Beyond Partisan Rhetoric: Institutional Constraints and Local COVID-19 Policies in Brazil

ABSTRACT*:Background:* Political polarization can influence policy responses, particularly during crises. While institutions aim to counterbalance these effects, their capacity to do so under stress remains underexplored. This study examines whether mayoral partisan ideology affected pandemic policymaking in Brazilian municipalities, a highly polarized context with a severe COVID-19 health burden. *Methods:* We used a regression discontinuity design in 599 closely contested mayoral elections in 2016 to identify causal effects of partisan ideology on municipal pandemic responses in 2020. The analysis focused on formal policy measures and behavioral outcomes, particularly compliance with social isolation. *Results*: Mayoral partisan ideology had minimal influence on formal pandemic policymaking at the municipal level, challenging assumptions based on national partisan cues. However, municipalities led by right-wing mayors showed lower compliance with social isolation in the short term, despite no significant differences in formal policies and overall compliance across the first year of the pandemic. *Conclusions*: These findings highlight the complexity of partisan influence on health policymaking during crises. While national politics may shape public discourse, institutional structures and political and electoral interests can mitigate ideological effects on local policymaking.

Keywords: Polarization; Public Policy, Institutions, Local Government, Health.

There is no conflict of interest to declare.

Introduction

Contemporary publics and their elected representatives appear increasingly polarized, meaning divided, in many national contexts (McCarty, 2019). Such polarization has significant consequences for how citizens perceive and interact with one another (Iyengar et al., 2019), for the stability and longevity of governing coalitions, and numerous other issues. Particularly worrisome from a welfare standpoint, the global rise in political polarization has brought renewed attention to the impact of partisan political ideologies on policy responses related to public health (McCoy et al., 2018). Many studies have suggested that political ideology is a key determinant of health (Pabayo et al., 2015; Subramanian et al., 2009), while many have raised concerns that public health policies surroundingvaccination, reproductive or mental health, addiction, and many other topics, are increasingly driven by ideological concerns as opposed to scientific evidence While such hot-button issues grab national attention, much if not most of the actual delivery of public health policy is local. Understanding the consequences of partisan ideologies on local responses is essential, as it sheds light on the broader implications of political polarization and electoral turnover at the grassroots level.

Political institutions are the formal and informal rules, procedures, and organizations that structure the behavior of political actors and determine how power is acquired, exercised, and constrained within a political system. Operationally, they can be measured by the presence and characteristics of governing bodies (e.g., legislatures, executives, courts), rule-making mechanisms (e.g., constitutions, electoral systems), and enforcement structures (e.g., bureaucracies, oversight bodies). Political systems have a variety of institutional features, including bureaucratic insulation, separation of powers, and a federal system of government, that encourage stable, predictable, and effective governance despite tendencies toward

"faction" (Madison, 1787) that political polarization has exacerbated. In addition to formal-legal political institutions, political scientists have long identified more informal institutions, such as political culture, norms of procedure, and expectations of civil society, as also playing important roles in constraining the policy discretion of political actors. However, how well these institutions perform under the extreme stress of a global crisis remains a critical and open question (Axelrod et al., 2021; Macedo & Lee, 2025).

Particularly during crises such as the COVID-19 pandemic, the response to the pandemic has been highly politicized, ideological, and partisan across many national contexts. In the United States and Europe, COVID-19 has exacerbated pre-existing political polarization (Jungkunz, 2021). The behavior of Brazil's former President, Jair Bolsonaro, like other populist leaders, has been linked to worse COVID-19 health outcomes in terms of cases and deaths (Fernandes & Fernandes, 2022). Ajzenman, Cavalcanti, and Da Mata (2023) provide an example of how the actions of the then-Brazilian president led to increased risky behavior following key public statements at the onset of the pandemic. Many scholars have attributed substantial responsibility for the politicization to elite actors, such as politicians or media figures (Kerr et al., 2021; Hart et al., 2020). Research has shown that the partisan political ideology of these elite actors can explain variations in community behavior during the pandemic in countries like Brazil, the United States, and Mexico (Ajzenman, Cavalcanti, & Da Mata, 2023; Ayala-Cantu, Frattini, & Morando, 2021; Barrios & Hochberg, 2021; Ramos et al., 2020).

This paper examines the influence of partisan political ideology on shaping Brazil's pandemic policy response at the municipal level and how institutions responded to it. The rise of Bolsonaro has reshaped Brazilian politics, contributing to the emergence of programmatic right-wing parties. Meanwhile, left-wing parties, such as the Workers' Party, have maintained

their consistent programmatic perspectives. Nevertheless, our analysis shows that the political ideologies of mayors, as reflected by their party affiliations, had no significant impact on the adoption, timing, or continuation of policies during the COVID-19 pandemic. We argue that political institutions played a key role in preventing local governments from delivering politicized responses. We document that mayors have faced three key constraints in adopting Non-pharmaceutical interventions (NPIs): shared municipal authority, decentralized healthcare governance, and oversight institutions monitoring policy implementation.

Our results suggest a different dynamic surrounding local policymaking. Contrary to conventional wisdom, we find no relationships between elite signaling, mayoral policy action, and community behavior. NPIs to combat the COVID-19 pandemic are no different in municipalities with mayors from parties on the political Left, Right, or Center. Instead, arguments surrounding political institutions and mayors' electoral interests are likely better explanations of mayors' health policy decisions during the pandemic.[1]. That is an important lesson, especially in light of the intense politicization we have seen worldwide—institutional resilience matters.

We draw on a unique dataset covering Brazil's municipal pandemic responses and mayoral partisan ideologies, employing Regression Discontinuity Design (RDD) and survival modeling. Our central research question is: Does mayoral partisan ideology influence municipal responses to the pandemic? We break this question into sub-questions, assessing the impact of mayoral partisan ideology on timing, duration, and compliance of municipal measures.

[1] An important contextual element in implementing measures to mitigate the pandemic's impact was the electoral calendar. In 2020, municipal elections were held in all 5570 Brazilian municipalities, both for the position of mayor and for city councils.

Brazilian governments, like most worldwide, implemented various NPIs to combat the COVID-19 pandemic, including stay-at-home orders, workplace and school closures, movement restrictions, gathering size limitations, and mask mandates. The rapid evolution of knowledge about the virus led to uncertainty among policymakers regarding the best course of action, as they balanced health, economic, and social values. This uncertainty led to an uncoordinated response to the pandemic, particularly, as already demonstrated, under federal systems (Touchton et al., 2021; Knaul et al., 2021). For instance, studies indicate that Brazil's federal government relaxed NPIs relatively early to mitigate economic impacts (Fernandes et al., 2023), while many subnational governments maintained stricter measures, particularly in areas with high local COVID-19 transmission rates (Abrucio et al., 2021). Conversely, some Brazilian municipalities relaxed or abandoned NPIs independently of the president or the Health Ministry's directives (Ferreira et al., 2021).

Our identification strategy addresses several issues inherent in our research question by relying on plausibly exogenous variation triggered by close elections. We use a close election design to determine assignment to treatment cohorts, which a large body of literature has shown to resemble random assignment (Brollo & Troiano, 2016; Boas et al., 2014). This design leverages the fact that the outcome of a close election is more idiosyncratic and "noisy" than that of elections with larger victory margins.

Findings show almost no differences in whether or how quickly mayors of different partisan ideologies enacted COVID-19 policies. However, we find a relationship between the mayor's partisan ideology and short-term NPI compliance at the onset of the pandemic. This effect proved to be transient, dissipating rapidly within the initial weeks of the pandemic. While observing unofficial channels of elite influence is challenging, the absence of formal influence

through political parties or ideological alliances suggests the strength of short-term informal channels. These may be more significant in times of uncertainty when pressures promoting institutional conformity are greater.

We organize the paper as follows. First, we review the literature on mayoral behavior and motivations for policy adoption and maintenance, as well as municipal residents' compliance with these policies. We then examine the institutional framework shaping municipal government actions during the pandemic. Next, we provide context on the pandemic's progression in Brazil and the varied municipal responses. Next, we outline our research design, data collection methods, and analysis techniques. We present our findings on the impact of mayoral partisan ideology on pandemic policies and compliance. Finally, we discuss the implications of our findings, highlighting the nuanced relationship between political ideology and policymaking under crisis conditions.

Motivations and Behaviors Surrounding Mayoral Policy Decisions

This section reviews the literature in two areas: (1) mayoral behavior and motivations for policy adoption and maintenance, and (2) residents' compliance with those policies. A large body of work explores what motivates politicians, usually grouped into three mechanisms: electoral incentives, ideological interests, and socialization. A fourth factor, institutions, tends to vary less but crucially conditions choices. We first examine what drives local politicians' policy decisions before turning to the institutional constraints of Brazil's Health System.

Politicians' interests are often equated with electoral concerns. As elections become more competitive, politicians are more likely to adopt popular policies and maintain existing ones to win votes (Walker, 1969; Riker & Ordeshook, 1973). Studies on policy adoption and

diffusion often highlight electoral cycles, where politicians deliver benefits near elections, sometimes adding partisan or ideological elements (Nordhaus, 1975; Alesina, 1988).

Beyond elections, ideology shapes policymaking. Policymakers act on ideas that go beyond vote-seeking (Sugiyama, 2008). As North (1990) argues, resource distribution decisions can reflect ideology, even when they are at odds with electoral or financial interests. Ideology influences how actors filter information, perceive the world, and evaluate policies (Mullins, 1972), and governments with different ideological leanings yield distinct outcomes (Hibbs, 1977). While partisanship often serves as a proxy for ideology, it does not always align, especially outside the OECD, where many parties are personalistic rather than programmatic (Lucas & Samuels, 2010; Borges, 2021). Still, in Brazil, mayoral partisanship often correlates with policy choices, particularly in social policy and health (Wampler et al., 2019; Mayka, 2019; Rich, 2019). Mayors from the Workers' Party and other left-wing parties, for example, have historically championed health and education reforms (Sugiyama, 2012) and progressive social policies (Wampler et al., 2019; Sakurai et al., 2011). We thus argue that national party ideologies generally align with those of mayors.

A third explanation is socialization. Politicians' behavior is embedded in networks of organizational and informal relationships that shape preferences (Kaufman, 1999). Personal and professional networks create meaning, legitimacy, and norms (Kilduff & Tsai, 2003; Passy, 2003). Formal networks encourage policy diffusion, as decision-makers rely on social cues and cognitive shortcuts (Walker, 1969; Balla, 2001), whereas informal networks—such as geographic proximity—motivate alignment with local peers (Mooney, 2001).

The socialization and ideological lenses are linked to residents' compliance through elite cues. In polarized contexts, such as Brazil during the COVID-19 pandemic, cues from

party leaders, the media, and elites shape behaviors beyond voting (Levendusky, 2010). Backhaus et al. (2023) demonstrate the role of ideology in vaccine hesitancy globally, while Furst et al. (2024) find that this effect was strongest early in the pandemic, fading over time in Brazil.

During the COVID-19 pandemic, Brazil's polarized elites sent clear signals regarding policy compliance. Party positions were distinct and internally coherent, making it easier for residents to follow ideological and partisan cues (Levendusky, 2010; Jost et al., 2022; Druckman & McGrath, 2019). Finally, we turn to institutions. Unlike motivations rooted in interests, ideology, or socialization, institutions set the structural context within which mayors act, shaping both opportunities and constraints. That completes our framework, which links individual-level motivations to the broader institutional environment that shapes policy decisions.

Institutional Constraints in the Brazilian Health System

The design of the Sistema Único de Saúde (SUS) – Brazil's Universal Health System – positions municipalities as the central actors delivering healthcare services (Touchton et al., 2017; Wampler et al., 2019; Mayka, 2019; Rich, 2019). While Brazil's federal structure assigns the management of health services to state and municipal governments, the federal government's roles are broader and more closely related to long-term strategies such as coordination and funding (Fernandes & Pereira, 2020). State and municipal policymakers jointly determine the locations of hospitals and urgent care centers, with municipal governments typically overseeing the majority of these facilities.

Additionally, regional hospitals, strategically located in geographically advantageous areas, may be managed by local or state governments. Federal hospitals exist; however, they

are typically affiliated with a medical research unit of a federal university and offer a limited range of medical services (Teixeira, Fernandes, Leite, 2017).

Municipalities play a central role in implementing health policies, relying on financial transfers from the Ministry of Health or state governments, which make up a substantial share of their budgets (Machado et al., 2014). Additionally, mayors have significant discretion in the extent to which they implement and sustain programs, particularly in the short term, even though the most relevant policies are designed at the national level (Funk & Philips, 2019).

However, mayors face three key institutional constraints that hinder their ability to adopt and sustain Non-Pharmaceutical Interventions (NPIs) to combat COVID-19. First, while mayors are the most powerful municipal actors, they are not the sole authorities in policy adoption and implementation. Municipal legislatures are required for many types of municipal policy actions, although they may be sidelined for shorter-term emergency measures. Likewise, municipal policy management councils have formal veto power over budget allocations in specific areas, such as health and education; however, in practice, mayors frequently circumvent their authority (Touchton et al., 2017; Wampler et al., 2019).

The second institutional constraint arises from Brazil's federal healthcare system. Under the National Health System, local governments are responsible for delivering most health services, while higher levels of government typically focus on system coordination and financial support (Fernandes & Pereira, 2020). Brazil presents a valuable case study of public health interventions during the pandemic, particularly regarding NPIs, as their implementation varied significantly across its 5,570 municipalities, 26 states, and the Federal District (Touchton et al., 2021). Municipal and state governments differed in the strictness of distancing measures, mask mandates, density controls, and travel restrictions. Municipal governments remained

tasked with managing hospitals and basic care units. In contrast, the federal government, in turn, was responsible for broader coordination of health activities, such as supplying ventilators or vaccines when municipal and state supplies were exhausted.

The third constraint stems from oversight institutions, which have taken measures at the state level to monitor and support municipal responses to the COVID-19 pandemic. These institutions play an important role in overseeing municipal governments and ensuring the adequate funding of the healthcare system (Fernandes & Teixeira, 2020). Oversight measures include the development of dedicated portals, the issuance of resolutions that establish public policy guidelines, and the implementation of new preventive measures. As detailed in Appendix J, only three audit institutions, out of 26 states and the Federal District, did not introduce new oversight measures related to the policies implemented by local governments in response to the pandemic (Luvizotto, 2020; Medeiros, 2023; Mendonça et al., 2020; Ribeiro et al., 2020).

Research Hypothesis

The design of Brazil's SUS made pandemic response a municipal government issue. Governors and mayors tended to consider NPIs to combat the pandemic more thoroughly than national government officials, due to their institutional responsibility to provide basic healthcare services and maintain the healthcare system they managed from collapse. Furthermore, local officials are held accountable by voters for their handling of health issues (Fernandes et al., 2022; Wampler et al., 2019; Mobarak et al., 2011).

However, many NPIs proposed to combat the pandemic posed significant economic threats, reducing economic growth and employment levels, and creating a political burden that municipal governments must address or manage. It was, therefore, not evident during the

pandemic what course of action a self-interested reelection-seeking mayor should have followed. It is essential to highlight that the election calendar in Brazil put all mayors and municipal representatives under electoral pressure due to the pandemic, as they needed to survive voters' short-term evaluation of their efforts.

