American Economic Journal: Economic Policy 2023, 15(3): 351–371
https://doi.org/10.1257/pol.20210284

More than Words: Leaders' Speech and Risky Behavior during a Pandemic[†]

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This paper investigates whether the anti-scientific rhetoric of modern populists can induce followers to engage in risky behavior. We gather electoral information, credit card expenses, and geo-localized mobile phone data for approximately 60 million devices in Brazil. After the president publicly dismissed the risks of the COVID-19 pandemic and challenged scientific recommendations, social distancing in pro-government localities declined. Consistently, credit card expenses increased immediately. Results are driven by localities with higher media penetration levels, active Twitter accounts, and a larger proportion of evangelical Christians, a critical electoral group. (*JEL* D72, D91, I12, I18, L82, O15, Z12)

Populism is rising globally. Mudde and Kaltwasse (2017) and Guriev and Papaioannou (2020) define populism as a "thin-centered ideology" that segregates society between "the corrupt elite" and "the pure people." This anti-elite view is often accompanied by anti-expert and anti-science sentiments since experts might be seen as part of the elite or co-opted by the elites to defend their vested interests. This explains, for instance, why some populist leaders, and their followers, dismiss the anthropogenic theory of global warming and, instead, relate it to an elite conspiracy, or why some may oppose vaccination programs.

If leaders are persuasive, this anti-scientific rhetoric could have substantial socioeconomic effects. However, the evidence for this is rather scarce, especially in a real-world, outside-the-lab setting. This paper aims to fill this gap by studying how the anti-scientific words and actions of a populist head of state, against the recommendations of international organizations and the scientific community, can trigger

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[†]Go to https://doi.org/10.1257/pol.20210284 to visit the article page for additional materials and author disclosure statement(s) or to comment in the online discussion forum.

the adoption of health-related risky behavior among his followers and affect public health.

We focus on the recent outbreak of COVID-19 in Brazil. At that time, Brazil was governed by Jair Bolsonaro, a populist leader (Guriev and Papaioannou 2020) who was aligned politically and rhetorically with other populist leaders worldwide, particularly with President Donald Trump. Both presidents have consistently shown similar patterns of defiance against scientific advice across several areas, ranging from curbing carbon dioxide emissions to interventions preventing the spread of COVID-19. The Brazilian president's COVID-19 rhetoric was widely deemed anti-scientific by medical scholars (Hotez 2021), economists (Sachs 2020), the media (Phillips and Briso 2020), and other members of the scientific community (Fraser 2020).

Since the start of the pandemic, the official response in Brazil has been notably heterogeneous among the different levels of government.[1] While subnational governments have implemented non-pharmaceutical interventions (NPIs) with varying levels of strictness and recommended adherence to social distancing, Brazil's president has minimized the risks of the disease, explicitly and publicly contradicting the instructions communicated by governors and the recommendations of the World Health Organization (WHO) and, more generally, the scientific community. On different occasions (e.g., Harris and Schipani 2020; *Economist* 2020), the president publicly encouraged citizens to go out and thus break social distancing policies. This context is therefore ideal for testing whether or not the anti-scientific speech of a populist head of state can affect individual risk perception and high-stakes behavior—such as adherence to preventive measures recommended by the health authorities, with potential negative externalities on the community at large.

To address our research question, we estimate a dynamic difference-in-difference model to test for pre- and posttreatment effects. We first deploy a social distancing index at the municipal-day level based on granular location data from 60 million anonymous mobile devices across Brazil. We then combine this information with municipal data from the 2018 presidential election. In our setting, the baseline "treatment" is a government support variable defined as the municipality's vote share for the president in the first round of the 2018 presidential election.[2] We tracked Bolsonaro's speeches and actions related to the pandemic from February 1 to April 14, 2020, and identified two major events in which the president publicly challenged the social distancing policies and set the day before the first event as the base period of the empirical model.

Following the prominent speeches by the president against social isolation policies, the social distancing index immediately falls in municipalities with a larger share of Bolsonaro's supporters versus municipalities where his support is lower. The effect is robust to using alternative definitions of Bolsonaro's political support. Pre-events are insignificant. To further support our results, we use daily data on credit card expenses from one of Brazil's largest banks. We document a consistent

[1] Brazil is a three-tiered federation with 26 states, a federal district, and 5,571 municipalities.

[2] We also consider alternative definitions of government support, such as the majority of votes and vote share above or below the state median.

(opposite) effect on consumer spending, mirroring those on social distancing. We also find that the results seem to be driven by in-person consumer spending (excluding purchases in pharmacies). This result suggests that the effect documented on mobility is hardly driven by lower-risk activities (such as outdoor running, which would not affect in-store purchases) or essential trips (such as buying medicines).[3]

We then present suggestive evidence of mechanisms that could underlie the main results. First, we show that the effect seems to be driven by municipalities with a higher presence of local media, a result consistent with other papers that emphasize the role of local media in disseminating political news in Brazil (e.g., Ferraz and Finan 2008; Bessone et al. 2019). Similarly, we show evidence consistent with the effect being driven by municipalities with a larger presence of Twitter accounts, suggesting the importance of social media in spreading political messages. Finally, we document a stronger effect in places with a larger proportion of evangelical Christians, a religious group that represents around a quarter of the population and that not only heavily supported the president in the 2018 election[4] but also showed stronger approval of the president's handling of the pandemic (Bächtold 2020).

Our paper builds on studies examining the socioeconomic consequences of populism. Most of this evidence relates to the (macro)economic performance of populist governments (e.g., Dornbusch and Edwards 1991; Funke et al. 2020). Part of the literature focuses on the effect of specific policies implemented by populist leaders, especially trade policies (e.g., Amiti et al. 2019; Fajgelbaum et al. 2020). Recent evidence documents how populist leaders have long-lasting institutional effects (e.g., media capture in Szeidl and Szucs 2021), and a growing literature studies the effect of populism on the formation of certain values and beliefs (e.g., Bursztyn et al. 2020b; Muller and Schwarz 2020). We contribute to this literature by documenting the effect of populism on citizens' engagement in risky behavior and public health.

Our paper also relates to the literature on leadership. Economics has traditionally focused on transactional leadership—incentives as the main channel through which the principal can induce behavior among the agents (e.g., Lazear and Rosen 1981; Holmstrom and Milgrom 1994). A growing theoretical (e.g., Acemoglu and Jackson 2015) and empirical literature has explored how leaders can motivate followers through speeches and exemplary behavior (e.g., Antonakis et al. 2014; Bassi and Rasul 2017; d'Adda et al. 2017; Ajzenman 2021). We add to this literature by focusing on the persuasive power of a populist leader's anti-expert rhetoric—a specific but widespread feature of modern populists that has been largely unexplored.

