	15	15	60	67	89	90
	Dependent variable: Social protection IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	-3.525	-0.752	-0.989	-0.691	-2.447*	-1.629	-2.138	-3.165**
SD	(2.228)	(1.695)	(2.178)	(1.709)	(1.258)	(1.159)	(1.706)	(1.262)
p-value	(0.114)	(0.657)	(0.650)	(0.686)	(0.052)	(0.160)	(0.210)	(0.012)
Covariates	no	yes	no	yes	no	yes	no	yes
obs.left	50	70	17	24	88	91	80	81
nobs.effective.right	44	60	17	24	60	63	85	86

i) Significance markers: *p<0.1; **p<0.05; ***p<0.01; *ii)* covariates representing state fixed-effects presented in all models, while a vector of covariates pertaining mayor (age, gender, education, and skin color) and municipality (population and GDP per capita) characteristics was added when informed; *iii)* optimal bandwith mserd, local linear estimator, triangular kernel. (*iv*) Mayors' ideology according to their parties. (*v*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off (municipalities where Jair Bolsonaro got more than 50% of the votes in the first round were labeled as right-leaning.

Table 12: Main Results - running variable multiplied by proportion of elderly ($\geq 80yo$)

	Dependent variable: NPI index							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.444**	0.392**	0.423**	0.403**	0.069	0.121	-0.389*	-0.528***
SD	(0.188)	(0.182)	(0.198)	(0.195)	(0.130)	(0.119)	(0.223)	(0.194)
p-value	(0.018)	(0.031)	(0.033)	(0.039)	(0.595)	(0.312)	(0.081)	(0.006)
Covariates	no	yes	no	yes	no	yes	no	yes
obs.left	95	90	39	38	108	117	43	42
obs. right	79	75	49	48	73	82	48	47
	Dependent variable: NPI IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	0.240	0.313	-0.054	-0.287	-0.112	-0.255	0.357	-0.125
SD	(0.269)	(0.258)	(0.449)	(0.435)	(0.280)	(0.253)	(0.549)	(0.305)
p-value	(0.372)	(0.226)	(0.905)	(0.510)	(0.691)	(0.314)	(0.516)	(0.683)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	118	120	36	36	123	148	67	119
obs. right	94	95	50	47	87	103	66	134
	Dependent variable: Social protection IBGE							
Municipality	*Right-leaning*				*Left-leaning*			
Mayor	*Right-wing*		*Left-wing*		*Right-wing*		*Left-wing*	
Robust	-4.561***	-3.799***	-1.452	-1.179	-1.752	-2.140**	-0.775	-0.857
SD	(1.251)	(1.188)	(1.619)	(1.414)	(1.078)	(0.854)	(1.981)	(1.280)
p-value	(¡0.001)	(0.001)	(0.370)	(0.404)	(0.104)	(0.012)	(0.696)	(0.503)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	77	77	36	37	124	188	64	110
obs. right	67	66	49	51	89	137	63	110

i) Significance markers: *p<0.1; **p<0.05; ***p<0.01; *ii)* covariates representing state fixed-effects presented in all models, while a vector of covariates pertaining mayor (age, gender, education, and skin color) and municipality (population and GDP per capita) characteristics was added when informed; *iii)* optimal bandwith mserd, local linear estimator, triangular kernel. (*iv*) Mayors' ideology according to their parties. (*v*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off (municipalities where Jair Bolsonaro got more than 50% of the votes were labeled as right-leaning.

C.1 Estimations Using Different Parameters

Table 13: Alternative kernels and bandwidths

	kernel = uniform		kernel =epanechnikov		bw = cerrd		bw = 0.2	
y = NPI index, sample = right-wing incumbent								
Robust	0.241**	0.265**	0.266**	0.316***	0.282**	0.340***	0.205**	0.206**
SD	(0.115)	(0.112)	(0.120)	(0.114)	(0.125)	(0.118)	(0.087)	(0.086)
p-value	(0.036)	(0.018)	(0.026)	(0.006)	(0.024)	(0.004)	(0.019)	(0.017)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	167	166	177	172	151	140	332	332
obs. right	126	126	139	134	111	108	286	286
y = social protection, right-wing mayor								
Robust	-1.080	-1.874**	-2.991***	-2.415**	-2.953***	-2.598**	-0.893	-0.758
SD	(0.783)	(0.894)	(1.037)	(1.001)	(1.093)	(1.065)	(0.673)	(0.649)
p-value	(0.168)	(0.036)	(0.004)	(0.016)	(0.007)	(0.015)	(0.185)	(0.243)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	281	191	175	170	138	130	450	450
obs. right	225	144	129	123	105	101	388	388
y = NPI index, left-wing mayor								
Robust	0.076	0.185	0.165	0.220	0.106	0.102	0.013	0.021
SD	(0.175)	(0.159)	(0.145)	(0.150)	(0.142)	(0.139)	(0.121)	(0.123)
p-value	(0.665)	(0.247)	(0.256)	(0.142)	(0.455)	(0.465)	(0.915)	(0.863)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	40	75	95	81	64	62	164	164
obs. right	54	89	116	98	85	82	207	207