The COVID-19 pandemic and ensuing health crisis put extraordinary pressure on the Brazilian health system, leading to overwhelming demand for services and the risk of collapse. NPI measures were important tools for decreasing pressure on the health system (Knaul et al., 2022; Touchton et al., 2021). Simultaneously, political polarization created a considerable divergence in public opinion on the appropriate set of public policies to pursue (Fernandes & Fernandes, 2022). Right-wing extremists, led by President Bolsonaro, opposed all NPI measures based on the belief that they would hinder the economy (Fernandes et al., 2023). This fact leads to our central hypothesis:

H1: The right-wing mayor adopted less stringent municipal NPIs to combat COVID-19.

While the close-election design provides a quasi-experimental approach to estimate the effect of elite mayoral partisan ideology on NPI adoption, maintenance, and compliance during the pandemic, the mechanism by which the partisan ideology of elite policymakers may influence local behavior is elusive.

We propose three theoretical alternative mechanisms. Political elites with policymaking authority may enact official policies that change community behavior. They may, for example, impose curfews, occupancy restrictions, school closures, or other measures that restrict popular mobility. Alternatively, political elites may promote informal measures related to the interpretation, application, and enforcement of policies and guidance regarding behavior. They may appear in a public place far from their home while applying for a shelter-in-place

order or appear in photographs unmasked despite official orders, communicating to the public that compliance is optional despite official legal requirements. More officially, but still challenging to observe, political elites may convey to immediate subordinates that failure of the public to achieve compliance with official recommendations from oversight institutions will generate accountability, and such informal, and hard-to-observe, threats of sanction can progress downward from top levels of government (Searle, 2005; Cruz-García & Peiró-Palomino, 2019). While informal and formal policies are not exclusive, they do not invariably align. Assumptions about which mechanism predominately influences community behaviors could lead to vastly different understandings of the problem that politics poses for responding to public health and other crises.

Examining the determinants of local policymaking and how partisan ideology affects local decisions during pandemics is imperative. In next section, we detail our methods and data.

Methods and Data

This research faces several methodological challenges. First, policy decisions are complex, and mayoral partisan ideology is only one among many factors shaping them. Second, mayors are not randomly assigned to cities; their election often reflects local partisan preferences. In Brazil, factors like population density, racial composition, and affluence predict both mayors' partisan affiliations and policy choices. Moreover, as strategic actors, mayors tailor policies to local needs, meaning that the municipal context can influence policy independently of ideology. To assess the impact of mayoral ideology on pandemic policies, we use two empirical approaches, both grounded in the idea that "close elections" approximate random assignment (see Appendix A for balance tests).

The first approach employs a regression discontinuity design (RDD) for close races, following Calonico et al. (2014, 2020). We analyze pandemic policies using both additive indices and latent indices (via one-parameter item response models) and measure NPI compliance with mobility data. All models use optimal bandwidths per Calonico et al. (2017). While RDD captures the overall and detailed stringency of municipal responses, it says little about the speed of decisions, a critical factor during crises like COVID-19. Maximum or average policy differences may mask important temporal variation. To address this, we adopt survival analysis as our second approach. Here, municipalities act as individuals, mayoral ideology defines treatment groups, and preserving pre-pandemic procedures resembles "survival." We assess time-to-adoption (in weeks) using log-rank tests and visual diagnostics (Bland & Altman, 2004).

A significant challenge for both approaches is Brazil's fragmented multi-party system. In 2016, 29 parties competed and won close mayoral races, making cohort analysis impractical. We therefore classify candidates into broad ideological categories—left, center, right—following Codato et al. (2018), focusing on close elections where the top two came from different categories. For RDD, we further simplify the analysis by categorizing the data into binaries (e.g., right-wing vs. non-right-wing) to define treatment contrasts clearly.

Our main results focus on right-wing mayors versus others, although Appendices F, G, and H explore variations, including "far-right" versus others or "left" versus others. As an additional robustness check, Appendix C uses RDD to test whether right-wing mayors spent less on health prior to the pandemic and whether they met Brazil's minimum health expenditure requirements. Lastly, Appendix K presents evidence of the robustness of null findings, showing the statistics of equivalence tests for these results.

Dependent variables

To measure these outcomes, we draw on multiple data sources. Social mobility data come from InLoco® (2020), a Brazilian technology firm that anonymously monitored over 60 million mobile devices across the country. InLoco's Social Isolation Index, publicly available, reports the percentage of devices that remained within 450 meters of the user's home, providing an aggregate measure of compliance at the municipal level.

We source COVID-19 health data from BRASIL.IO (2020), which compiles daily reports of COVID-19 cases and deaths from Brazil's state authorities (see Appendix D). Data on municipal policies come from three primary sources. First, the 2020 Pesquisa de Informações Básicas Municipais (MUNIC), conducted by the Brazilian Institute of Geography and Statistics (IBGE), offers detailed administrative records from 5,467 of Brazil's 5,569 municipalities, including whether social isolation measures were adopted, whether monitoring systems were implemented, and whether sanctions (such as fines or compulsory isolation) were applied.

Second, the Brazilian Confederation of Municipalities (Confederação Nacional de Municípios – CNM) provides data on six key municipal NPIs, documenting the first day of policy implementation (Souza Santos et al., 2021; see Box 1). Finally, we supplement these sources with original data collection from 192 municipalities, using manual coding of NPI measures and survey responses from local leaders to capture details on specific policies and their adoption timing (Appendix I).

Box 1. Dimensions of NPI measures from CNM data collection

a. Creation of sanitary barriers (monitoring checkpoint for people entering and leaving the municipality);
b. Adoption of restrictive measures to reduce the circulation and agglomeration of people;
c. Adoption of social isolation measures, allowing only essential services;
d. Adoption of mask mandates;
e. Adoption of measures to reduce the supply of public transportation;
f. Adoption of measures for the relaxation of restrictive measures of social isolation.

Main Independent variable

In 2016, 5,570 Brazilian municipalities held elections, but only a small number of these municipalities had close elections. Further, not all these elections had significant partisan ideological stakes in the sense of contestation between candidates that fell into distinct left-center-right categories. There were 509 elections with <3% margin between the winning and losing party, which translates to 9.1 percent of total municipal elections. We present the distribution of close elections in Table 1, breaking down the ideological contests in our data. As discussed above, we use mayors' partisan identifications to infer ideology. Mayors from parties with right-wing political platforms are then categorized as ideologically right-wing. At the same time, those from centrist parties are categorized as centrist, and those from left-wing parties are categorized as left-wing.

We focus on the contests between mayoral candidates on the political right versus center and right versus left, as the Brazilian pandemic experience indicates a stronger radicalization of right parties toward denialist approaches and preferences for less stringent NPI measures (Fernandes et al., 2023). Hence, we have a distribution of 599 electoral contests between parties with different left-center-right ideologies, minus the 128 municipalities where the close election was between Center and Left-wing parties. We therefore present our data from the other 471 municipalities with close elections between mayoral candidates from Right-

wing parties and parties from the left or center. Of those, 228 municipalities have a right-wing mayor, and 243 have a left- or center-wing mayor.

For those 471 municipalities, we present descriptive statistics for our central continuous dependent variables in Table 3: municipal NPI measures and social mobility.

Table 1. Close elections among parties from different political ideologies in Brazil[2]

	Left – Candidate Barely Lost	Center Candidate Barely Lost	Right Candidate Barely Lost	Total
Left Candidate Barely Won	-	64	96	160
Center Candidate Barely Won	64	-	147	211
Right Candidate Barely Won	85	143	-	228
Total	149	207	243	599

Count of municipalities experiencing various types of close elections. For example, there were 85 close elections where the right candidate won by a narrow margin, and the left candidate lost by a similarly narrow margin. Source: Supreme Electoral Tribunal and FGV – Cepesp (2024)

NPI measures

Table 2 presents the number of municipalities that adopted various NPIs in the CNM dataset, as well as the number of municipalities that did not report this information. There is considerable variation in the adoption of NPI across municipalities. Almost all municipalities for which data is available implemented measures to restrict the movement or gathering of people. Additionally, a significant majority also relaxed pandemic measures several months

[2]Left Parties: PC do B, PCB, PCO, PDT, PPL, PSB, PSOL, PSTU, PT. Center: PMDB, PMN, PPS, PROS, PSDB, PV, PHS, PPS. Right Parties: PAN, PEN, DEM, PGT, PL, PR, PP, PRB, PRN, PRONA, PRP, PRTB, PSC, PSD, PSDC, PSL, PSN, PST, PT do B, PTB, PTC, PTN, SD.

after they were adopted. However, less than half of the municipalities adopted measures to limit public transportation or implement health checkpoints at municipal borders.

Table 2. Descriptive statistics of the CNM dataset

Item	Question	Did not adopt	Adopted	Missing
Q1.	Sanitary barriers (monitoring checkpoints for popular mobility at municipal borders)	166	163	142
Q2.	Restrictive measures to reduce the movement/agglomeration of people.	8	320	143
Q3.	Social isolation measures, allowing ONLY essential services.	72	256	143
Q4.	Mandatory use of face masks.	17	311	143
Q5.	Measures to reduce public transit	163	157	151
Q6.	Flexibility of restrictive measures and social isolation.	122	205	144

Source: CNM dataset.

Based on these metrics, we introduce two summary indices to gauge the stringency of each municipality's policies. First, we constructed a cumulative index (NPI_MUN) by tallying the NPI adopted in each municipality while inversely incorporating the responses in Q6. Second, we apply item response theory, utilizing the stringency of responses to determine the position of each municipality on an underlying spectrum of strictness, employing a one-parameter logistic model (Qtheta). We present a comprehensive overview of the local policy variables in Table 3, as well as the compliance with social isolation.

Table 3. Summary measure of the stringency of municipal policies adopted by Brazilian municipalities from the CNM and MUNIC-IBGE Dataset

categorical municipal stringency measures (CNM dataset)							
CNM dataset	**1**	**2**	**3**	**4**	**5**	**6**	**Missing**
NPI_MUN Categories							
Freq.	2	25	78	105	91	28	142
Percent	0.42	5.31	16.56	22.29	19.32	5.94	30.15
MUNIC IBGE dataset	**0**	**1**					**Missing**
NPI – Decree	83§	388					-
NPI - Monitoring	242	229					-
NPI - Sanctions	183	288					

continuous municipal stringency measures (CNM dataset)					
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
NPI_MUN	329	4.04	1.1	1	6
Qtheta	471	0	0.18	-0.72	0.37

Continuous municipal behavioral measures					
Average Social Isolation	389	0.39	0.03	0.27	0.54

§ In 67 of those 83, there was no mandatory social isolation, defined by decree; besides non-response, but there were recommendations for social isolation.

Source: CNM dataset, Munic/IBGE dataset, and InLocal

Results

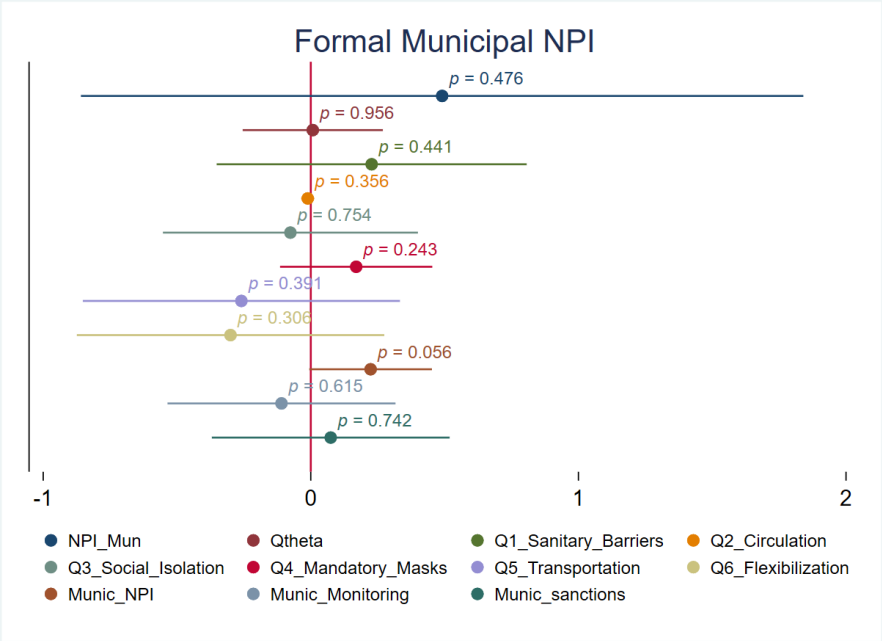
Mayors' Partisan Ideology and Municipal NPIs in Brazil

Figure 1 displays the estimated results for each Non-Pharmaceutical Intervention (NPI) adopted at the municipal level. It uses graphical bars to represent points and their confidence intervals, along with p-values for each regression. Bars crossing the zero axis indicate no significant confidence intervals. Detailed results are provided in the left half of Table 4[3]. We reject the hypothesis of an ideology effect for all NPIs based on the RDD estimators, whether using continuous measures obtained from the CNM database, with additive or IRT-based measurements (Qtheta), the specific measures of the six dimensions from Table 2, or the three measures obtained from the MUNIC/IBGE data. The only noteworthy estimate, albeit within the margin of acceptance of the null hypothesis and against our central hypothesis, indicates that municipalities with right-wing mayors enacted more formal decrees, making social isolation compulsory more frequently than municipalities with non-right mayors (p-value = 0.056). No effects were found for monitoring and sanctioning measures.

Hence, the data shows no significant effect of the mayor's partisan ideology on measures to promote social isolation or other NPIs. It should also be noted that in most of the models, the estimated effects are positive in the direction of greater stringency in municipalities governed by mayors from parties on the political right, which runs counter to initial expectations and conventional wisdom on the topic. Appendices F, G, and H also show the null results for far-right, left, and center-wing mayors for most NPI measures.

[3] In Table 4, we present the full robust estimations. The conventional and bias-corrected results are presented in the appendix. All results remain similar.

Figure 1. The estimated effects of ideology on the adoption of NPI in Brazilian municipalities, 2020.



Behavioral Measures: Social Compliance

Figure 2 presents the results of estimating the effects of major partisan ideology on compliance with social isolation. Once more, each bar represents an estimated point for the indicated month or week on the stated date. Bars crossing the zero axis indicate no significant confidence intervals. Detailed results are provided in the right half of Table 4.

In the upper part of Figure 2, we present the results for each month from February to December 2020, the pandemic's first year, and the average social isolation compliance in each municipality with close elections. The figure demonstrates that the general effect of mayoral partisan ideology is null; the only exception is compliance rates with social isolation in March 2020 during the onset of the pandemic. Residents in municipalities with right-wing mayors were systematically less compliant with NPI in the initial phase of the pandemic. These findings are consistent with those of Ajzenman, Cavalcanti, and Da Mata (2023), who show that presidential speeches during the first two months of the pandemic had significant effects on municipalities with higher vote shares for President Bolsonaro between February and early April. However, no significant effect was found on the implementation of NPIs.

As noted in the previous section, there are no statistically significant differences in the stringency of municipal public policies adopted by mayors from right-wing parties compared to those from left- and center-wing parties. At most, we find a non-statistically significant relationship, indicating that mayors from right-wing parties adopted policies earlier than center- and left-wing mayors. Here, we find evidence suggesting that the enforcement of policies adopted by mayors at the beginning of the pandemic was less stringent in municipalities with mayors from right-wing parties. Still, the effect is small and disappears from April 2020 on.