Finally, we also contribute to a recent literature on social distancing compliance during the COVID-19 pandemic. Barrios and Hochberg (2020) document a partisan divide in compliance with social distancing, results consistent with those of Allcott et al. (2020) and Gadarian et al. (2021). In a paper closer to ours, Grossman et al. (2020) show that governors' stay-at-home recommendations in the United

[3] Investigating the effects of Bolsonaro's speech and actions on COVID-19 reported cases is a challenging task. Testing in Brazil during our period of analysis seemed to be disproportionately low in comparison to other countries (e.g., McCoy et al. 2020b). In addition, testing was not uniformly distributed among Brazilian states (or municipalities) or days, and there is no reason to believe that its distribution across time or space was unrelated to other relevant variables or events. For this reason, we do not analyze any effect of the events considered on COVID-19 cases.

[4] 70 percent of evangelicals voted for Bolsonaro. See Folha De S. Paolo (2018).

States, which preceded actual stay-at-home orders, led to a large and significant reduction in mobility. Bursztyn et al. (2020a) show that prevention messages broadcasted on TV shows have had a significant impact on viewer social distancing behavior during the COVID-19 pandemic in the United States. Also related to our work, Bisbee and Lee (2020) use data from the United States to document partisan differences in individuals' reactions across counties to Trump's pronouncements about the severity of the pandemic. While most papers document a partisan divide, we contribute by focusing on individuals' responses to political leaders' words and actions—in a context outside the United States. By using comprehensive data related to social distancing, credit card expenses, and social media, we also contribute by exploring potential channels, such as the role of traditional and social media.

The paper is structured as follows. Section I introduces the context and chronology of events in Brazil. Section II describes the data. Section III presents the empirical model and the main results. Section IV concludes.

I. Context

During the COVID-19 pandemic, most nations introduced NPIs to reduce the virus's spread. These interventions aim to "flatten the curve" to keep the number of critical cases at a manageable level. Although some of these measures are beyond individuals' control (e.g., school closures), the level of compliance depends on citizens' actions, particularly when isolation is not legally enforced.

In this section, we discuss Brazil's response to the pandemic focusing on the period from February 1 to April 14, 2020—see Section II for details on data availability. At that time, knowledge about COVID-19 was scarce, and uncertainty about how it spreads was pervasive. The official government response to the pandemic was heterogeneous and uncoordinated, in part because state governments in Brazil's federation have the power to implement their own social distancing policies (online Appendix Figure A.1 shows that every state government adopted social distancing policies but the timing varied across locations), and the federal government's view differed from that of the subnational governments.[5]

As cases began to rise, President Bolsonaro minimized the pandemic, explicitly challenging the recommendations of the scientific community and the WHO. He encouraged people to go out and frequent stores, and even attend public demonstrations in the streets, contradicting his own health minister. Bolsonaro was dismissive of the effects of the virus, calling it "just a little dose of flu" (see Magalhaes and Forero 2020) and a "media trick" (see Phillips and Briso 2020). His behavior was so controversial that it rapidly attracted the attention of dozens of international media outlets, including *Economist* (2020a) and Londono, Andreoni, and Casado (2020), among many others.

[5] Although states have the power to implement and enforce social distancing policies, municipal governments also have some degree of autonomy to implement specific policies. When exploring the mechanisms, we show that implementing this type of intervention at the municipal level, at least for our period of analysis, was not affected by the president's words and actions.

Despite such opposition to social distancing measures, the president's messages have not always been uniform. To summarize his most prominent actions and public pronouncements, we develop a daily indicator of news coverage based on Di Tella and Franceschelli's (2011) methodology. The goal is to use an objective and systematic approach to identify key events (those that were more salient) regarding Bolsonaro's opposition to social distancing. More specifically, for each of the four largest newspapers by daily circulation—*Folha de Sao Paulo*, *O Globo*, *O Estado de Sao Paulo*, and *Correio Brasiliense*—we measured the share of their front-page area that reported Bolsonaro (i) undervaluing the disease or (ii) speaking (or acting) against social distancing policies. In online Appendix Figures A.2 and A.3, we show examples of the type of news we classified in each category and the area we consider for each, which includes the main text, the headline, and any accompanying figure (if available).

In Figure 1, panel A we show how this variable evolved through time, using a moving average of two days. Two events stand out. First was Bolsonaro's participation in the public demonstrations of March 15, 2020. These were street protests against the Congress and the Supreme Court, and they were organized by conservative activists closely aligned with the president (see *Folha de Sao Paulo*, February 23, 2020). When joining the crowds in one of the demonstrations that broke social distancing recommendations, the president took selfies, fist-bumped several supporters, and posted a record number of tweets (47) since becoming president. His behavior quickly captured national and international media attention, with headlines directly alluding to his "bad example to the nation."

The second event was his official pronouncement in the evening of March 24, 2020. Presidential pronouncements are rare and reserved for especially relevant communications.[6] This type of message is particularly relevant because every TV or radio station in the country must mandatorily broadcast the pronouncement. On March 24, 2020, Bolsonaro emphatically opposed NPIs implemented by subnational governments, stressed that the country should return to normalcy, and minimized the pandemic's effect with unscientific claims (e.g., even though he was 65 years old, he claimed that the disease would be a "little flu" for him given his "history of athleticism"). His speech again captured the attention of national and international media outlets.

In online Appendix C, we detail the pandemic-related events from Bolsonaro's actions and speeches. The detailed description suggests that the intensity of Bolsonaro's speech and behavior against social distancing was certainly not homogeneous and was, in some moments, even confusing. However, the narrative seems to confirm what we observed analyzing the news coverage index.

To further corroborate the identification of the main events, in Figure 1, panel B we show that March 15, 2020 and March 25, 2020 were key dates for Google searches of the words "protests" and "Bolsonaro pronouncements," respectively (Google 2021). Finally, we analyze all of the tweets made by Bolsonaro and his three sons (who are also high-profile politicians and are seen as representatives of

[6] In online Appendix D, we include the translation of each of the five public official pronouncements during our period of analysis.