Notes: *i)* Significance markers: *p<0.1; **p<0.05; ***p<0.01; *ii)* covariates representing state fixed-effects; (*iii*) Mayors' ideology according to their parties.

C.2 Optimum Bandwidth Selection Algorithms

Table 14: Estimated Bandwidths

	BW est. (h)		*BW bias (b)*	
mserd	0.176	0.176	0.329	0.329
msetwo	0.183	0.189	0.311	0.394
msesum	0.188	0.188	0.348	0.348
msecomb1	0.176	0.176	0.329	0.329
msecomb2	0.183	0.188	0.329	0.348
cerrd	0.122	0.122	0.329	0.329
certwo	0.126	0.130	0.311	0.394
cersum	0.130	0.130	0.348	0.348
cercomb1	0.122	0.122	0.329	0.329
cercomb2	0.126	0.130	0.329	0.348

Notes: triangular kernel.

D Placebo Tests

Table 15: Regressions with discontinuity set as different cut-offs

	c = -0.15		c = 0.15		c = -0.1		c = 0.1	
y = NPI index, right-wing mayor								
Robust	-0.241	-0.273	-0.092	-0.081	-0.093	-0.135	0.301**	0.209*
SD	(0.210)	(0.224)	(0.164)	(0.160)	(0.156)	(0.161)	(0.120)	(0.109)
p-value	(0.250)	(0.222)	(0.573)	(0.614)	(0.549)	(0.403)	(0.012)	(0.054)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	44	34	137	115	90	85	85	115
obs. right	108	83	71	64	167	156	75	83
y = social protection, right-wing mayor								
Robust	0.442	0.261	0.436	-0.437	0.241	-0.571	-2.148**	-1.995**
SD	(1.163)	(1.217)	(2.046)	(1.313)	(0.963)	(0.855)	(0.905)	(0.980)
Covariates	no	yes	no	yes	no	yes	no	yes
p-value	(0.704)	(0.830)	(0.831)	(0.739)	(0.802)	(0.504)	(0.018)	(0.042)
obs. left	87	71	76	155	114	140	274	238
obs. right	208	156	43	73	205	312	153	141
y = NPI index, left-wing mayor								
Robust	0.106	-0.124	-0.149	-0.092	-0.099	0.085	0.232	0.247
SD	(0.313)	(0.202)	(0.187)	(0.142)	(0.217)	(0.170)	(0.192)	(0.171)
p-value	(0.735)	(0.540)	(0.427)	(0.519)	(0.647)	(0.616)	(0.227)	(0.147)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	22	29	45	113	34	38	97	97
nobs. right	32	48	32	55	48	59	56	57
y = social protection, left-wing mayor								
Robust	1.382	2.009	3.171*	1.250	10.536***	-0.136	-1.629	-1.411
SD	(1.740)	(1.376)	(1.744)	(1.283)	(1.486)	(1.172)	(1.182)	(1.183)
p-value	(0.427)	(0.144)	(0.069)	(0.330)	(0.000)	(0.908)	(0.168)	(0.233)
Covariates	no	yes	no	yes	no	yes	no	yes
obs. left	50	47	60	156	29	56	188	176
obs. right	118	102	42	82	45	109	102	94

i) Significance markers: *p<0.1; **p<0.05; ***p<0.01; *ii)* covariates representing state fixed-effects presented in all models, while a vector of covariates pertaining mayor (age, gender, education, and skin color) and municipality (population and GDP per capita) characteristics was added when informed; *iii)* optimal bandwith mserd, local linear estimator, triangular kernel. (*iv*) Mayors' ideology according to their parties. (*v*) Ideology of the municipality is determined by the results of the 2018 presidential election's run-off.