The estimates indicate that in municipalities with right-wing mayors, compliance with social isolation was, on average, 3.0 percentage points lower than isolation in other municipalities, but only for March 2020. The Appendix G and H results also indicated a short-term effect in the first phase of the pandemic, as there is a clear positive short-term social isolation compliance for municipalities with the mayor from center-wing parties in March of about 5.6 percentage points higher and from left parties in February of about 4.6 points.

Based on this effect in March 2020, we analyzed the pandemic's first two months in more detail. We examined social isolation from the first week of February 2020, three weeks before the first case of COVID-19 was identified in Brazil, to the remaining weeks in March and April, as shown in the bottom part of Figure 2.

Once again, we found the same pattern, except for the negative and significant effect in the last week of February 2020, which disappeared in the following two weeks. The reduction in compliance with social distancing in municipalities with right-wing mayors occurred during the second half of March and the first week of April 2020. Estimated effects range from a drop of 8 percentage points in the third week of March to 6 points in the following week and 7 points in the first week of April. Nevertheless, beyond this timeframe, no significant effects were observed. It is essential to point out that the loss of significance is not associated with the increase in uncertainty of the estimated models. As the confidence intervals remain relatively stable, the loss of effect results from reducing the size of the estimated coefficient.

The second half of the first month of the pandemic in Brazil is precisely the moment in which President Jair Bolsonaro spoke out for the first time in a more incisive way against the policies of social isolation. However, any effect from this rhetoric disappears from the data by

the end of April 2020, which points to the practical impossibility of right-wing mayors mirroring Bolsonaro's political positions over the pandemic's entire course.

In Appendix H, we show a strong positive short-term effect in the increased social isolation compliance in municipalities with center-wing mayors from about 17 percentage points compared to the other municipalities in the third week of March.

Figure 2. The estimated effects of ideology on compliance with social isolation by month during 2020.

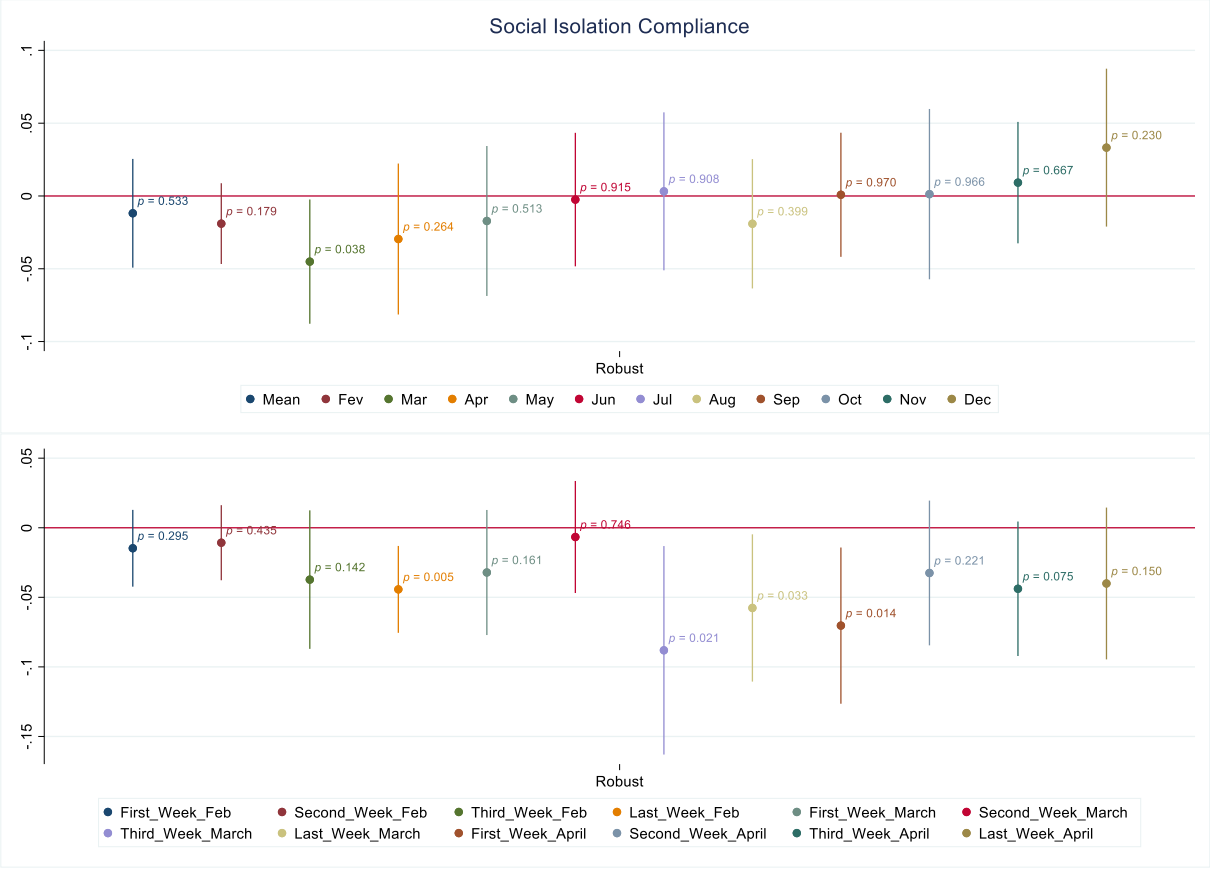


Table 4. Robust estimations of Municipal NPI and Social Isolation Compliance

RDD Results

NPI Policy Measures	***Coef.*** ***S.E.***	**p-value**	**NPI Compliance – average social isolation**	***Coef.*** ***S.E.***	**p-value**
NPI_Mun (additive)	0.491 0.689	0.476	Annual Mean	-0.012 0.019	0.533
Qtheta (IRT)	-0.010 0.792	0.896	February	-0.019 0.014	0.179
Q1 - Sanitary Barriers	0.227 0.296	0.441	March	-0.045 0.022	0.038
Q2 - Restrictive measures on popular mobility	-0.011 0.012	0.356	April	-0.030 0.026	0.264
Q3 - Social Isolation Measures	-0.076 0.243	0.754	May	-0.017 0.026	0.513
Q4 - Mandatory Face Masks	0.170 0.145	0.243	June	-0.002 0.023	0.915
Q5 - Limitations of Public Transit	-0.259 0.302	0.391	July	0.003 0.028	0.908
Q6 - Flexibility of restrictive measures	0.300 0.293	0.306	August	-0.019 0.023	0.399
Decree - NPI: Mandatory measures	0.224 0.117	0.056	September	0.001 0.022	0.970
Monitoring - NPI compliance	-0.109 0.217	0.615	October	0.001 0.030	0.966
			November	0.009 0.021	0.667
			December	0.033 0.028	0.230

Additional results

The survival analysis conducted across various policy domains, including non-essential commercial activities, education, industrial activities, transportation, public sanitation, quarantine measures, and mobility restrictions, shows no statistically significant differences in the adoption or duration of policies based on mayoral partisan ideology and NPIs to combat COVID-19.

The results related to non-essential commercial activities, industrial activities, transportation, quarantine measures, and mobility restrictions are not based on mayoral ideology. In the education sector, mayors from parties on the center/left were more likely to discontinue NPI policies. They exhibited a faster rate of policy termination than their right-wing counterparts. Also, evaluating public sanitation measures shows that center/left mayors might have implemented these measures slightly faster. Nevertheless, neither difference was statistically significant. We provide detailed results in Appendix I.

Our findings regarding COVID-19 cases or deaths are striking, as we find no effect of the mayor's political ideology. Although we found some impact on compliance with social isolation, the lower compliance rate in municipalities governed by right-wing mayors did not result in statistically significantly higher COVID-19 cases or deaths.

As the COVID-19 pandemic began in Brazil in March 2020, municipalities with less social isolation during this period likely experienced a later spike in cases. Nevertheless, throughout the year, the results show no systematic change in municipal outcomes due to mayoral ideological variation, whether analyzing policy stringency or popular behavior and health outcomes from the pandemic. We present these results in detail in Appendices F, G, and H, which compare ideological subgroups (extreme right, left, and center) with all other parties,

providing additional nuance to our findings. Across all comparisons, the estimated effects on NPI adoption and social isolation compliance are generally small and statistically insignificant. The robustness checks using alternative ideological groupings reveal some variation in statistical significance—particularly due to the small sample of extreme-right mayors—but overall, they support the main findings, with effects broadly consistent in direction and structure across different comparisons. These results suggest that while ideological labels may shape pandemic discourse at the national level, they had limited influence on formal municipal responses. That supports the interpretation that institutional constraints and compliance mechanisms played a more decisive role than partisan alignment in shaping local public health actions during the early stages of the pandemic.

Finally, the results tell a different story when we analyze local health expenditures over the entire term. In Appendix C, we show that, while all local governments met the legal requirement of allocating at least 15% of their budget to health spending, regardless of ideological alignment, right-wing mayors consistently spent a smaller share of health expenditures before the pandemic. As a robustness check, this validates our methodological approach and, most importantly, demonstrates that right-wing mayors also act programmatically.

Institutional Constraints on Mayors

The results in the previous sections counter expectations surrounding elite signals and pandemic policy responses in Brazil and worldwide. Prior research and broad assumptions suggest that Brazilian mayors would follow partisan cues from the former president, leading opposition figures, and prominent governors to implement more or less stringent NPIs based on ideology. However, while all local governments met minimum health spending requirements, our analysis shows that right-wing mayors consistently allocated a lower share

to health expenditures before the pandemic, reflecting programmatic behavior. Despite this, we find almost no partisan effects in our study, which is the first to draw on such a broad, deep, fine-grained dataset and to use rigorous identification strategies to estimate the effects of mayoral partisan ideology on NPIs.

This is a robust and relevant finding since previous ecological research has indicated that in Brazilian municipalities more in tune with the right, that is, with a higher percentage of voters for then-president Jair Bolsonaro, there was less social isolation, more confirmed cases, and deaths from Covid-19 (Lorena et al., 2022). In addition, survey research also shows that Jair Bolsonaro's supporters, who considered that he was managing the pandemic well, were also less respectful of social isolation measures (Pereira et al., 2020) and a reduced propensity to get vaccinated at the end of the first year of the pandemic (Furst et al., 2024). Comparative research also shows the behavior of medical populism (Lasco, 2020), in which populist leaders were associated with worse performance and lower effectiveness of NPIs, as in Brazil, England, and the United States (Bayerlein et al., 2021). The findings indicate that this connection, relatively canonical in the field, was not realized through the formal positioning of local politicians guided by effective ideological ties but rather by more general aspects of the electorate's behavior and political polarization.

We argue that, for Brazil, elite ideology was less influential in formal policy than other common factors, such as institutional resilience within the Health Ministry, responsiveness to local demands, or local political considerations, such as an impending mayoral election in 2020. Thus, institutions and interests are likely superior explanations for mayoral policy behavior than partisan ideology. To the extent that mayors did respond to elite signals, they did so mainly

through informal and unofficial channels and not according to the official and formal mechanisms that many would have presumed.

Overall, we find that the national health system and its municipal implementation were resilient in the face of populist challenges to weaken the response to the COVID-19 pandemic at the national level. Additionally, electoral accountability mechanisms at the municipal level suggest that mayors are beholden more to their constituents than to the president and/or to a broader partisan ideological commitment regarding municipal policy.

We cannot adjudicate directly between these potential parallel explanations. However, we can draw on previous research showing that mayors are powerful in their municipalities, and residents readily attribute many social policy outcomes, especially health policy ones, to the mayors, with subsequent electoral rewards or punishments (Mobarak et al. 2011; Wampler et al., 2019; Coelho, 2018). These relationships are important for moderating political ideology and tailoring policy toward local preferences. For example, to the extent we do find differences across mayors' political ideologies, we observe mayors on the political left keeping schools open longer than other mayors, which may reflect constituent preferences, which, again, run counter to the national-level preferences of a less stringent response on the political right.

Furthermore, the unexpected strength of oversight systems may have mitigated the effects of polarization. For example, in the state of Acre, the state government's oversight institution created a COVID-19 Panel, a dedicated web portal to monitor cases, hospital beds, vaccination, and public expenditures related to the pandemic. Similarly, the state of Alagoas's oversight institution issued resolutions outlining directives and recommendations to tackle the health crisis. In the state of Amapa, the oversight institution established new preventive measures following health guidelines. The Bahia state oversight institution created the COVID-

19 Information Panel, gathering data and governmental decisions pertinent to municipal actions during the pandemic. Likewise, the State of Ceará's oversight institution developed a dedicated monitoring panel for overseeing public sector actions against COVID-19. These measures may have influenced mayors to adopt different health and NPI policies than they would have just based on partisan ideology. A more comprehensive discussion is provided in Appendix J; additional analyses can be found in Luvizotto (2020), Medeiros (2023), Mendonça et al. (2020), and Ribeiro et al. (2020).

Our study shows the importance of testing the conventional wisdom rather than accepting it uncritically, which, in Brazil, may reflect international public opinion marshaled against President Jair Bolsonaro during the COVID-19 pandemic. Moreover, our results are an important reminder that federal governments operate with an extensive web of accountability that, in Brazil's case, features 5,569 municipal governments that appear to be more responsible to constituents that are literally and figuratively closer to these governments than to national politicians (Praça & Taylor, 2014). Mayors' electoral incentives may matter more for policy adoption and duration than national politicians' rhetoric, including from a co-partisan president. In turn, local policies operating within established institutional structures, such as Brazil's historically robust national health system, are likely more influenced by municipal needs than by national political trends, which is what advocates of federalism would hope.

Conclusion

This paper challenges the prevailing assumptions about the role of national partisan ideology in shaping political responses at the municipal level. Contrary to expectations, our findings show that mayoral partisan ideology did not significantly influence the adoption or timing of Non-Pharmaceutical Interventions (NPIs) during the COVID-19 pandemic in Brazil.

This result underscores the complexity of policymaking under crisis conditions and highlights the limitations of attributing policy decisions solely to partisan ideological motivations. Instead, institutional resilience, local demands, and electoral considerations may be more crucial in determining municipal responses to local problems.

Moreover, the nuanced relationship between mayoral partisan ideology and community compliance with NPIs suggests that informal channels of elite influence may be more significant than formal policy mechanisms for influencing residents' behavior, at least in the short term. For example, right-wing elites told followers that social isolation was not necessary and that the COVID-19 virus was not dangerous. Our data demonstrates that municipalities with right-wing mayors exhibited lower compliance with social isolation measures in the early stages of the pandemic, which suggests the public's attunement to these elite messages (Touchton et al., 2021). However, this effect was short-lived and disappeared by April 2020, when COVID-19 deaths became a reality. This finding points to the importance of understanding the informal and unofficial ways political elites can affect public behavior, particularly during periods of high uncertainty and institutional pressure. Right-wing mayors consistently spent less on health in the years leading up to the pandemic while still adhering to the minimum required legal expenditure levels, which suggests policy discretion based on their political views. Yet mayors face three key institutional constraints to their policy discretion in adopting and sustaining NPIs to combat COVID-19: (1) shared municipal authority, where legislatures and policy councils influence decision-making; (2) Brazil's federal healthcare system, which decentralizes service delivery while higher levels of government coordinate resources; and (3) oversight institutions, which monitor municipal responses and enforce public policy guidelines (Touchton et al., 2019; Mayka 2019; Rich, 2019).