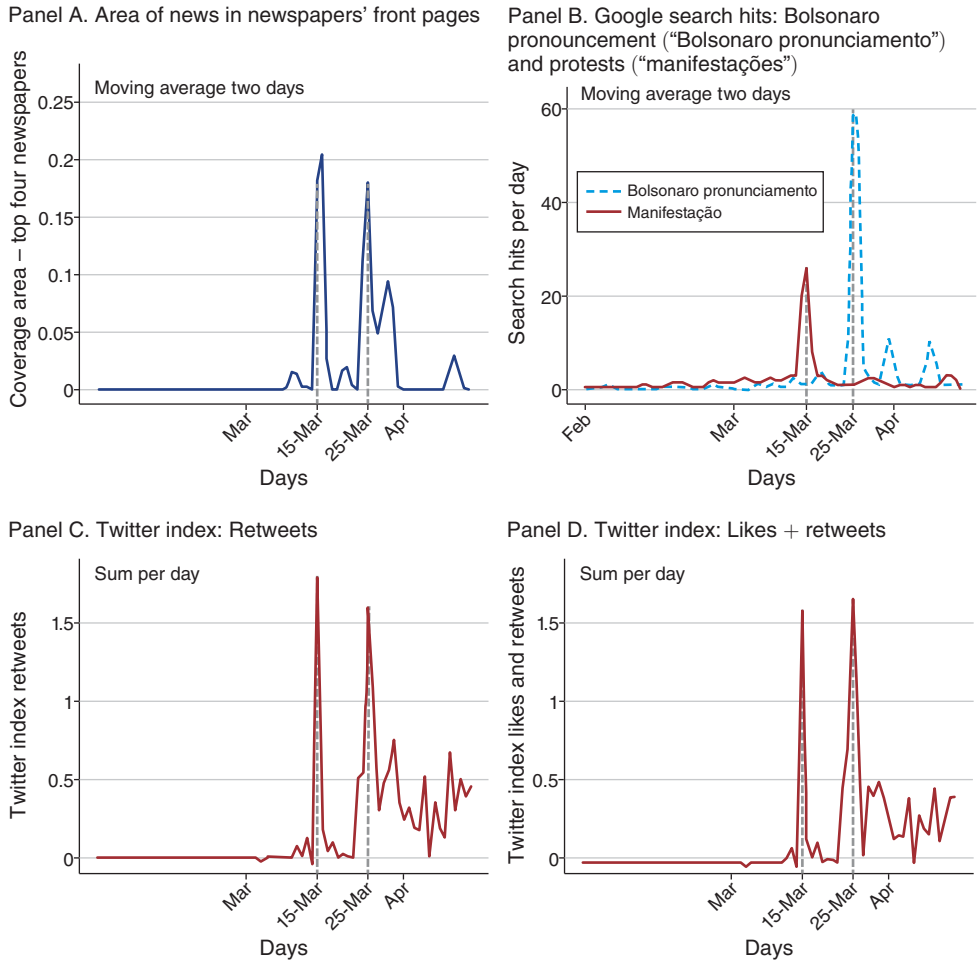

FIGURE 1. INTENSITY OF EVENTS: PRESIDENT AGAINST SOCIAL DISTANCING

Notes: Panel A shows the "news coverage index," defined as the share of the area (0 to 1) of the four main newspapers' front pages covering news of Bolsonaro against isolation or undervaluing COVID-19 (moving average: two days). Panel B shows the results (moving average: two days) for Google searches in Brazil for "protests" ("manifestações") and "Bolsonaro pronouncement" ("Bolsonaro pronunciamento")—searches made in Portuguese. Panels C and D show Twitter indexes based on daily "retweets" and "likes + retweets," respectively. We created an unweighted index for each tweet that was 1 if against, 0 if neutral or other, and −1 if in favor of social distancing. Then we normalized this simple index using the number of likes (or likes plus retweets) to create an index between −1 and 1 for likes (or likes plus retweets). Finally, we aggregated the indices (which were so far tweet specific) to daily values. We used the tweets of the president and his three sons for this analysis.

their father by many in government and politics—see Harris, Schipani, and Unzelte 2019) and create an index based on retweets and likes of their anti-isolation messages (Twitter 2021). The Twitter indices (Figure 1, panels C and D) are defined as follows. We first assign a 1 to every tweet in which the content was against social distancing/isolation (for example, when he urged governors to reduce NPI stringency), a 0 if the tweet was neutral, or a −1 if it was in favor of social distancing. Then we weight this simple index using the number of either likes or likes plus

retweets, normalized over the entire sample,[7] to create an index between −1 and 1, capturing both content and reach. Finally, we aggregate the indices to obtain daily values. The pattern of March 15, 2020 and March 25, 2020 being the most prominent dates for the spread of anti-isolation messages is confirmed using both likes (a neater measure since retweets could be from people criticizing Bolsonaro's speeches and actions) and likes plus retweets as weights.

II. Data

We leverage comprehensive data to measure the effects of the political leader's behavior and public pronouncements. The unit of our analysis is the municipality. To measure social distancing, we use an index created and developed by In Loco (In Loco 2020), a Brazilian technology company that provides information based on mobile location data. In Loco collects anonymized location data from 60 million devices, enabled by mobile apps that provide location-aware services while ensuring the privacy of their users. Using Bluetooth, Wi-Fi, and GPS, the company developed its technology to track the devices' location and movement to different places, with a precision of three meters. In Loco collects data using a standard procedure for location data companies: software development kits in widely used mobile apps with a location tracking opt-in. These kits run in the background of mobile apps to record location data. The company leverages pairs of positions (locations based on multiple app use by the same device) to improve location precision and measure the device's movement.[8]

The social distancing index measures the percentage of devices in a given municipality that remained within a radius of 450 meters of the location identified as home—the home location is determined by frequent nighttime checks based on network signals and on-device sensors. The index is computed on a daily basis and ranges from 0 to 1. We use data for the 3,975 (out of 5,571) municipalities in Brazil for which the social index is measured—some small municipalities do not have enough mobile devices, so the index is not computed. We obtained data on the social distancing index from February 1 to April 14, 2020. In Loco started to compute the index on February 1, 2020, and thus there are no previous data available. We requested the data at the municipality-day level—the most granular available information provided by In Loco that could be used for research purposes by the time. The company made the social distancing index available from February 1 to April 14, 2020 fixing our analysis for this particular period when there was uncertainty about the severity and spread of the virus. Online Appendix Figure A.4 shows that while the social distancing index has risen nationally, the changes have not been homogeneous. The mean of the index for the entire period is 0.37 (0.25 in February

[7] The index puts higher weights on Bolsonaro's tweets because he has more followers than his sons.

[8] In Loco's location technology is 30 times more accurate than that of GPS. See Peixoto et al. (2020) for additional details. Despite its extensive coverage (one-fourth of all Brazilian devices are tracked), measurement error could exist, and the sample of devices covered by In Loco might not be representative of the overall population. Despite these potential issues, several papers have been using similar data in order to measure mobility, as they are correlated with other sources used to assess mobility (e.g., Barrios and Hochberg 2020; Gadarian, Goodman, and Pepinsky 2020).