In conclusion, we make a significant contribution to the broader debate on the interplay between political ideology and policymaking. We highlight the resilience of local institutions and the critical role of electoral accountability in shaping policy outcomes, even in highly polarized political environments. Our results also challenge some conventional wisdom about the influence of partisan politics on pandemic responses and underscore the need for a more nuanced and context-specific understanding of how political dynamics impact public health policies. These insights are vital for designing more effective and responsive governance structures in future crises. Better institutions may be the right strategy to address politicized policies.

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Beyond Partisan Rhetoric: Institutional Constraints and Local COVID-19 Policies in Brazil

Summary

Introduction

In this appendix, we provide new estimates to demonstrate the robustness of our findings. First, in section A, we present the Balance Test for our research design. We selected several characteristics of municipalities commonly used in the literature on COVID-19 determinants and outcomes to describe these municipalities. We then tested for any correlation with the municipalities chosen for the Regression Discontinuity Analysis.

In section B, we present all the results of Table 4 of the manuscript, where we presented the analyses of the effects of ideology on NPIs and social isolation compliance, and re-estimated the discontinuity effect using the conventional and bias-corrected approaches.

Section C shows the predictive validity analysis by estimating the effect of the ideology scale on health spending.

In section B, we expand the analysis of the COVID-19 database by incorporating the number of confirmed cases and deaths at the municipal level as a dependent variable, as detailed in the manuscript. Additionally, we conducted a weekly analysis of the data rather than the primary monthly strategy. Our focus was on the initial weeks of the pandemic, a period characterized by heightened uncertainty in decision-making. In section C, we analyze the results of the RDD with a stricter cut-off of only 2%.

Sections D to F explore possible ideological variations. In section E, we narrow the analysis to compare mayors affiliated with radical right parties (PRTB, PSC, and PL) to those from center and left parties. A significant limitation of this analysis is its small sample size; only 24 candidates who came first or second in the 2016 municipal elections belonged to these parties, which formed the core of Bolsonarism in Brazil—eight of whom were victorious.

In section D, we compare the results of left-wing parties with those of the center and right parties and center parties with those of the left and right parties. The findings maintain the same structure as presented in the manuscript, supporting our research conclusions. In section F, we compare the results of more centrist parties with those of others. Again, the findings are consistent with those in the manuscript and support our research conclusions.

Section H presents the results of a survival analysis conducted to assess the impact of mayoral ideology on the likelihood of adopting and the duration of municipal NPIs (non-pharmaceutical interventions) to combat COVID-19. We performed this analysis using data collected through manual coding of NPI policies and responses from a survey sent to municipal leaders.

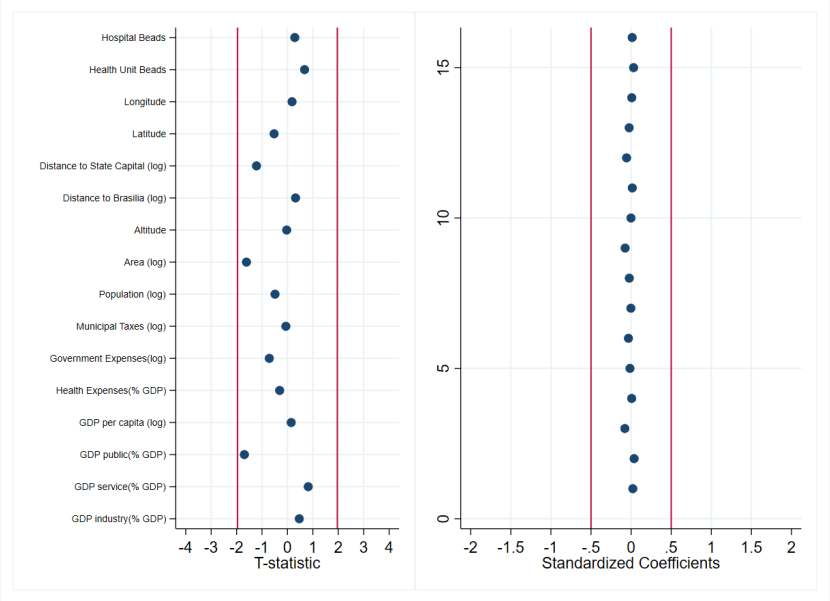
Finally, section I provides a detailed study of oversight institutions' measures to monitor local government policies regarding COVID-19. We provide specific details and sources for each state. Only three audit institutions took no measures out of the 26 states and the federal district. These initiatives underscore the crucial role of oversight institutions in guiding public policy and ensuring effective resource utilization during the pandemic.

A. Balance test

Figure A1 presents the overall balance of our data for many important descriptive municipal variables. Our balance tests indicate that our close election design has leverage to produce reliable inferences of the effects of mayoral ideology on COVID-19 policies and health outcomes. We use data collected by IBGE, DATASUS, and IPEA that measures broad characteristics of Brazilian municipalities. There is balance on all indicators such as the local infrastructure of health services, measured by the number of available hospital bed and local basic health care beds. Apart from that, the data is balanced on geographical measures such as the geographic area, longitude, latitude, and altitude of Brazilian municipalities. Also, there is no difference in the median distance of the municipality from state capitals and from the Brazilian capital, Brasília, as the highway system was an important vector of the spread of COVID-19 in Brazil[1]. Also, there is balance on the size of the population, as well as for fiscal measures on taxation and expenditures in each municipality.

[1] NICOLELIS, Miguel AL et al. The impact of super-spreader cities, highways, and intensive care availability in the early stages of the COVID-19 epidemic in Brazil. Scientific reports, v. 11, n. 1, p. 13001, 2021.

Figure A1. Balance tests for descriptive municipal variables



Note: Figure A1 presents the results of bivariate linear regressions between the mayor's political ideology and municipal characteristics. In the left part of the figure, we present the results of the models in terms of the t-statistic of the Wald test and in the right part we present the standardized coefficients.

B. Full RDD estimations from Table 4 of the Manuscript

TableB1. Municipal NPI –RDD Results

	Convencional	Bias-corrected *Coef.* *S.E.* *p-value*	Robust
NPI_Mun (additive)	0.380	0.491	0.491
	0.571	0.571	0.689
	0.506	0.390	0.476
Qtheta (IRT)	-0.021	-0.010	-0.010
	0.676	0.676	0.792
	0.756	0.878	0.896
Q1	0.214	0.227	0.227
Sanitary Barriers	0.244	0.244	0.296
	0.381	0.351	0.441
Q2	-0.009	-0.011	-0.011
Restrictive measures	0.009	0.009	0.012
on popular mobility	0.291	0.193	0.356
Q3	-0.103	-0.076	-0.076
Social Isolation	0.203	0.203	0.243
Measures	0.610	0.707	0.754
Q4	0.133	0.170	0.170
Mandatory	0.128	0.128	0.145
Face masks	0.301	0.186	0.243
Q5	-0.241	-0.259	-0.259
Limitation of	0.248	0.248	0.302
Public transit	0.332	0.296	0.391
Q6	0.268	0.300	0.300
Flexibility of restrictive	0.243	0.243	0.293
Measures	0.270	0.217	0.306
Decree - NPI	*0.191*	**0.224**	*0.224*
Mandatory NPI measures	*0.101*	**0.101**	*0.117*
	0.059+	**0.027***	*0.056+*
Monitoring - NPI	-0.055	-0.109	-0.109
Monitoring NPI compliance	0.190	0.190	0.217
	0.772	0.564	0.615
Sanctions - NPI	0.050	0.074	0.074
Sanction NPI non-compliance	0.190	0.190	0.227
	0.792	0.695	0.742

Table B2. Social Isolation Compliance – RDD Results

	Conventional	Bias-corrected *Coef.* *S.E.* *p-value*	Robust
Annual Mean	-0.012	-0.012	-0.012
	0.016	0.016	0.019
	0.441	0.452	0.533
February	-0.017	-0.019	-0.019
	0.012	0.012	0.014
	0.147	0.114	0.179
March	**-0.043**	**-0.045**	**-0.045**
	0.018	**0.018**	**0.022**
	0.019*	**0.014***	**0.038***
April	-0.030	-0.030	-0.030
	0.022	0.022	0.026
	0.181	0.182	0.264
May	-0.017	-0.017	-0.017
	0.022	0.022	0.026
	0.435	0.431	0.513
June	-0.004	-0.002	-0.002
	0.019	0.019	0.023
	0.847	0.898	0.915
July	0.002	0.003	0.003
	0.023	0.023	0.028
	0.939	0.890	0.908
August	-0.016	-0.019	-0.019
	0.019	0.019	0.023
	0.386	0.311	0.399
September	0.000	0.001	0.001
	0.018	0.018	0.022
	0.988	0.964	0.970
October	0.004	0.001	0.001
	0.025	0.025	0.030
	0.886	0.959	0.966
November	0.006	0.009	0.009
	0.018	0.018	0.021
	0.749	0.616	0.667
December	0.025	0.033	0.033
	0.024	0.024	0.028
	0.292	0.169	0.230

C. Sensitive analysis of the ideology effects on health care expenditure

In this section, we propose a predictive validity test for the ideological measure used in the study. Predictive validity refers to the ability of an instrument or test to predict future outcomes or behaviors. It is a form of criterion validity, where the test is evaluated based on its correlation with a specific measure that it is expected to predict. Thus, predictive validity is a measure of how effectively a test or instrument can predict future outcomes and is suitable for validating the use of instruments in practical contexts. For that we use the effects of ideology of the mayor on the health share of expenditures.

The mean health share across all ideological groups (center, left, and right) hovered around 24.5%, showing little deviation in both 2017 and 2018. However, in 2019, a slight decrease was observed for all groups, with the center group showing the lowest mean at 24.14%. Besides, standard deviations remained low across all groups and years, indicating limited variability within the data, suggesting stable budgeting trends.

These figures show that all local governments meet the minimum legal requirements of 15% every year, no matter what the ideological spectrum of the mayor. Audit institutions yearly audit health expenditures to check compliance with these norms. Mayors that do not comply with it cannot run elections next term. Our analysis explores the health share expenditure across different ideological groups (center, left, and right) over several years, focusing on the influence of political ideology on budget allocations before the pandemic. As summarized in Table C1, the average health share is consistent across groups and years, with minimal variation.

Table C1 - Summary of Health Share by Ideological Group and Year

Year	Ideological Group	Observations	Mean Health Share	Std. Dev.	Min Health Share	Max Health Share
2017	Center	209	0.2461	0.0315	0.1606	0.3924
2017	Left	159	0.2453	0.0295	0.1806	0.3587
2017	Right	226	0.2458	0.0309	0.1541	0.3417
2018	Center	209	0.2461	0.0315	0.1606	0.3924
2018	Left	159	0.2453	0.0295	0.1806	0.3587
2018	Right	226	0.2458	0.0309	0.1541	0.3417
2019	Center	210	0.2414	0.0332	0.1278	0.3481
2019	Left	158	0.2429	0.0304	0.161	0.3958
2019	Right	228	0.2418	0.0319	0.1293	0.3415

However, despite compliance with the rule, we also run Regression Discontinuity Design (RDD) analysis on health share expenditure by right-wing mayors before the pandemic. The analysis uses RDD estimates with optimal bandwidth, with results reported using conventional, bias-corrected, and robust methods (Calonico et al., 2017). The results are in Table C2.

In summary, the results suggest that right-wing mayors consistently reduced the share of health expenditures before the pandemic, with the largest effects seen in 2017 and 2018. The statistical significance of these reductions diminishes slightly in 2019 and 2020, though robust estimations indicate that the effect remains noteworthy.

Table C2 - RDD Results for Health Share Expenditure by Year

Year	Method	Coefficient	Standard Error	z-value	p-value	95% Confidence Interval
2017	Conventional	-0.022	0.008	-2.76	**0.006**	[-0.0372, -0.0063]
2017	Bias-corrected	-0.025	0.008	-3.15	**0.002**	[-0.0403, -0.0094]
2017	Robust	-0.025	0.009	-2.72	**0.007**	[-0.0427, -0.0069]
2018	Conventional	-0.022	0.008	-2.76	**0.006**	[-0.0372, -0.0063]
2018	Bias-corrected	-0.025	0.008	-3.15	**0.002**	[-0.0403, -0.0094]
2018	Robust	-0.025	0.009	-2.72	**0.007**	[-0.0427, -0.0069]
2019	Conventional	-0.018	0.009	-1.88	**0.061**	[-0.0364, 0.0008]
2019	Bias-corrected	-0.022	0.009	-2.27	**0.023**	[-0.0401, -0.0029]
2019	Robust	-0.022	0.010	-2.06	**0.040**	[-0.0421, -0.0010]
2020	Conventional	-0.018	0.010	-1.72	0.085	[-0.0379, 0.0024]
2020	Bias-corrected	-0.022	0.010	-2.1	**0.036**	[-0.0418, -0.0014]
2020	Robust	-0.022	0.0116	-1.87	0.062	[-0.0443, 0.0011]

D. Confirmed Cases and Deaths by COVID-19.

Data on COVID-19 health outcomes were collected by BRASIL-IO (2020). Brazilian state authorities published detailed daily data on cases of infections and deaths from COVID-19. Brasil-IO is a non-government organization which collects data from the states and publishes data at local and national levels. It compiled daily epidemiological bulletins from the 27 State Health Departments and provided a database with the historical series of confirmed cases and deaths by municipality. Using data from Brazil's states is of fundamental importance since the federal government took measures to jeopardize the transparency of the Brazilian Ministry of Health and obstruct data access on several occasions. At Table D1, we present the descriptive statistics of those variables for the monthly dataset.

Table D1. Summary measure of the severity of municipal policies adopted by Brazilian municipalities from the CNM Dataset

Variable	Obs	Mean	Std. Dev.	Min	Max
Average New Cases (monthly)	389	1495.32	4286.20	12	44578
Average New Deaths (monthly)	389	34.84	116.36	0	1019

We explore the effects of mayoral ideology and the relative efficacy of municipalities governed by right-wing mayors in controlling the number of cases and deaths from COVID-19 in Figure D1, D2 and D3. To do so, we repeated the same analysis, observing the data throughout

2020 at the monthly dataset as well as with a on the first two months of the pandemic in the weekly dataset.

We present the full results in Table D2 for the monthly analysis. The results are striking: there is no effect of the mayor's political ideology on COVID-19 cases or deaths in both analyses. While we observed some impact on compliance with social isolation measures in the manuscript's examination of short-term effects, the lower compliance rates in municipalities governed by right-wing mayors did not lead to statistically significantly higher COVID-19 cases or deaths. As the COVID-19 pandemic was still beginning in Brazil in March 2020, municipalities with less social isolation in this period were likely hit by the virus later. Nevertheless, throughout the year, the results demonstrate no systematic change in municipal health performance due to mayoral ideological variation, whether analyzing the data on policy stringency or on popular behavior and health outcomes from the pandemic.

Figure D1 illustrates the estimated effects of ideology on the monthly number of confirmed COVID-19 cases and deaths during the first year of the pandemic in 2020. The results reveal no significant impact of ideology on any of the variables. Figure D2 shows the estimated effects of ideology on the weekly number of confirmed COVID-19 cases during the first two months of the pandemic in 2020, with no significant impact observed. Figure D3 depicts the estimated effects of ideology on the monthly number of COVID-19 deaths throughout 2020, similarly indicating no significant influence of ideology on the number of COVID-19 deaths.

Figure D1. The estimated effects of ideology on the number of confirmed COVID-19 cases and deaths by month during 2020.

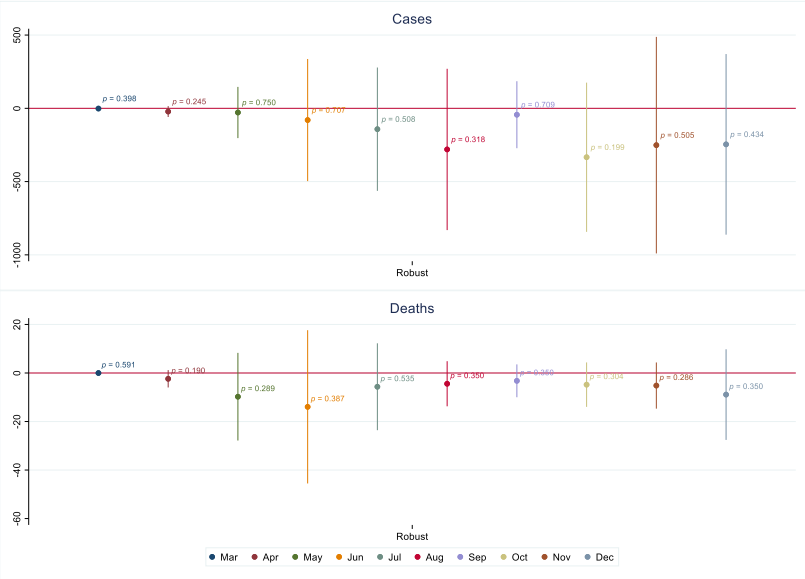


Figure D2. The estimated effects of ideology on the number of confirmed COVID-19 cases by week during the first two months of the pandemic in 2020.

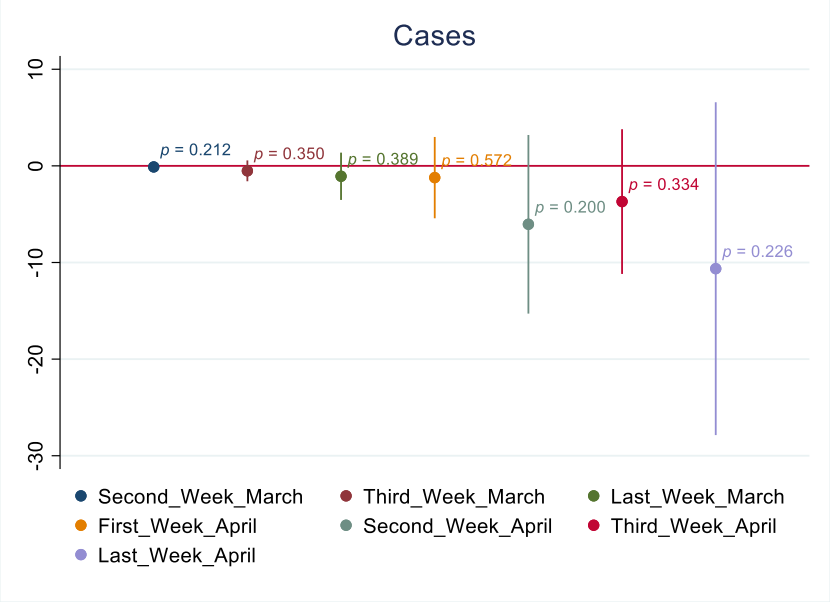
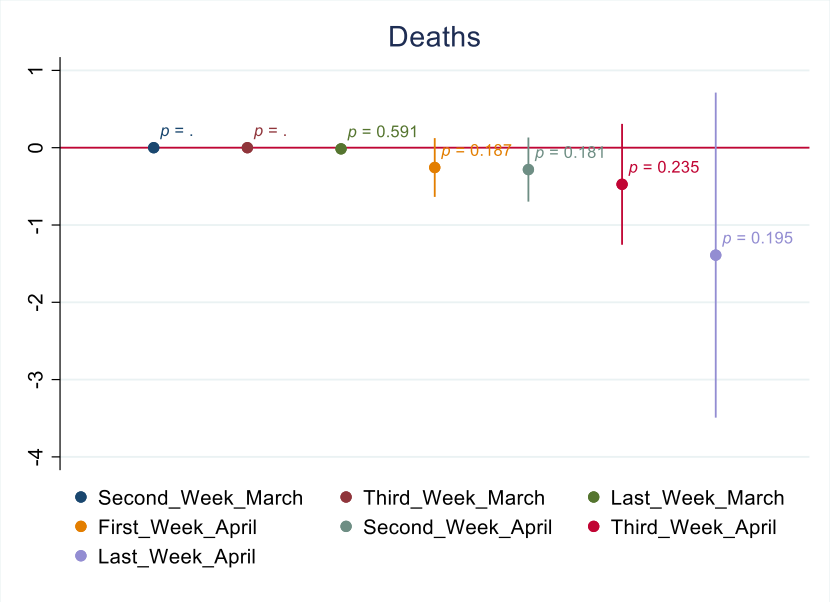


Table D2. Confirmed COVID-19 Cases and Deaths – RDD Results

	Conven-tional	Bias-corrected	Robust	Conven-tional	Bias-corrected	Robust
	Coef. (Confirmed Cases)			*Coef. (Deaths)*		
	S.E.			*S.E.*		
	p-value			*p-value*		
March	-1.068	-1.603	-1.603	-0.004	-0.015	-0.015
	1.734	1.734	1.895	0.013	0.013	0.028
	0.538	0.355	0.398	0.755	0.264	0.591
April	-16.850	-21.970	-21.970	-1.836	-2.391	-2.391
	16.575	16.575	18.898	1.421	1.421	1.824
	0.309	0.185	0.245	0.196	0.092	0.190
May	-23.157	-28.465	-28.465	-7.474	-9.770	-9.770
	78.987	78.987	89.175	7.835	7.835	9.217
	0.769	0.719	0.750	0.340	0.212	0.289
June	-90.563	-80.042	-80.042	-11.425	-13.953	-13.953
	194.030	194.030	212.660	14.228	14.228	16.115
	0.641	0.680	0.707	0.422	0.327	0.387
July	-131.770	-142.310	-142.310	-5.285	-5.667	-5.667
	195.710	195.710	214.760	7.908	7.908	9.137
	0.501	0.467	0.508	0.504	0.474	0.535
August	-237.740	-280.550	-280.550	-3.200	-4.432	-4.432
	248.750	248.750	280.900	4.320	4.320	4.742
	0.339	0.259	0.318	0.459	0.305	0.350
September	-51.456	-43.573	-43.573	-2.531	-3.229	-3.229
	103.470	103.470	116.620	3.066	3.066	3.453
	0.619	0.674	0.709	0.409	0.292	0.350
October	-275.800	-333.850	-333.850	-4.105	-4.805	-4.805
	225.070	225.070	259.890	3.984	3.984	4.674
	0.220	0.138	0.199	0.303	0.228	0.304
November	-262.610	-251.320	-251.320	-4.739	-5.182	-5.182
	338.050	338.050	376.990	4.371	4.371	4.855
	0.437	0.457	0.505	0.278	0.236	0.286
December	-256.260	-245.890	-245.890	-7.678	-8.907	-8.907
	300.540	300.540	314.410	8.184	8.184	9.529
	0.394	0.413	0.434	0.348	0.276	0.350

Figure D3. The estimated effects of ideology on the number of COVID-19 deaths by week during the first two months of the pandemic in 2020.



E. Results using 2% Cut-off

In this section, we present the results using a 2% Cut-off for Regression Discontinuity Design (RDD) as a robustness check.

Figure E1 illustrates the estimated effects of ideology on the adoption of Non-Pharmaceutical Interventions (NPI) in Brazilian municipalities in 2020, using a 2% RDD margin. The results indicate no significant effect. Full results presented in Table E1. Figure E2 shows the estimated effects of ideology on compliance with social isolation measures, evaluated monthly throughout 2020 with a 2% RDD margin. Once again, there is no significant effect observed, despite the short term effect on compliance in March that remains robust with a smaller dataset.

Figure E3 displays the estimated effects of ideology on the number of confirmed COVID-19 cases per month during 2020, using a 2% RDD margin. Like the previous figures, the results show no significant effect. Figure E4 presents the estimated effects of ideology on the number of COVID-19 deaths per month in 2020, using a 2% RDD margin. Consistent with the other findings, there is no significant effect detected.

Figure E1. The estimated effects of ideology on the adoption of NPI in Brazilian municipalities, 2020 (2% RDD margins)

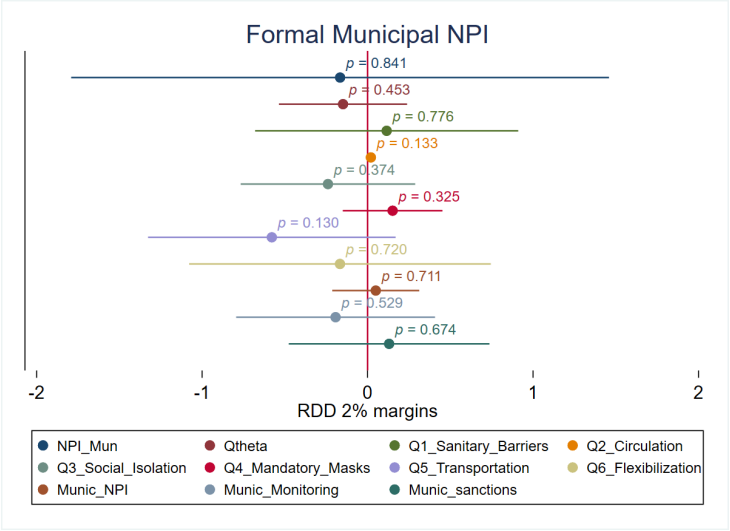


Figure E2. The estimated effects of ideology on the compliance with social isolation by month during 2020. (2% RDD margins)

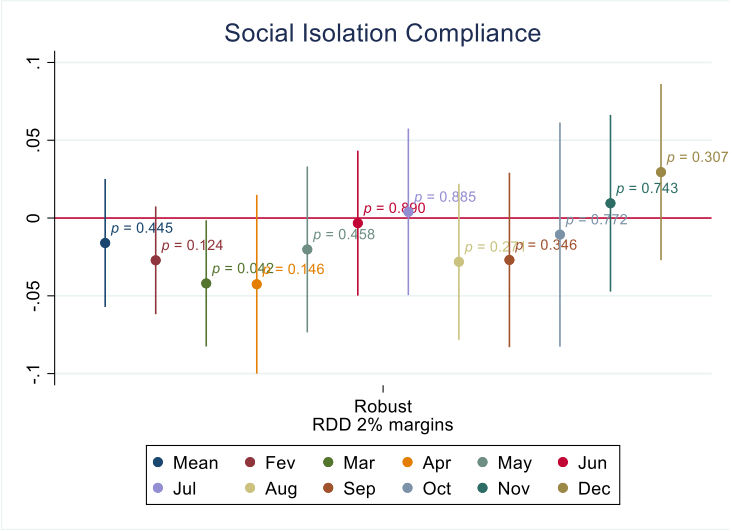


Figure E3. The estimated effects of ideology on the number of confirmed COVID-19 cases by month during 2020. (2% RDD margins)

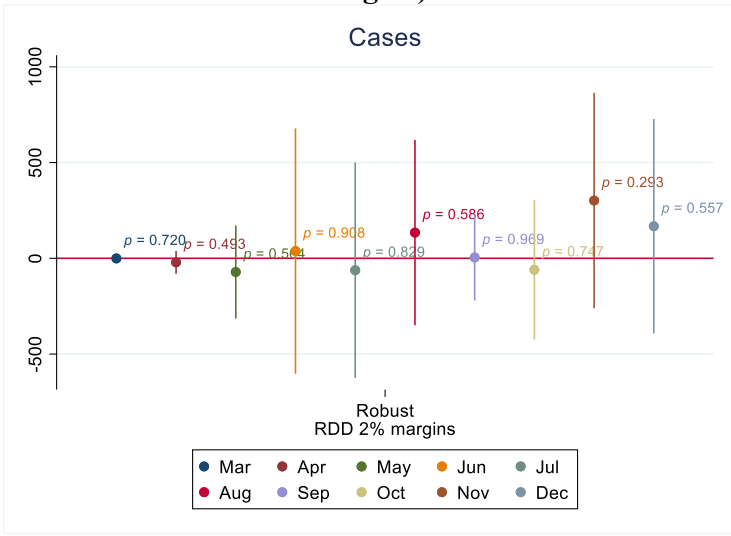


Figure E4. The estimated effects of ideology on the number of COVID-19 deaths by month during 2020. (2% RDD margins)

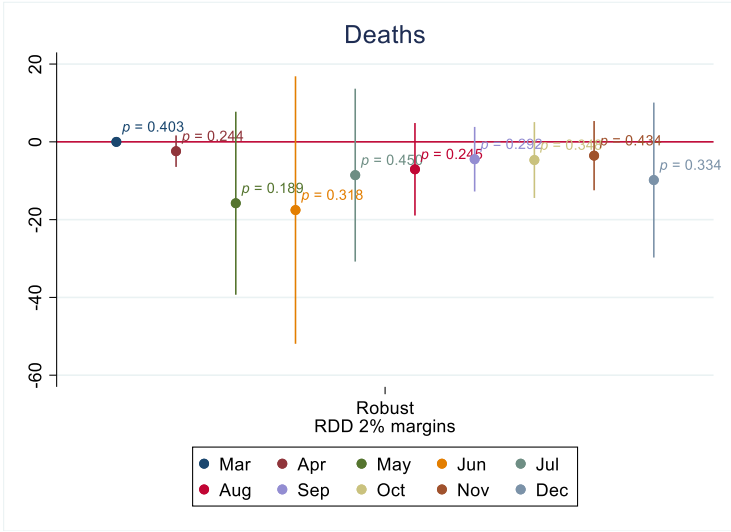


Table E1. Municipal NPI –RDD Results (2% cut-off)

	Conven-tional	Bias-corrected *Coef.* *S.E.* *p-value*	Robust
NPI_Mun (additive)	-0.051	-0.166	-0.166
	0.689	0.689	0.829
	0.941	0.810	0.841
Qtheta (IRT)	-0.080	-0.095	-0.095
	0.098	0.098	0.119
	0.415	0.333	0.422
Q1	0.177	0.115	0.115
Sanitary Barriers	0.331	0.331	0.406
	0.594	0.727	0.776
Q2	0.020	0.020	0.020
Restrictive measures	0.013	0.013	0.013
on people circulation	0.133	0.133	0.133
Q3	-0.172	-0.239	-0.239
Social Isolation	0.226	0.226	0.269
Measures	0.447	0.290	0.374
Q4	0.129	0.151	0.151
Mandatory	0.132	0.132	0.154
Face masks	0.328	0.252	0.325
Q5	-0.467	-0.579	-0.579
Reduction of the	0.324	0.324	0.382
Public transportation	0.149	0.074	0.130
Q6	-0.217	-0.167	-0.167
Flexibilization of restrictive	0.379	0.379	0.465
Measures	0.568	0.660	0.720
Decree - NPI	0.094	0.050	0.050
Mandatory NPI meadures	0.114	0.114	0.134
	0.409	0.663	0.711
Monitoring - NPI	-0.156	-0.193	-0.193
Monitoring NPI compliance	0.254	0.254	0.307
	0.538	0.446	0.529
Sanctions - NPI	0.092	0.130	0.130
Sanction NPI non-compliance	0.254	0.254	0.309
	0.717	0.608	0.674

F. Robustness Checks: Extreme Right vs Other parties

In this section, we reduce the analysis to a comparison between mayors affiliated to radical right parties (PRTB, PSC and PL) and center and left parties. An important caveat with this analysis is its small sample size, as only 24 candidates who came first or second in the 2016 municipal elections belonged to these parties that formed the hard core of bolsonarism in Brazil – eight of them were victorious.