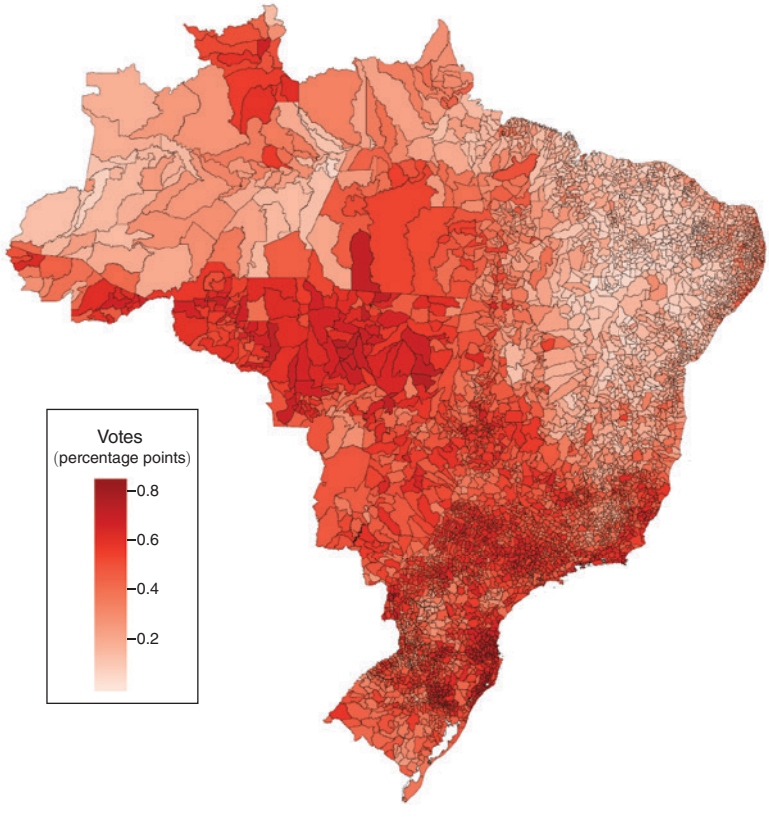

FIGURE 2. VOTES FOR BOLSONARO IN THE 2018 PRESIDENTIAL ELECTION

Notes: The figure shows, for each municipality, the percentage of votes for Bolsonaro in the first round of the 2018 presidential elections in Brazil. See Section II for more details on the data.

2020 and 0.53 in the first two weeks of April, 2020). Online Appendix Figure A.5 compares In Loco's and Google's social distancing indices (Google 2020) for each Brazilian state and shows a high correlation between the two measures during these three months.[9]

To measure support for Bolsonaro, we use electoral data provided by the Superior Electoral Court (Tribunal Superior Eleitoral 2018). We collected data on vote counts for the 2018 presidential election aggregated at the municipality level. We use several vote-related measures as a proxy for the president's local support. Figure 2 shows the distribution of votes for Bolsonaro across municipalities in the 2018 presidential election.

The 2010 population census carried out by the Brazilian Bureau of Statistics (IBGE) provides data on income, poverty, and religion at the municipal level (IBGE 2010). We use the 2019 estimate of population counts provided by the IBGE

[9] We use Google's mobility trends for places of residence. For further details see https://www.google.com/covid19/mobility/data_documentation.html?hl=en. State level is the most disaggregated level available for Google's index in Brazil.

(IBGE 2019). We also gathered data from the IBGE's 2018 MUNIC (IBGE 2018) containing information on local-level media presence, such as TV broadcasters.

We measure consumer spending using credit card expenses from one of Brazil's largest banks (this bank has more than one-third of the market share in assets and credit card customers). The expense data are aggregated at the municipality-day level (based on where the card owner resides). Expenses are divided into in-person and online expenses and presented by economic sector. Online Appendix Figure A.6 shows a high correlation between our measure of credit card expenses (aggregated at the state level) and Brazil's Central Bank measure (data on the universe of credit card expenses, which are publicly available and aggregated at the state level; Central Bank of Brazil 2021). Data on municipality-level NPIs are from de Souza Santos et al. (2021) and were collected through a phone-based survey conducted directly with each municipality administration. We create an indicator variable for each day of our period of study that equals 1 if a municipality implemented NPIs related to agglomeration restrictions, closure of nonessential services, and use of face masks. Online Appendix Table A.1 presents descriptive statistics of the variables used in this paper.[10]

III. Empirical Strategy and Results

A. *Empirical Specification*

We use a dynamic difference-in-difference specification to assess pretreatment and posttreatment effects. In particular, we estimate the following model:

$$(1)\quad Y_{md} = \sum_{\tau=-k}^{K} \beta_\tau \times \left[GovSup_m \times \left(PeriodsAfterEvent = \tau\right)\right] + \phi_d + \rho_m + \delta_{sd} + \lambda \mathbf{X}_{md} + \epsilon_{md},$$

where Y_{md} is the social distancing index for municipality m in period d, and $GovSup_m$ is a measure of government support in municipality m. The indicator variable "$PeriodsAfterEvent = \tau$" takes a value of 1 τ periods away from Bolsonaro's participation in the March 15 protests and 0 otherwise. The parameter β_τ is the dynamic treatment effect. Since the social distancing index is bounded between 0 and 1, each coefficient β_τ should be interpreted as a change in percentage points in social distancing relative to the base period. The omitted coefficient $\beta_{\tau=-1}$ corresponds to March 14 to use the day before the first prominent event as the base day. ρ_m and ϕ_d are municipality and period fixed effects, respectively.

In our baseline model, we define the municipality's government support ($GovSup_m$) as Bolsonaro's vote share in the first round of the 2018 presidential election. In this case, β_τ in equation (1) corresponds to a change in percentage points in social distancing of an increment of 1 percentage point in Bolsonaro's vote share.

[10] For more details on Brazil's Central Bank data, see https://www.bcb.gov.br/htms/infecon/credbanmicro.asp?frame=1. The data of municipality-level NPIs are for 4,027 municipalities—see de Souza Santos et al. (2021) for more details.

Importantly, our vote-share support definition uses the full variation in the election data. As Figure 2 shows, there is a clear regional divide in support for Bolsonaro. If we classified municipalities where the president obtained more than, for instance, 50 percent of the votes in the first round of election as "government support," we would lose within-state variability in our treatment variable for about one-third of the states. In the robustness exercises, however, we also consider alternative definitions of government support.

We use 74 days in the analysis (from February 1 to April 14, 2020). In order to obtain more precise estimates, our baseline estimates pool two adjacent days. Therefore, by pooling two days, we consider half as many periods (37 periods) in equation (1). In the interest of full disclosure, we present the day-by-day effects in the online Appendix and show similar results.

As most social distancing policies have been implemented at the state level and around the dates of our key events, our estimates are based on within-state variation. Therefore, equation (1) includes state-period fixed effects (δ_{sd}). Accounting for within-state variability is important to isolate our estimation from any state-specific shocks that could have been different in pro- and anti-Bolsonaro states. If the dates when state policies were implemented correlate with Bolsonaro's speeches (e.g., an anti-Bolsonaro state could strategically decide to toughen the lockdown when Bolsonaro publicly undervalues the disease), our estimates would be biased. Having within-state variability is also crucial for identifying the effect because we cannot control for law enforcement timing (that could have been affected by Bolsonaro's words and actions).[11]

In equation (1) we also control for relevant characteristics at the municipality-period level in vector $\mathbf{X}_{md}$. To account for the fact that support for the government is strongly correlated with variables such as poverty and rurality (both time invariant), we include the interaction between period fixed effects and a poverty dummy, as well as period fixed effects and a rurality dummy in $\mathbf{X}_{md}$.[12] These controls also alleviate a potential concern that would arise if, for example, Bolsonaro's message affected social distancing differently in pro-Bolsonaro municipalities not because of their political alignment but because of other municipality time-invariant characteristics, which are correlated with citizens' political preferences. To account for the plausible correlation of policies within states and time (the level at which isolation policies are typically implemented), we cluster the standard errors at the state-period level. We also weight the municipal averages by their population in 2019.

We hypothesize that the president's supporters are more prone to being persuaded by his prominent events than his critics are, even in a context of high-stake decisions, such as adherence (or not) to preventive measures recommended by the health authorities. Our identifying assumption is that in the period of analysis, municipalities with different vote shares for the president would have had similar trends in

[11] The fact that we analyze more than one event makes correlations between the timing of Bolsonaro's speeches and state or municipal-level policies (that affect pro- and anti-Bolsonaro supporters differently) more unlikely.

[12] The poverty dummy equals 1 if the municipal poverty rate is above the national-level median. The rurality dummy equals 1 if the proportion of residents living in rural areas is above the national-level median.

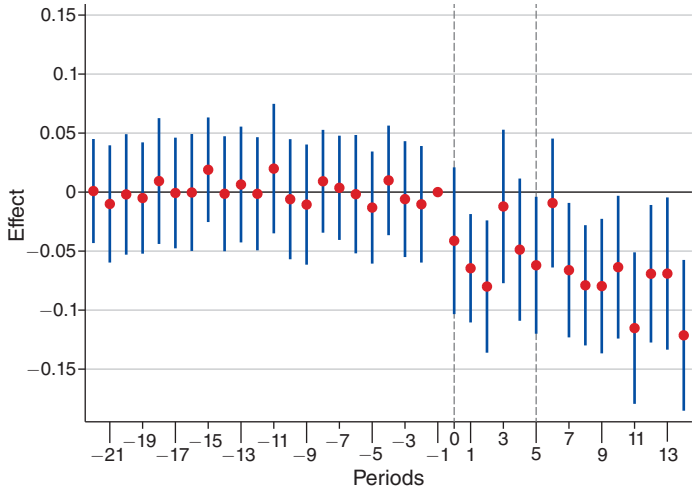

FIGURE 3. SOCIAL DISTANCING: BASELINE RESULTS

Notes: All results are expressed in percentage points (0–1 scale). The figure shows the baseline results, where the government support variable equals share of votes for the president in the first round of the 2018 elections. Coefficients are estimated from the empirical model in Section III for 3,975 municipalities for which data on social distancing index are available. Data are provided at the municipality-day level. The period before the first prominent event is normalized to zero at $t = -1$. Vertical dotted lines indicate the two prominent events. The dependent variable is the social distancing index for municipality m on day period-d (two adjacent days). Standard errors are clustered at the state-period level. Confidence intervals are 95 percent.

social distancing in the absence of the prominent events. In Section IIIC, we discuss potential threats to our identification strategy.

B. *Baseline Results*

Baseline results are presented in Figure 3. The two vertical dotted lines highlight the periods of the two prominent events that we identified. All the pretreatment effects are indistinguishable from zero; i.e., there are no effects on social distancing before the first prominent event. By contrast, the point estimate of every period after the first event is negative, and most of them are significantly different from 0. Importantly, the effect persists until the end of our period of analysis.

Notice that, given the nature of our specification, we cannot estimate the effect of the president's speech on the *levels* of mobility, only on the difference between pro- and anti-Bolsonaro municipalities. Besides, the specification does not allow us to differentiate between pro-Bolsonaro municipalities *decreasing* social distancing and anti-Bolsonaro municipalities being affected by the speeches in the opposite direction, thus *increasing* social distancing. We can only identify the sum of these two effects.

Figure 3 shows that 1 additional percentage point in Bolsonaro's vote share implies a posttreatment effect of approximately 0.1 points in the social distancing index. According to our data on the distribution of votes, the difference in Bolsonaro's vote

share between a municipality in the twenty-fifth percentile and another in the seventy-fifth percentile corresponds to approximately 36 percentage points. Based on our baseline results, such difference implies a reduction of 3.6 percentage points in the isolation index for the municipality in the seventy-fifth percentile relative to the one in the twenty-fifth percentile of this vote share. This represents approximately 16 percent of the pre-NPI social distancing, or 0.23 standard deviations of the mean.

Online Appendix Figure A.7 points out that results have a similar pattern when we assess day-by-day effects. Online Appendix Table A.2 shows the magnitude of the coefficients with different sets of controls. A potential drawback of our specification would be that the two prominent events are close in time, and thus it could be challenging to assess whether the first event had any impact. Figure 3, however, suggests that this is not a concern, as social distancing decreases in pro-Bolsonaro municipalities relative to anti-Bolsonaro municipalities right after the first main event.

Conceptually, the results are consistent with the first event working as a large information shock, and thus we observe an initial relative drop in social distancing. The second event operates as a confirmation of the president's view on the severity of the pandemic and/or on his opinion on social distancing measures, and therefore we note that social distancing remains relative lower after this event in pro- versus anti-Boslonaro municipalities.

C. *Threats to Identification Strategy and Interpretation*

As we use a difference-in-difference specification, our identifying assumption is that, in the period of analysis, municipalities with different vote shares for the president would have had similar trends in social distancing in the absence of the prominent events. Using the dynamic difference-in-difference analysis, we formally checked pre-trends in the dependent variable and showed no anticipatory effects. Nonetheless, there are some potential threats to our identification strategy that could still be present, which we now discuss.

For instance, it could have been the case that the timing of the prominent events we identified in our empirical strategy coincided with other relevant events that, in turn, triggered a reaction among Bolsonaro's followers. A plausible example of this would be a direct effect of Trump's words or actions related to COVID-19. Trump and Bolsonaro gave similar speeches relating to social distancing, and Bolsonaro's supporters also identified themselves with Trump. If Trump's speeches directly affected Bolsonaro's supporters' behavior, our estimates could be capturing part of this effect. In order for this to be a threat to our identification, it is necessary that Trump's activity regarding COVID-19 was extraordinarily salient and close to the main Bolsonaro-related events we are considering. In addition, it is necessary that Trump's speeches were consequential for Brazilian individuals regarding their social distancing behavior.

According to FactCheck.org (a nonpartisan and nonprofit project of the Annenberg Public Policy Center of the University of Pennsylvania), there were 32 COVID-19-related comments by Trump (or the White House) in our period of analysis (Kiely et al. 2020). Online Appendix Figure A.8 shows the counts (moving

average: two days) from the timeline of Trump's COVID-19 comments. The figure shows that there was no extraordinary activity regarding COVID-19 by Trump around the main events of our paper. The highest peak happened in early March 2020. Around March 15, the first event we study, the count of Trump's mentions to COVID-19 is similar to many other days before and after. Around the second event, the count is slightly higher, but considerably lower than the peak in early March. Likewise, regarding the content or the tone of Trump's words, he does not seem to have been any more cautious before or after the events.[13] This evidence, albeit anecdotal and suggestive, helps alleviate a potential concern related to Trump having a direct effect on the behavior of Bolsonaro's supporters.