Figure F1. The estimated effects of ideology on the adoption of NPI in Brazilian municipalities, Extreme Right x Others

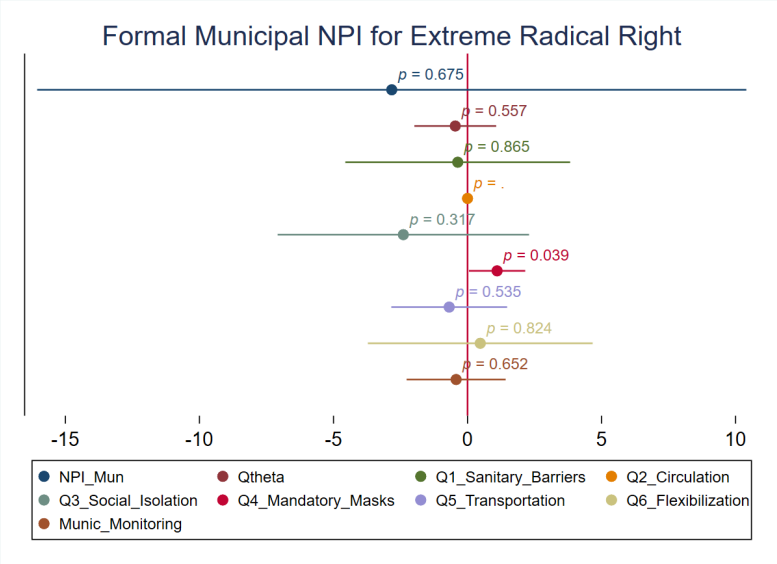


Figure F2. The estimated effects of ideology on social isolation compliance in Brazilian municipalities, Extreme Right x Others (months and weeks)

While the comparison between extreme right mayors and others reveals a statistically significant negative effect only for the adoption of mandatory mask policies (Figure F1), most coefficients are small and statistically indistinguishable from zero. This is largely attributable to the small sample size of extreme right mayors, which limits statistical power and leads to wide confidence intervals. Nonetheless, the direction of effects—consistently negative—aligns with theoretical expectations of less stringent policy responses. Regarding social isolation compliance (Figure F2), small and significant reductions are observed only in February and late March, with no sustained effects across the remaining months. Taken together, these results suggest that although extreme right affiliation may have influenced public health behavior in specific early moments, it did not produce systematic or large differences in municipal-level outcomes throughout the pandemic.

G. Robustness Checks: Left vs other parties

In this section, we compare the results of the left-wing parties with those of the center and right, and the center parties with those of the left and right. The findings present the same structure found in the manuscript and corroborate the research findings.

Figure G1. The estimated effects of ideology on the adoption of NPI in Brazilian municipalities, Left Wing x Others

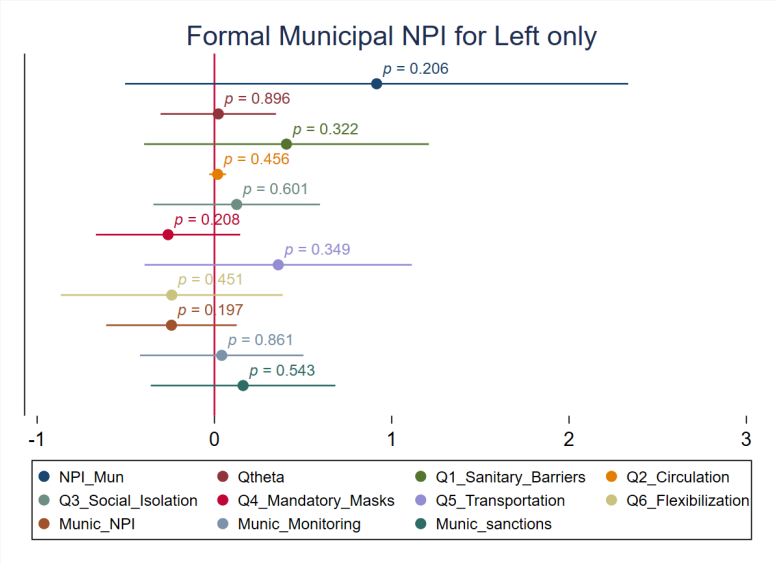
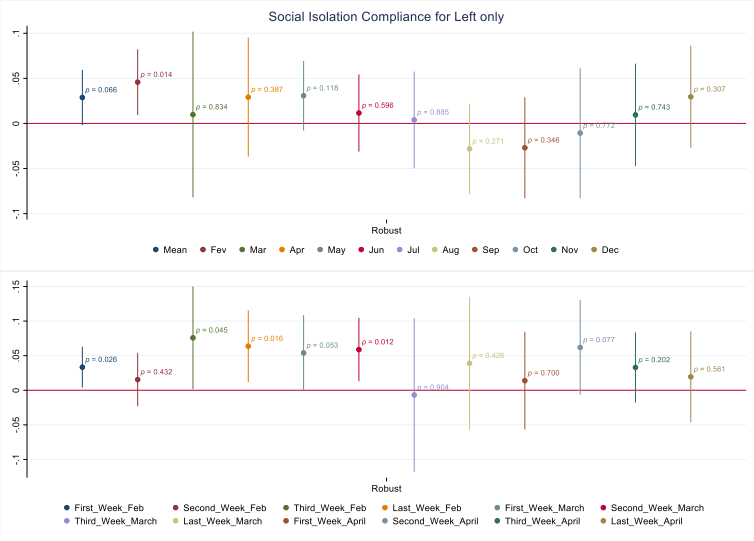


Figure G2. The estimated effects of ideology on social isolation compliance in Brazilian municipalities, Left Wing x Others (months and weeks)



The estimates for left-wing mayors relative to others (Figures G1 and G2) are consistently close to zero and statistically insignificant, with no clear pattern of higher or lower adoption of NPIs or social isolation compliance. These null results support the main findings in the manuscript by indicating that leftist affiliation, while possibly associated with pro-science rhetoric, did not translate into significantly more stringent municipal measures when compared to center and right-wing administrations. This suggests a broader institutional convergence across political orientations in the municipal response to the pandemic.

H. Robustness Checks: Center vs other parties

In this section, we compared the results of the more center-ring parties with others. Again, the results present the same structure found in the manuscript and corroborate the research findings.

Figure H1. The estimated effects of ideology on the adoption of NPI in Brazilian municipalities, Center Wing x Others

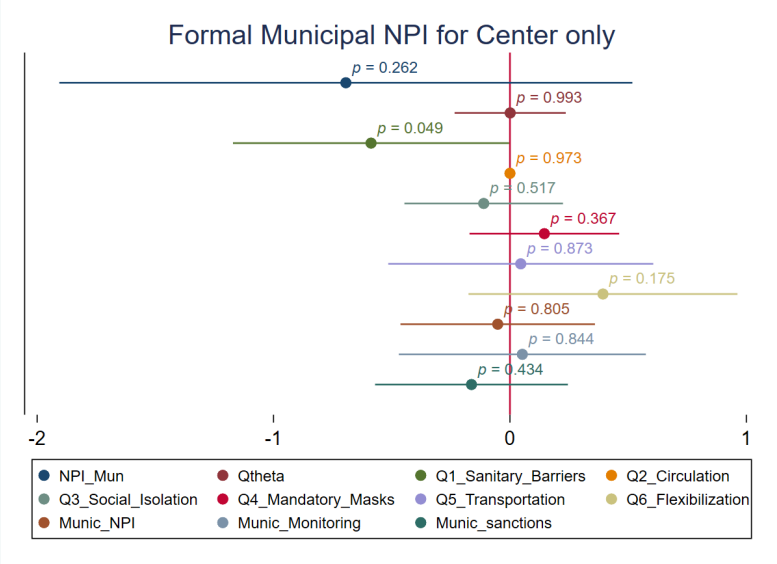
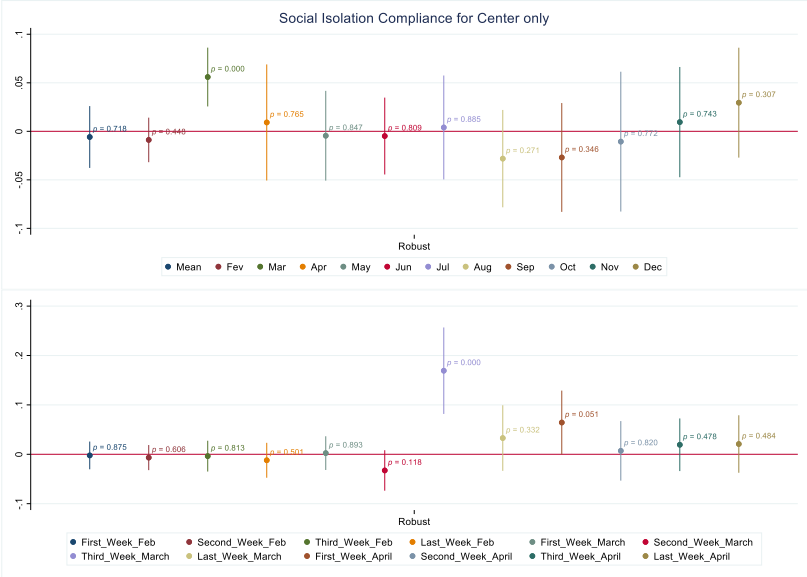


Figure H2. The estimated effects of ideology on social isolation compliance in Brazilian municipalities, Center Wing x Others (months and weeks)



For centrist mayors (Figures H1 and H2), results similarly show limited ideological influence. Only one estimate—the adoption of sanitary barriers—reaches conventional levels of statistical significance (p = 0.049), and even that effect is modest. Across other NPIs and throughout the timeline of social isolation compliance, the estimated effects are close to zero. These findings reinforce the argument that center-aligned municipal administrations, like those on the left, operated within a constrained institutional environment that limited policy differentiation based on partisan alignment. Although occasional significant estimates appear, they are neither large nor consistently patterned.

I. Survival Analysis on NPI adoption and duration

This section presents the results of a survival analysis conducted to assess the impact of mayoral ideology on the likelihood of adopting and the duration of municipal NPIs to combat COVID-19. We performed this analysis using data collected through our own manual coding of NPI policies and responses from a survey sent to municipal leaders. The analysis includes information from 192 municipalities, based on both survey responses and our manual coding, following the dimensions listed in the municipal questionnaire. Details of these dimensions are provided in Box 1, which outlines the NPI measures from our project data collection. For each dimension, we recorded the timing of NPI adoption in biweekly periods during the first four months of the pandemic (February to May).

Data collection involved sending a questionnaire to municipal authorities. In cases where no response was received, a team of researchers contacted public managers and organized civil society representatives in the municipalities to obtain answers via telephone interviews or online contact. We successfully gathered data from 192 of the 471 selected municipalities (41%).

Box I1. Dimensions of NPI measures from the project data collection

a. Have events and activities of cultural, sports, or religious establishments (museums, theaters, cinemas, fitness centers, temples, etc.) been suspended?
b. Have the activities of bars, restaurants, and similar establishments (snack bars, cafes, etc.) been suspended?
c. Have non-essential commercial and service establishments (clothing, toy, appliance, etc.) suspended their activities?
d. Are classes at educational establishments (schools and universities) suspended?
e. Have industrial establishments, except essential ones, suspended their activities?
f. Have land, river, or sea passenger transportation restrictions been imposed?
g. Have procedures been adopted by the municipal administration for the disinfection of public places?
h. Have policies been adopted for the Isolation of Patients contaminated with COVID-19?
i. Have policies been adopted for contact quarantine of patients contaminated with COVID-19?

We present the results of estimation in Figure I1 (I to VIII). Like with the RDD approach above, these analyses encompassed diverse policy domains, such as closure of non-essential commercial activities, education, industrial activities, transportation, public disinfection, quarantine measures (infected, contacts, and repeal), and mobility restrictions. At Table G1 we present the results of the log-rank tests. All of them indicated no significant results.

- Closure of Non-Essential Commercial Activities: The survival analysis revealed no statistically significant difference in the adoption or duration of municipal closures of non-essential commercial activities by mayoral ideology.
- Education: The analysis demonstrated a noteworthy difference in policy outcomes based on mayoral ideology in the education sector. Specifically, policies endorsed by mayors on the center/left were significantly more likely to be discontinued and exhibited a faster rate of policy termination than those advocated by the center-right.
- Industrial Activities: The survival analysis of the industrial sector indicated that mayoral ideology had no statistically significant influence on the adoption or duration of the cessation of industrial activities. Both right and center-left policies exhibited similar survival times and termination probabilities within this sector.
- Transportation: Like with the industrial sector, the transportation sector showed no statistically significant differences in NPI adoption or duration based on mayoral ideology. Both center-right and center-left policies demonstrated comparable survival times and closure probabilities.
- Public Sanitation: The analysis suggested that municipalities with mayors from center/left parties may have been somewhat faster in implementing public sanitation measures to disinfect air and surfaces than municipalities with center-right mayors. However, we found that this difference is not statistically significant.
- Quarantine Measures (isolation time for infected people, their contacts, and the elimination of quarantine requirements). Across the various quarantine measures – isolation of the infected, isolation of those who contacted infected people, and repeal – the survival analysis demonstrated no substantial difference in NPI adoption or duration

based on mayoral ideology. Policies related to quarantining infected individuals, their contacts, and the eventual elimination of quarantine measures exhibited similar survival times and closure probabilities irrespective of political stance.

- Mobility: We found no statistically significant differences in population mobility for municipalities with mayors on the center-right relative to those with mayors on the center-left.

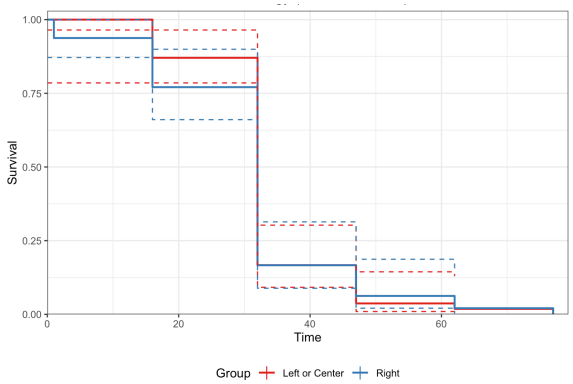
The survival analysis conducted on various policy domains reveals insights into the relationship between mayoral political ideology and NPI to combat COVID-19. While non-essential commercial and industrial sectors showed no appreciable differences across mayoral ideologies, the education sector highlighted the propensity of center/left mayors to cancel scholastic activities faster and with a higher likelihood. However, transportation, quarantine measures, and mobility policies appeared to be relatively immune to the influence of mayoral ideology, displaying similar outcomes regardless of center-right or center-left positions These findings illuminate the nuanced interplay between political considerations and policy dynamics within different sectors.

Table I1. NPI Policy Log Rank tests.

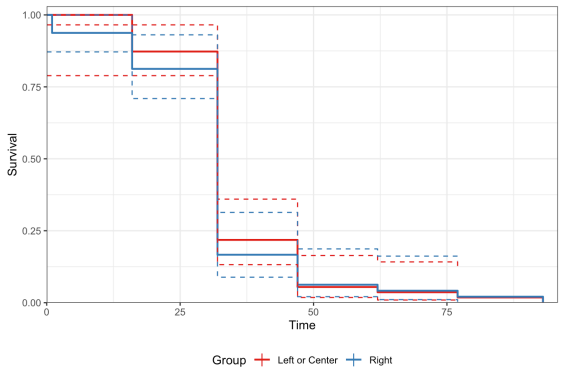
NPI Policy	Chisq	p-value
Restaurant Closure	0.4	0.50
Non-Essential Commercial Activities Closure	0.5	0.50
Education Closure	3.0	0.08
Industrial Closure	1.8	0.20
Passenger Transport Closure	1.2	0.30
Public Sanitation Survival Rate	1.7	0.20
Quarantine Infected Survival Rate	0.1	0.70
Quarantine Contacts Survival Rate	0.0	1.00

FIGURE I1. NPI Policy Time Survival Rates

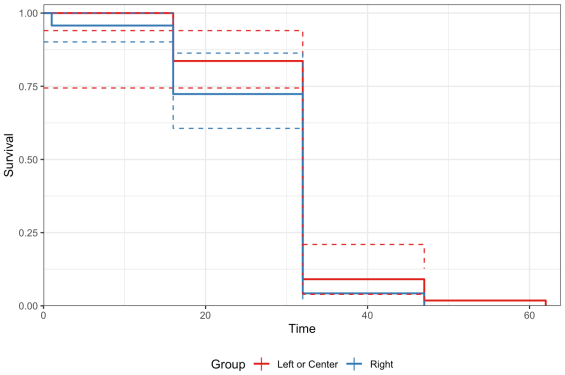
I. Restaurant Closure Time Survival Rate.



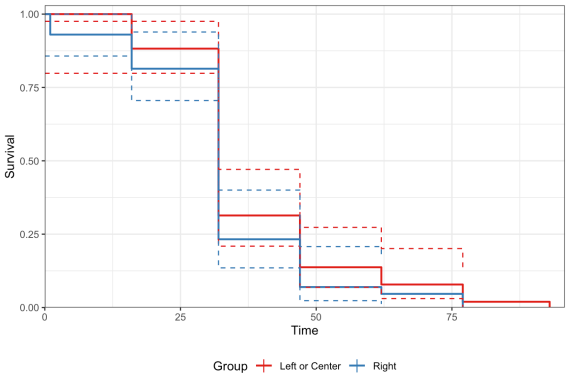
II. Non-Essential Commercial Activities Closure



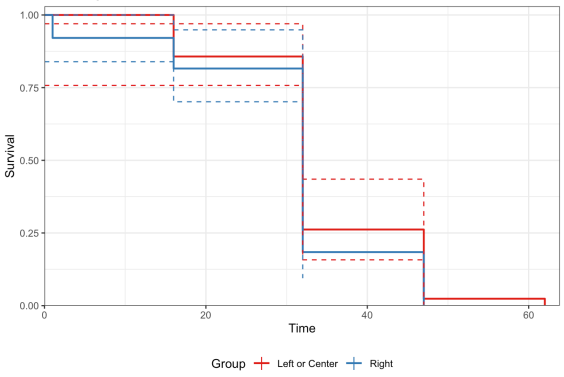
III. Education Closure Time Survival Rate



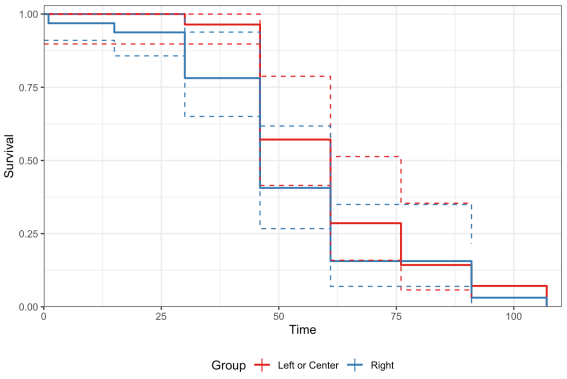
IV Industrial Closure



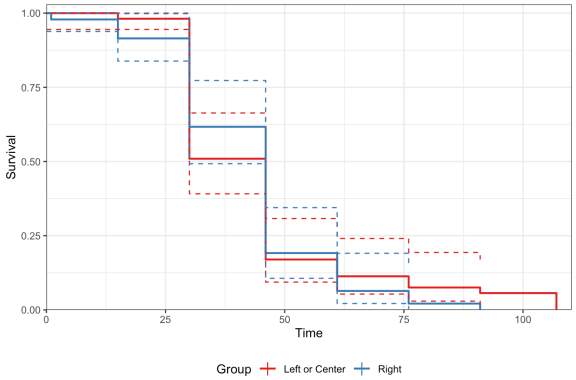
V. Passenger Transport Closure



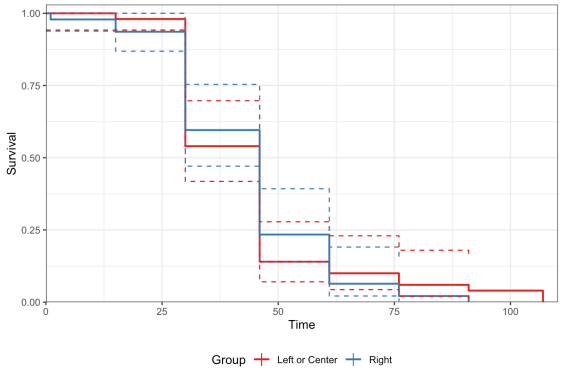
VI. Public Sanitation



VII. Quarantine Infected



VIII. Quarantine Contacts



J. Oversight Institution Measures

Oversight institutions across different states in Brazil have implemented various measures to address the challenges posed by the COVID-19 pandemic. For instance, the Court of Auditors of the State of Acre developed the COVID-19 Panel, a dedicated portal that monitors cases, hospital beds, vaccination, and public expenditures related to the pandemic. Similarly, the T Court of Auditors of the State of Alagoas issued resolutions outlining directives and recommendations to tackle the health crisis, including the requirement for contingency plans aligned with national and state pandemic response strategies. In Amapá, the Court of Auditors established new preventive measures following health guidelines to safeguard staff and visitors during this challenging period. The Court of Auditors of the Municipal Governments of Estado da Bahia produced the COVID-19 Information Panel, which gathers data and governmental decisions pertinent to municipal actions during the pandemic, aiding municipal managers in crafting effective responses. Likewise, the Court of Auditors of the State of Ceará developed a dedicated monitoring panel to oversee public sector actions against COVID-19, enhancing transparency and accountability.

In the literature, some papers have documented the actions taken by the oversight system. Luvizotto (2020) reports that the Federal Court of Accounts (TCU), the State Court of Accounts of São Paulo (TCE-SP), and the Municipal Court of Accounts of São Paulo (TCMSP) adopted both internal and external measures to ensure the exercise of their functions. In addition to suspending deadlines and implementing virtual sessions, these courts developed educational initiatives, issued technical notes, and reinforced real-time monitoring of administrative acts, demonstrating concern for the integrity of public spending and transparency in light of the relaxation of emergency contracting rules.

Similarly, Mendonça et al. (2020) analyzed the performance of five state and municipal courts of auditors from different regions of the country (TCE/PA, TCM/GO, TCE/PR, TCE/RJ, TCM/BA). The study highlighted the rapid transition to teleworking and the intensive use of digital platforms such as Zoom, Google Meet, and Skype, which ensured institutional continuity. Transparency practices were also highlighted, such as the availability of structured data on emergency contracts in public dashboards, reinforcing the role of TCs in disseminating qualified information to citizens. In addition, Ribeiro et al. (2020) argue that Brazilian TCs, in the face of public calamity, assumed a more guiding role, thereby overcoming the model of exclusively posterior and punitive control. The research shows that the TCs developed guidelines to orient managers regarding emergency contracting without bidding, extraordinary expenses, and accountability, promoting prior and concurrent control. This paradigm shift enabled timely interventions before the consolidation of administrative acts that could be potentially harmful to the treasury.

Finally, Medeiros (2023) analyzes in depth the role of TCU and the TCE of Acre in monitoring public health policies during the 2020 and 2021 fiscal years. The author argues that, given the specificities of the pandemic context, these institutions reinterpreted their constitutional powers and began to act more directly in the formulation, implementation, and evaluation of public health policies. The research shows that the Courts exercised not only supervisory and punitive functions, but also pedagogical and collaborative ones, contributing to the realization of the fundamental right to health and the mitigation of administrative and legal risks related to the health crisis.

All in all, only three audit institutions out of the 26 states and the federal district took no action. These initiatives exemplify the role of oversight institutions in guiding public policy and ensuring effective resource utilization during the pandemic. Table J1 below indicates whether the audit

institution adopted measures related to Monitoring Tools, Regulation/Guidance, Transparency, and Inspection/Audits during the COVID-19 pandemic.

Table J1 – Summary of Institutional Responses by Brazilian State Audit Courts During the COVID-19 Crisis

State	Monitoring Tools	Regulation / Guidance	Transparency Measures	Inspection / Audits	No Action Reported
Acre	1	0	1	0	0
Alagoas	0	1	1	0	0
Amapá	0	1	0	0	0
Amazonas	1	1	1	1	0
Bahia (TCM)	1	0	1	0	0
Ceará	1	0	1	0	0
Espírito Santo	1	1	1	0	0
Goiás	1	0	1	0	0
Maranhão	1	1	1	1	0
Mato Grosso	1	1	1	1	0
Mato Grosso do Sul	0	1	0	0	0
Minas Gerais	1	1	1	1	0
Pará (TCM)	1	1	1	0	0
Paraíba	0	0	0	1	0
Paraná	1	0	1	1	0

Pernambuco	1	1	1	0	0
Piauí	1	1	1	1	0
Rio Grande do Norte	1	1	1	0	0
Rio Grande do Sul	1	1	1	0	0
Rondônia	0	1	1	1	0
Roraima	1	0	1	0	0
Santa Catarina	1	0	1	0	0
São Paulo	1	1	1	1	0
Distrito Federal	1	1	1	1	0
Rio de Janeiro	0	0	0	0	1
Sergipe	0	0	0	0	1
Tocantins	0	0	0	0	1

Below we provide a detailed description of the actions taken accordingly with research on their reports and websites:

Court of Auditors of the State of Acre:
Developed the Covid-19 Panel, a specific portal that monitors cases, beds, vaccination and public spending related to the pandemic. This initiative aims to provide accurate and updated information to guide the decisions of public managers and the population in general.

Court of Auditors of the State of Alagoas:

It issued a resolution that establishes determinations and recommendations to face the health crisis resulting from COVID-19. Among the measures, the requirement that entities under jurisdiction

draw up a Contingency Plan aligned with current legislation and national and state plans to combat the pandemic stands out.

Court of Auditors of the State of Amapá:

Established new measures to prevent and combat coronavirus, following the guidelines of the Ministry of Health and decrees of the State Government. These measures aim to protect both staff and the public who need to interact with the court during this challenging time.

Court of Auditors of the State of Amazonas

Faced with the increase in hospitalizations due to Covid-19 and the need for new emergency investments, the president of the Court of Auditors of the State of Amazonas (TCE-AM), counselor Mario de Mello, determined the reestablishment of the Public Resources Monitoring Committee. This committee, which had initially been established during the first wave of the pandemic, is now resuming its activities to monitor the actions of state and municipal public authorities. Under the coordination of President Mario de Mello and with the participation of six other TCE-AM employees, the Committee will monitor emergency hiring and require detailed information on the measures adopted to combat the pandemic and public spending, using a virtual tool provided by the Secretariat of Court Technology to facilitate data crossing and analysis.

Court of Auditors of the Municipalities of the State of Bahia:

It produced the TCM-BA COVID-19 Information Panel, which brings together data, government deliberations, and other relevant information about the actions of municipal public authorities during the pandemic. This panel serves as an important tool to guide municipal managers and ensure an effective response to the crisis.

Court of Auditors of the State of Ceará:

Developed a panel dedicated to monitoring public administration actions to combat COVID-19. This tool allows you to closely monitor the measures adopted by public bodies in Ceará, promoting transparency and accountability to the population.

Court of Auditors of the State of Espírito Santo:

Approved Ordinance 38/2022, which regulates the sending of information related to combating the pandemic. This measure establishes that the heads of Municipal Executive Branches must forward data on revenue collected, cash availability, extraordinary credits and other relevant economic issues. Furthermore, the court created a hotsite to centralize information, facilitating public access to data and guidance related to COVID-19.

Court of Auditors of the Municipalities of Goiás:

Created a panel dedicated to expenses related to the fight against COVID-19, with complete details of expenses. This initiative aims to promote transparency and allow citizens of Goiás to monitor in a clear and accessible way how public resources are being used in the pandemic.

Court of Auditors of the State of Maranhão

It developed a specific website, accessible through the address www.coronavirus.tce.ma.gov.br , to provide information and guidance on the actions of the Maranhão Court of Auditors during the Public Health Emergency of National Importance (ESPIN) caused by COVID-19. 19. The website concentrates measures adopted by the court, such as Technical Notes, the State Contingency Plan, Ordinances related to the pandemic, a Hiring Wall and access to the transparency portals of Maranhão municipalities. This initiative seeks to clarify and guide those inspected, TCE employees, and citizens on monitoring the application of public resources during the pandemic.

Court of Auditors of the State of Mato Grosso

It created the Covid-19 Radar, an analysis and monitoring panel that allows the population of Mato Grosso to monitor the resources invested by the State Government and the state's 141 municipalities in the fight against COVID-19. The panel provides information on bids related to the pandemic, approved values, number of cases, available hospital structure, resources received, and ongoing inspection processes. This tool promotes transparency by showing in a practical and accessible way how public resources are being used to combat the pandemic.

Court of Auditors of the State of Mato Grosso do Sul

It implemented several measures, including the creation of a hiring guide and the establishment of joint coordination forums, to help combat COVID-19. These initiatives aim to provide guidance and coordinate efforts to ensure an effective response to the challenge posed by the pandemic in the state.

Court of Auditors of the State of Minas Gerais:

Established the Coordination Committee for Monitoring Actions on Measures to Combat the COVID-19 Pandemic, with the aim of coordinating a front of support and guidance for those under jurisdiction in actions related to combating the pandemic. In addition, it created a hotsite to provide useful information to public managers and a communication channel to clarify doubts about the management of public resources intended to combat COVID-19.

Court of Auditors of the Municipalities of the State of Pará:

Created a hotsite to guide those under jurisdiction and the population about conduct and obligations provided for by law during the pandemic. Furthermore, it seeks to inform citizens about measures taken during the pandemic period, ensuring transparency regarding exceptional measures adopted to help combat COVID-19.

Court of Auditors of the State of Paraíba:

It implemented special supervision over the use of resources and the policies adopted by municipalities to combat the pandemic. In addition, it published thematic reports to provide detailed information on the actions of public bodies in the fight against COVID-19, contributing to transparency and accountability to society.