Another potential concern would arise if the timing of the implementation of NPIs was systematically different between pro- and anti-Bolsonaro municipalities. In that case, our estimates could be capturing, at least partially, this effect.[14] The inclusion of state-period fixed effects alleviates part of this problem, as states implemented most of the policies. To study the role of changes in municipality-specific regulations, we estimate the baseline model using a municipality-level indicator variable (that equals 1 if a municipality implemented NPIs restricting agglomeration, requiring the closure of nonessential services, and making the use of face masks compulsory) as the dependent variable. In Figure 4 we show that there is no evidence that local mayors in pro-Bolsonaro municipalities adopted different local NPIs. Therefore, the results presented so far suggest that the relevant people's responses in pro-Bolsonaro (versus anti-Bolsonaro) municipalities are not driven by differences in local-level regulations.

Furthermore, one of the main prominent events we identified was a large protest. A threat could arise if further protests themselves directly affected the mobility of Bolsonaro's supporters. In that case, our identification would be threatened, as we would be confounding the effect of Bolsonaro's words and actions on social distancing with the mechanical effect of protesting. We formally test this possibility using civic protest data at the municipality-day level in the country. The data on protests are compiled by "The Armed Conflict Location and Event Data Project" (ACLED 2021), and they contain the detailed localization of protests. During the period of analysis, there were 490 civic protests, which means that the probability of having a protest on a given day-municipality is 0.12 percent. We estimate our main model using an indicator variable (that equals 1 if there was a protest in a given

[13] For instance, on March 7, 2020, Trump stated, "No, I am not concerned at all. No, we have done a great job with it" (when referring to the virus). On March 10, 2020, he noted that "We're prepared, and we're doing a great job with it. And it will go away. Just stay calm. It will go away." On March 13, 2020 (close to the first event of this paper), Trump declared a national emergency. On March 15, 2020, he said, "this is a very contagious—this is a very contagious virus. It's incredible. But it's something that we have tremendous control over" (a comment that could potentially be interpreted as Trump trying to convince people that there is nothing to worry about). The following day (March 16, 2020), the White House announced recommendations for a 15-day period designed to slow the spread of the coronavirus, involving measures such as staying at home. On March 17, 2020, Trump stated "I have always known this is a—this is a real—this is a pandemic. I have felt it was a pandemic long before it was called a pandemic."

[14] Even if this were true, it would not necessarily affect the internal validity of our results, but it would challenge the interpretation of our findings. If, for instance, mayors reacted to Bolsonaro's words and actions by changing regulations, we would be identifying the effect of Bolsonaro's actions on mayors' policies. If, instead, the timing of municipality-specific policies coincided with (but was not caused by) Bolsonaro's speeches, the internal validity of our estimations would be directly affected.

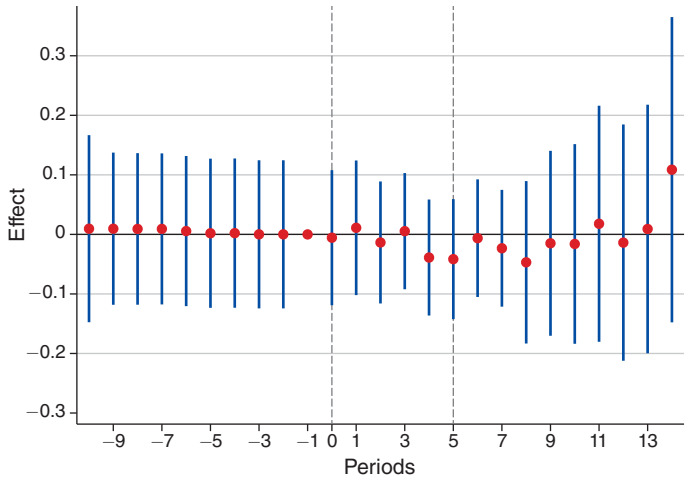

FIGURE 4. EFFECTS ON MUNICIPALITY-LEVEL NPIS

Notes: All results are expressed in percentage points (0–1 scale). The dependent variable is an indicator variable that equals 1 if a municipality has implemented local-level NPIs toward social distancing, restricting agglomerations, and use of face masks. The government support variable equals share of votes for the president in the first round of the 2018 elections. Coefficients are estimated from the empirical model in Section III for 3,975 municipalities for which data on social distancing index is available. Data are provided at the municipality-day level. The period before the first prominent event is normalized to zero at $t = -1$. Vertical dotted lines indicate the two prominent events. The dependent variable is the social distancing index for municipality m on day-period d (two adjacent days). The first municipal NPIs were implemented at the end of February so that the figure starts the analysis on $t = -10$. Standard errors are clustered at the state-period level. Confidence intervals are 95 percent.

day-municipality and 0 otherwise) as the dependent variable. In online Appendix Figure A.9, we show the results. There were no significant spikes in the number of protests in pro-Bolsonaro versus anti-Bolsonaro municipalities after the main events. If anything, the figure suggests a reduction (although nonsignificant) in the probability of a protest happening right after the first event. By contrast, if the protests change the risk perception of the population, our findings would be partially be explained by this factor.

Finally, although we control for characteristics at the municipality level (interacted with period effects), pro- and anti-Bolsonaro municipalities could still differ in unobservable dimensions besides their political preferences. Consequently, if the reaction to Bolsonaro's words and actions were driven by other such individual characteristics, which were not controlled in our empirical specification, we could be capturing the effects of these unobservable features and not differences in behavior due to differences in support for the president. For instance, municipalities could differ by their age structure or the prevalence of slums (Brotherhood et al. 2022). We believe this is unlikely to explain a significant part of our results because those features should affect social distancing during the whole pandemic and not only following Bolsonaro's speeches and actions.

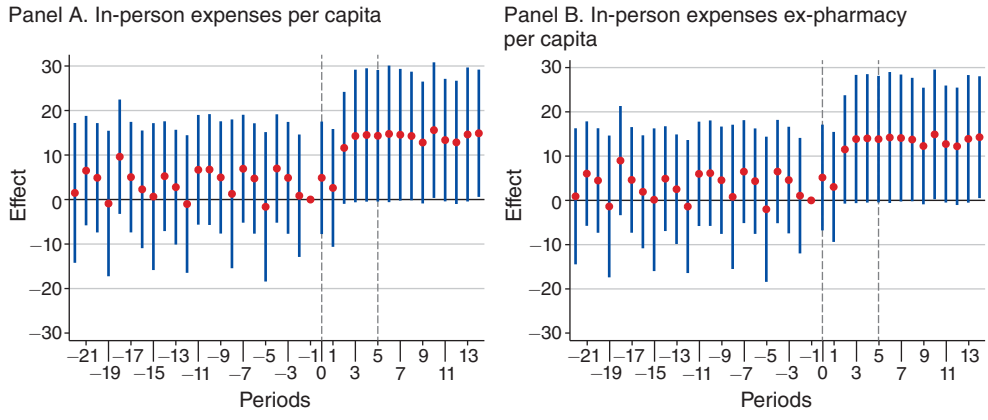

FIGURE 5. CREDIT CARD EXPENSES

Notes: Coefficients are estimated from the empirical model in Section III for 3,975 municipalities for which data on social distancing index are available. The day before each intervention is normalized to 0 at $t = -1$. Vertical dotted lines indicate the two prominent events. Panel A: the dependent variable is the per capita value of in-person credit card expenses in municipality m on day d. Panel B: the dependent variable is the per capita value of in-person credit card expenses (excluding purchases in pharmacies) in municipality m on day d. The government support variable equals share of votes for the president in the first round of the 2018 elections (the scale is 0–1). Standard errors are clustered at the state-day level. Confidence intervals are 95 percent.