Court of Auditors of the State of Paraná:

Evaluated municipal transparency portals and state executive powers regarding actions aimed at combating the pandemic. This analysis aims to ensure that information related to the use of public resources to combat COVID-19 is accessible to the population, promoting transparency and accountability on the part of public managers.

Court of Auditors of the State of Pernambuco:

Developed a website with recommendations, mapping of cases, expenses and other relevant information related to the COVID-19 pandemic. This initiative aims to provide updated guidance and data to the population and public managers, contributing to effectively facing the health crisis.

Court of Auditors of the State of Piauí:

Through the Covid Commission, TCE-PI created a panel as a transparency tool for the population, providing information on revenues, expenses and public administration contracts related to the new coronavirus pandemic. Furthermore, the panel includes a specific tab on the vaccination process, with data updated daily by the Ministry of Health. This initiative is essential to evaluate immunization services in the state, identify possible inconsistencies and demand improvements in the provision of this service by local managers. The panel represents an important contribution to the work of monitoring institutions and social control over actions related to the pandemic in Piauí.

Court of Auditors of the State of Rio Grande do Norte:

Created the Transparency Portal for the State of RN, allowing the monitoring of budgetary and financial information from the state executive. The portal allows citizens to efficiently and transparently monitor the use of public resources during the COVID-19 pandemic. In addition, it provides information on planning, tax reports, tenders, works carried out in the state, and other relevant data related to COVID-19.

Court of Auditors of the State of Rio Grande do Sul:

In partnership with Famurs, TCE-RS launched the "Covid-19 Information Bulletin", a booklet with guidelines for mayors of the 497 municipalities in Rio Grande do Sul. The document offers legal answers to 20 questions selected among the most relevant to municipal managers, addressing topics such as emergency and public calamity decrees, financial and budgetary arrangements, among others. This initiative seeks to provide safe guidance to municipal managers to deal with the health crisis and its consequences.

Court of Auditors of the State of Rondônia:

It recommended that municipalities adopt practices similar to those of the Rondônia State Government to provide greater transparency to expenses related to preventing and combating COVID-19. The recommendation includes the availability of all necessary information for proper control and transparency of public spending, such as public calls, exemptions, commitments, bank orders, and proof of settlement.

Court of Auditors of the State of Roraima:

A dynamic report was made available containing updated information about the COVID-19 pandemic scenario in the State of Roraima. The "Covid-19 Pandemic Roraima Panel" offers segmented data through graphs and information on the state's ranking at a national level, number of confirmed cases, new cases, available beds, evolution of the disease, deaths by age group and

the progress of the pandemic by municipality. This initiative aims to provide clear and accessible information to the population about the COVID-19 situation in Roraima.

Court of Auditors of the State of Santa Catarina:

A portal was launched, offering a comprehensive Covid-19 Spending Indicator, including information on purchase orders, tenders, contracts, suppliers, products and amounts paid in all municipalities in the state. This centralized platform allowed them to closely monitor how resources are being used to combat the pandemic, promoting transparency, accountability, and efficient management of funds destined to combat COVID-19 throughout the region.

Court of Auditors of the State of São Paulo

To monitor the actions of the State and city halls during the pandemic, the Court of Auditors is applying a monthly questionnaire to managers about the acts resulting from public calamity decrees. This determination was communicated to the 644 municipalities inspected by TCESP through SDG Notice No. 21/2020, published on 05/23/2020, and to the State through SDG Notice No. 34/2020, published on 07/18/2020. The data entered by municipal managers, together with information provided by state managers and collected in various state information systems, were compiled and made available on this panel for public access. This initiative aims to promote transparency and social control over the measures adopted to combat the pandemic.

Court of Auditors of the Federal District

In response to the COVID-19 health emergency, the Federal District Court of Auditors (TCDF) prepared an action plan to guide the inspection of the DF Government's expenses in combating the pandemic, promoting transparency and social control. Through a hotsite, the TCDF provides useful information to public managers and facilitates the monitoring of expenses by citizens, providing a Covid-19 Panel for research by topic and detailing expenses by agency. This initiative aims to

strengthen the governance of public resources and ensure their correct application, without compromising management during the crisis.

Court of Auditors of the States of Sergipe, Tocantins and Rio de Janeiro

There is no record of a special initiative related to Covid.

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K. Equivalence Tests for RDD robustness check

Equivalence Tests for the main outcomes

In response to the reviewer's concern about large but statistically non-significant effects in our RDD estimates, we incorporated equivalence testing to formally assess whether these effects are small enough to be considered practically negligible (Lakens, 2017; Hartman, 2020; Fitzgerald, 2024).

Traditional null hypothesis significance tests cannot provide affirmative evidence of null effects, as a non-significant result indicates a lack of evidence for an effect, not evidence of absence. By contrast, equivalence testing assesses whether the estimated treatment effect lies within a region of practical indifference, thus

We conducted equivalence tests on our three primary outcomes, NPI_MUN2, Qtheta, and IsolatedMean_all, using the Hartman Equivalence Test[2], which builds upon the TOST (Two One-Sided Tests) framework. We chose these three indicators because the first two are summary measures of the non-pharmacological policies adopted by Brazilian municipalities. At the same time, the last indicates the average level of social isolation in the first year of the pandemic.

We report whether the estimated RDD effect is statistically equivalent to zero within a predefined equivalence bound (ε) for each outcome. As the equivalence tests of the study were not preregistered, we examine how the conclusions vary as ε changes; hence, we explore a range of plausible bounds and visualize the sensitivity of p-values to changes in ε using equivalence curves.

[2] "The equivalence test implemented in our study follows the rdd.equiv() function proposed by Hartman, available at: https://github.com/ekhartman/rdd_equivalence."

NPI_MUN

The conventional RDD estimate was 0.38 (SE = 0.571) and the Robust RDD estimation was 0.49 (SE = 0.689), both not statistically significant. Using an equivalence threshold of ε = 1.75 - allowing differences up to 1.75 points on the 1 to 6 scale of NPI_MUN, the equivalence test returned a p-value of 0.033, suggesting statistical evidence of a negligible effect. The threshold lies just above the suggested benchmark of ε = 1.5 used in recent equivalence testing of density ratios (Fitzgerald, 2024). As shown in Figure 1, the p-value declines steadily as ε increases:

* ε = 1.40 → p = 0.090

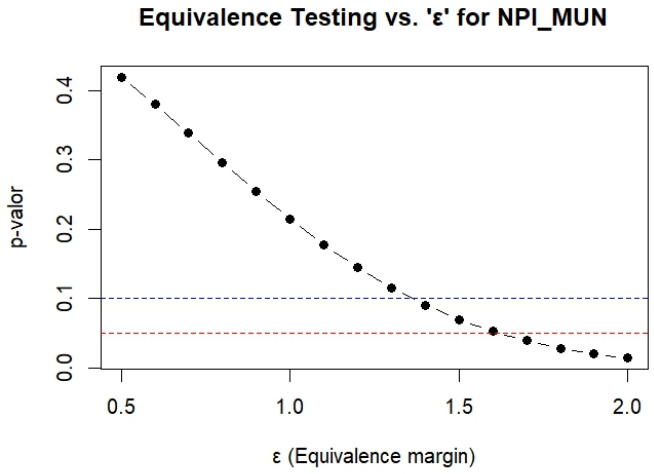
* ε = 1.50 → p = 0.069

* ε = 1.60 → p = 0.052

* ε = 1.75 → p = 0.033

The sensitivity analysis suggests that the estimated effect is unlikely to exceed 1.6 points on the NPI scale, reinforcing the interpretation that the RDD effect is not only statistically null but practically negligible at any effect larger than ±1.6.

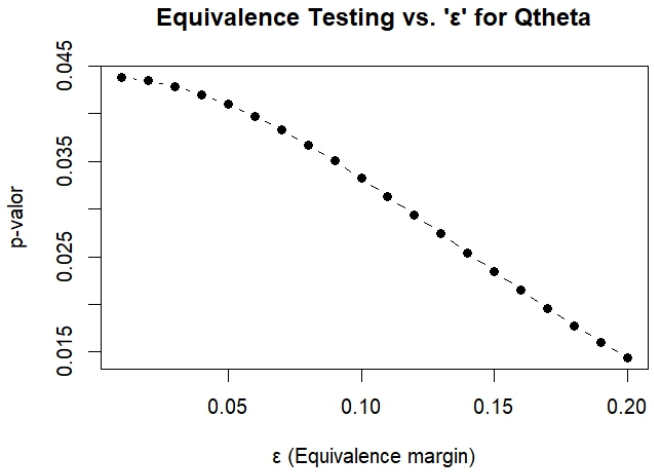
Figure 1. Variation of p-values from ε for Equivalence Tests on NPI_Mun



Qtheta

The RDD estimate for Qtheta was -0.02 (SE = 0.113), again non-significant (p = 0.860). Using a conservative ε = 0.1, corresponding to less than 10% of the observed range of Qtheta (which spans from -0.82 to 0.42), the equivalence test returned a p-value of 0.033, leading to a rejection of the hypothesis that the effect is meaningfully different from zero. The p-value curve in Figure 2 confirms that the result is robust across a narrow range of equivalence margins, with $p < 0.05$ consistently observed for ε between 0.01 and 0.1. Given the tight distribution of Qtheta (median = -0.077; IQR ≈ 0.25), an effect within ±0.1 is arguably negligible, supporting a claim of evidence of absence.

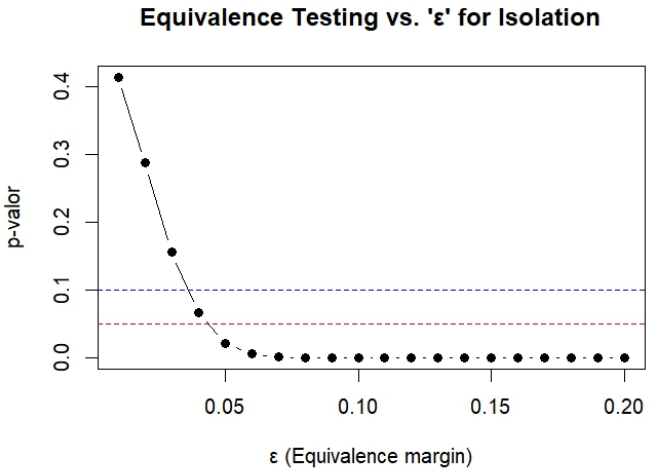
Figure 2. Variation of p-values from ε for Equivalence Tests on Qtheta



IsolatedMean_all

The RDD estimate for IsolatedMean_all was –0.012 (SE = 0.016), again statistically non-significant (p = 0.441). Using a conservative equivalence threshold of ε = 0.05 from the variable's total range spanning from 0.24 to 0.57, the equivalence test returned a p-value = 0.022, providing strong evidence in favor of practical equivalence. As illustrated in Figure 3, the p-value remains well below 0.05 even for very narrow equivalence margins. The inverted bound was estimated at ε = 0.043, meaning the observed effect is statistically distinguishable from any effect larger than ±0.043. Given the limited variability of this outcome (mean = 0.39; SD ≈ 0.05), a deviation of this size is substantively trivial, reinforcing the interpretation that the treatment had no meaningful impact on the social isolation measure.

Figure 3. Variation of p-values from ε for Equivalence Tests on Isolated_mean



Following Hartman's framework, these results offer an important inferential leverage from the absence of evidence (non-significance in traditional hypothesis testing) to the evidence of absence (rejection of the null in equivalence testing). The Hartman approach directly responds to the reviewer's concern about statistical power and provides a more rigorous interpretation of the null effects presented in the original manuscript.

Equivalence Tests for Density Sensitivity

To address the concern raised regarding the potential lack of statistical power in the regression discontinuity design (RDD), specifically the interpretation of large, non-significant point estimates, we supplemented our main analysis with an assessment of the RDD framework's identification assumptions.

The reviewer is correct in noting that non-significant effects alone do not constitute evidence of absence; rather, equivalence testing offers a more appropriate inferential strategy for evaluating whether discontinuities are small enough to be considered negligible in practice (Lakens, 2017; Lakens et al., 2018).

A critical assumption in RDD is the continuity of the running variable's density at the cutoff. If units can precisely manipulate their value of the running variable to sort just above or below the cutoff, causal interpretation becomes invalid. We tested for such manipulation using the McCrary density test as implemented via **rddensity** in Stata, which estimates local polynomial densities on either side of the cutoff (Calonico, Cattaneo, & Titiunik, 2014).

The robust test statistic was 0.59 with a p-value of 0.5527, indicating no statistically significant discontinuity in the density of the running variable (winning_margin) at the cutoff. This result was robust across bandwidth specifications and binomial balance checks across symmetric intervals around the cutoff.

However, as the reviewer rightly points out, a failure to reject the null in such a test does not provide affirmative evidence of continuity. To formally assess evidence of absence, we applied an equivalence test of density continuity following the approach proposed by Erin Hartman (2020), as operationalized in Stata by Jack Fitzgerald’s lddtest command (Fitzgerald, 2024).

Using a benchmark equivalence bound of $\varepsilon = 1.5$, which allows up to 50% difference in local densities and has been proposed as a practical standard in recent work (Hartman, 2020 and Fitzgerald, 2024), we conducted equivalence tests to evaluate whether the observed log-difference in density around the cutoff lies within an acceptable margin of practical indifference.

The estimated log-difference in local densities was 0.045, with a standard error of 0.303, yielding a 90% confidence interval of [–0.454, 0.544]. This interval overlaps but does not fall entirely within the equivalence bounds defined by $\pm\log(1.5) \approx \pm 0.405$. At a significance level of $\alpha = 0.10$, the equivalence test yielded a p-value of 0.117, which is suggestive but not formally sufficient to reject the null hypothesis of a meaningful discontinuity at this equivalence level.

However, no specific equivalence ratio (ε) was pre-registered for this analysis. We therefore explored a range of plausible bounds, from $\varepsilon = 1.4$ to $\varepsilon = 1.75$ (corresponding to $\pm\log(\varepsilon) \approx 0.336$ to 0.560). These values capture a spectrum of reasonable tolerances for discontinuity in the density. As ε increases, the 90% confidence interval begins to fall more fully within the equivalence range, and p-values of the test decrease steadily. For instance:

$\varepsilon = 1.4 \rightarrow$ bounds $\pm 0.336 \rightarrow p = 0.154$

$\varepsilon = 1.5 \rightarrow$ bounds $\pm 0.405 \rightarrow p = 0.117$

$\varepsilon = 1.6 \rightarrow$ bounds $\pm 0.470 \rightarrow p = 0.081$

$\varepsilon = 1.75 \rightarrow$ bounds $\pm 0.560 \rightarrow p = 0.045$

This pattern suggests the data support equivalence at slightly more permissive thresholds ($\varepsilon \geq 1.6$). In other words, the null hypothesis of a practically meaningful density discontinuity can be rejected

at $\alpha = 0.10$ when the bound is $\varepsilon = 1.6$ or higher, implying that the density is likely continuous within a 60–75% tolerance range. These results complement the non-significant findings from the traditional manipulation test and strengthen the case that no substantively relevant sorting or manipulation occurred at the cutoff. They also respond directly to the reviewer's recommendation to go beyond non-rejection by assessing evidence of absence.

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