D. *Further Analysis*

If the results on social distancing reflect a relative increase in mobility, we should also expect a relative increase in expenses in person.

In Figure 5, panel A we provide evidence by estimating the empirical model using (per capita) in-person card expenses as the dependent variable. Results indicate that in-person card expenses increased immediately after the first event. An additional 1 percentage point of Bolsonaro's vote share is associated with a 0.14 real (the local currency) increase in per capita in-person expenses. Thus, moving from a municipality in the twenty-fifth percentile of vote share to another in the seventy-fifth percentile of vote share is associated with an increase of 5 reais, which represents a 0.58 standard deviation increase in daily per capita in-person expenses. In-person purchases include several categories of commercial transactions, including nonessential activities. To exclude expenditures on essential goods, in Figure 5, panel B we examine (per capita) in-person card expenses, excluding purchases in pharmacies, and find an almost identical pattern to per capita expenses. The documented relative increase in mobility in pro- versus anti-Bolsonaro municipalities seems not to be capturing only low-risk activities (e.g., outdoor exercising) or essential trips.

For robustness, in online Appendix Figure A.10, we estimate the empirical model using different definitions of credit card expenses as the dependent variables. In online Appendix Figures A.10(a) and A.10(b), we document an increase in *total* in-person card expenses (expressed in reais) including and excluding pharmacy expenses, respectively, in pro- relative to anti-Bolsonaro municipalities.

E. *Channels*

To provide suggestive evidence on the mechanisms underlying our findings, we first explore the potential role of the local media. In Figure 6, we estimate the baseline model for two subsamples: municipalities where there is no presence of local TV broadcasters (Figure 6, panel A) and those where there is at least one (Figure 6, panel B). Consistent with papers showing the crucial role of local media in spreading news in Brazil (e.g., Ferraz and Finan 2008; Varjao 2019), the results seem to be driven by municipalities with some presence of local media.

We then study the role of social media (Twitter, a platform intensively used by Bolsonaro). We define a Twitter-usage indicator, proceeding as follows. We first live streamed all the tweets in Brazil (a less computationally costly procedure than scraping older tweets). Our program ran for five days (July 20–24, 2020), capturing tweets every 20 minutes. We captured 60,000 tweets, which we then classified according to their municipality. We defined a simple indicator that equals 1 if there is at least one tweet and 0 otherwise, which divides the sample into two approximately equal-sized subsamples. In Figure 6, panel C and Figure 6, panel D, we show the results. The pattern seems clear: there is no impact among municipalities with no presence of active Twitter accounts, and a large impact among the rest. The presence of Twitter activity could be correlated with omitted variables, and thus our results are only suggestive.

We also assess the relevance of the presence of evangelicals, who represent around a quarter of the population and had the largest vote share for Bolsonaro (70 percent) among any religious group (Folha 2018). Unlike other religious groups that also supported Bolsonaro in 2018, evangelicals explicitly supported his handling of the pandemic against isolation policies (Bächtold 2020). We analyze whether municipalities with a greater share of evangelicals show a different pattern in social distancing. We implement this by splitting municipalities into two subsamples: below or above the municipal median proportion of evangelical parishioners. Figure 6, panel E and Figure 6, panel F suggest that the fall in social distancing of pro- relative to anti-Bolsonaro municipalities is stronger in municipalities where the proportion of evangelical parishioners is above the municipal median than in those where the proportion is below the median—although effects are also significant for the latter group in some periods.[15]

F. *Robustness Exercises*

We now perform robustness exercises for the baseline social distancing analysis. To check other measures of government support, we create two alternative definitions for $GovSup_m$. The first one is a "pro-government" indicator variable that equals 1 if Bolsonaro's vote share in municipality m was above the median observed

[15] In the online Appendix, we show that the results on traditional media, social media, and the presence of evangelicals are robust when we use alternative definitions of government support (above/below state median and majority of votes)—see online Appendix Figures A.11 and A.12. Using these alternative definitions, the results in municipalities where the proportion of evangelical parishioners is below the median are less strong.

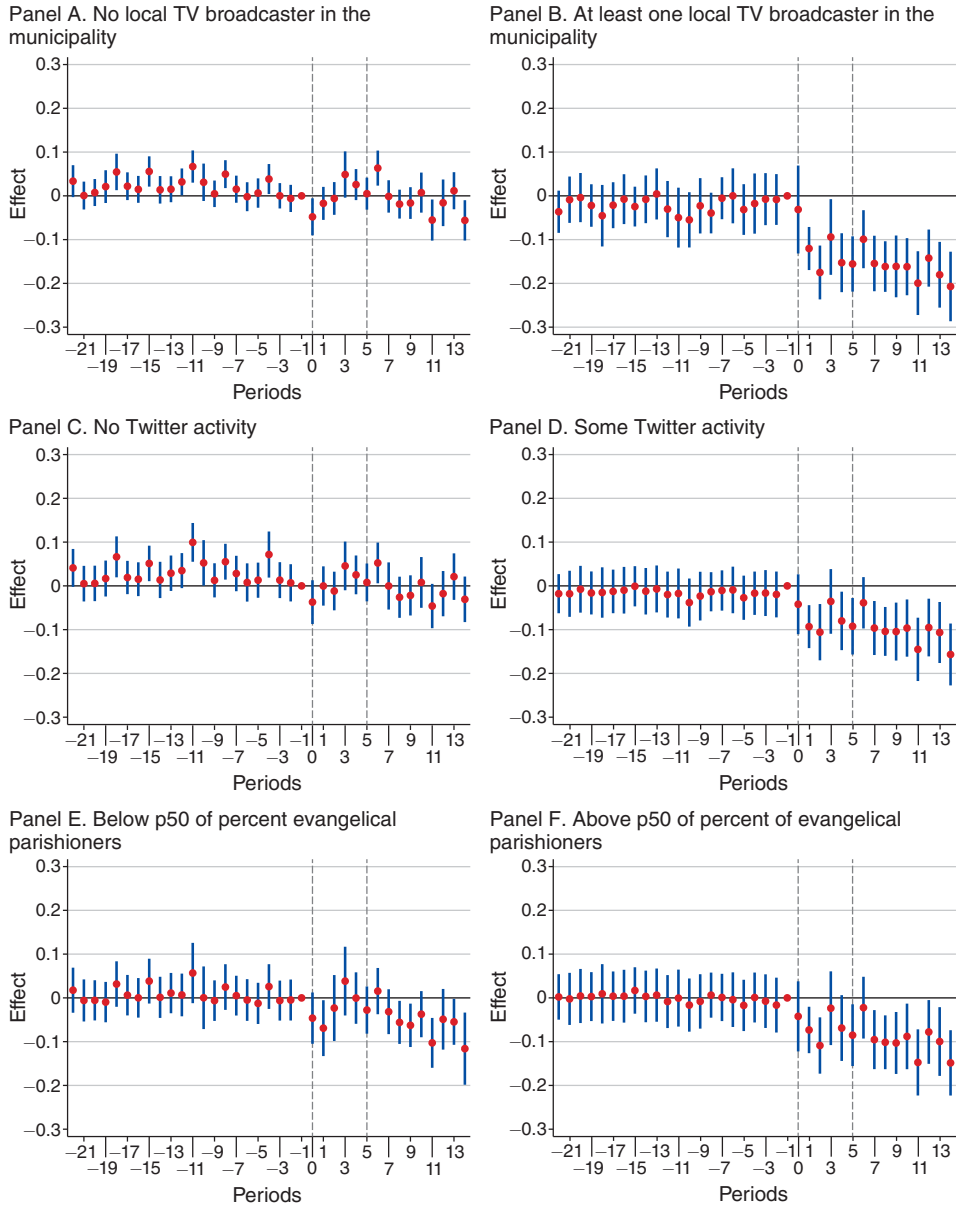

FIGURE 6. AVERAGE EFFECT ON SOCIAL DISTANCING—BY MEDIA PRESENCE, TWITTER ACTIVITY, AND PRESENCE OF EVANGELICAL PARISHIONERS

Notes: All results are expressed in percentage points (0–1 scale). Coefficients are estimated from the empirical model in Section III for 3,975 municipalities for which data on social distancing index are available. Data are provided at the municipality-day level. The period before the first prominent event is normalized to 0 at $t = -1$. Vertical dotted lines indicate the two prominent events. The dependent variable is the social distancing index for municipality m on day d. The government support variable equals share of votes for the president in the first round of the 2018 elections. Panel A shows the results for municipalities without a local TV broadcaster, while panel B presents for municipalities with at least one local TV broadcaster. Panel C shows the results for municipalities where no Twitter activity was registered in the sampled days. Panel D shows the results for municipalities where some Twitter activity was registered in the sampled days (at least one tweet). Panel E shows the results for municipalities with below-median percentages of evangelical parishioners (non-Pentecostal), while panel F shows for above-median. Standard errors are clustered at the state-day level. Religion data come from the 2010 census. Confidence intervals are 95 percent.

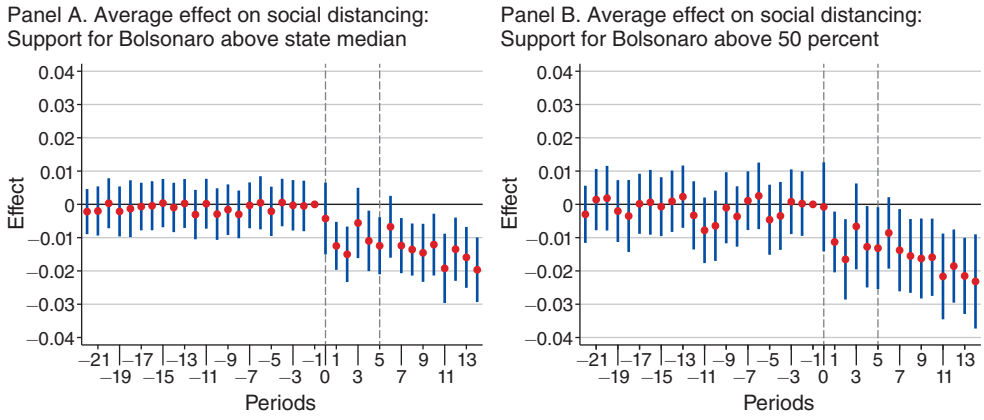

Figure 7. Social Distancing: Robustness to Using Alternative Definitions of Government Support

Notes: All results are expressed in percentage points (0–1 scale). Coefficients are estimated from the empirical model in Section III for 3,975 municipalities for which data on social distancing index is available. Data are provided at the municipality-day level. The period before the first prominent event is normalized to zero at $t = -1$. Vertical dotted lines indicate the two prominent events. The dependent variable is the social distancing index for municipality m on day d. Panel A shows the results when the treated dummy equals 1 if the votes for the president in the first round were above the median observed in the state. Panel B presents the results when the treated dummy equals 1 for municipalities where votes for the president were above 50 percent in the first round of the 2018 election. Standard errors are clustered at the state-day level. Confidence intervals are 95 percent.

in the state in the first round of the 2018 presidential election. Notice that we keep within-state variability with this pro-government dummy. In this case, β_τ of equation (1) should be interpreted as a change in percentage points in the social distancing of pro-government localities (compared to other municipalities) relative to the base period. The results presented in Figure 7, panel A, show a very similar pattern: no clear "political divide" before the first event, after which there is a drop of about 1.5 percentage points in the social distancing index for pro-Bolsonaro municipalities relative to the other municipalities. The effects seem to persist after the second event.

In Figure 7, panel B we present the results for a second "pro-government" indicator variable that equals 1 if Bolsonaro had more than 50 percent of the votes in the first round of the election. The results are again similar in magnitude and significance: there are no anticipatory effects and a large posttreatment effect—an average reduction of the social distancing index of about 1.5 percentage points in pro- relative to anti-Bolsonaro municipalities.

IV. Conclusion

Modern populist movements are based on the claim that they protect the people from a corrupt elite (e.g., Guriev and Papaioannou 2020). Since scientific experts are, in general, part of the elite, populist leaders frequently campaign against scientific advice. During the COVID-19 pandemic, the Brazilian president explicitly challenged the advice of experts and publicly spread an anti-isolation message. We investigate how his words and actions triggered the adoption of risky behavior

among his supporters during a health crisis, above and beyond the effect of institutions and regulation.

We document a significant decrease in social distancing in pro-government municipalities versus anti-government municipalities following the president's most visible events advising, through words and example, against self-isolation behavior and policies. Consistently, in person credit card expenses grew. Our findings have potentially far-reaching implications for different issues societies face beyond the COVID-19 pandemic, such as adherence to climate change mitigation policies, compliance with vaccination campaigns, coordination of nonviolent protests, and openness and respect for the differences that exist among individuals.

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