Assessing the impact of Covid-19 on support for democracy in Brazil: a panel study

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ABSTRACT **Introduction:** While substantial shifts in political and social values typically evolve over generational timescales, exceptional disruptive events can occasionally prompt swift changes in societal attitudes. This article investigates the extent to which the Covid-19 pandemic has influenced the level of democratic support among Brazilian citizens. **Materials and methods:** Our research employed a three-wave online longitudinal panel study (N = 1,301) to assess the attitudes of Brazilian citizens towards democracy at three distinct intervals throughout the Covid-19 pandemic. Our research tool gauged various dimensions of democratic attitudes and inquired about the respondents' experiences with Covid-19 as well as of their close social circles. Utilizing a combination of propensity score matching and a difference-in-differences design, we estimated the causal effect of the Covid-19 experience on both "diffuse" and "specific" support for democracy. **Findings:** Our analysis revealed that exposure to the virus had limited overall impact on our measures of democratic support. However, we did identify some evidence indicating that severe exposure to Covid-19 had a negative effect on one dimension of democratic support, specifically, diffuse support. **Discussion:** Our findings underscore the resilience of deeply ingrained ideological beliefs and values. Despite being one of the most disruptive global events in recent history, the Covid-19 pandemic displayed only a modest influence on the foundations of democratic culture. While this suggests that concerns about the pandemic's impact on democratic attitudes may have been overstated, it remains crucial for social and political leaders to remain mindful of actively reinforcing and upholding democratic governance during the post-pandemic recovery phase.

I. Introduction[1]

The international landscape in recent years has been precarious for liberal democracies. The latest report from the V-Dem Institute highlights that in 2021 there was a record number of autocratization processes, with 33 countries, comprising 36% of the world´s population experiencing a deterioration of the democratic regime (V-Dem, 2022). It is still early to know what role the Covid-19 pandemic has played in the processes of political change around the world, but it already seems certain that democracy is at a crossroads in the post-pandemic world. On the one hand, an increasingly authoritarian world, marked not only by more repression in already authoritarian environments, but also by the use of authoritarian tactics in democratic regimes, puts the survival of democratic norms and institutions at risk. On the other hand, there are auspicious seeds of innovation and government reform being planted in diverse contexts, as many governments and citizens realize that basic political freedoms will only survive if democracy adapts and revitalizes itself for new generations facing major challenges (International IDEA, 2021).

An imperative question refers to the impact of the pandemic on the values and political attitudes across various countries. The political culture tradition holds that the functioning and survival of democratic institutions at the systemic level are closely linked to value orientations at the individual level

(Almond & Verba, 1989), so that the prevalence of a civic culture (or, democratic culture) is essential for the sustainability of democracy (Moisés, 2011). While political attitudes are generally slow to change, certain acute crises such as wars (Hong & Kang, 2017), natural disasters (Lazarev et al., 2014), and major economic crises (Grosjean et al., 2013) have been shown to disrupt attitudinal balances and promote rapid changes in beliefs. The Covid-19 pandemic may represent such a crisis. Therefore, this research seeks to answer the question of whether variable exposure to the Covid-19 pandemic caused changes in support for democracy.

The Covid-19 pandemic is one of the most dramatic social crises since World War II, presenting an excellent opportunity to explore the impact of the crisis. The spread of the coronavirus has rapidly reached a global scale, progressing at high speed and severely restricting the daily lives of billions of people. In this scenario, the tragic pandemic offered us a unique opportunity to study how people's political orientations behave in times of crisis. Accordingly, our study seeks to investigate the extent to which exposure to Covid-19 affected support for democracy in Brazil through an online longitudinal panel that surveyed a sample of 1,301 respondents throughout three different stages of the pandemic: (i) Wave 1 - "In the middle of the crisis: first peak of the pandemic" (May/June 2020); (ii) Wave 2 - "End in sight: start of vaccination" (January/February 2021); (iii) Wave 3 - "In recovery: public life begins to turn back to normalcy" (September/October 2021).

Brazil is among the countries that have suffered the most from this crisis. In fact, President Jair Bolsonaro has shown clear authoritarian inclinations in dealing with the pandemic, suggesting that this crisis has indeed represented a real threat to the country's young democracy (Rennó et al., 2021). In addition, the country figures in the infamous list of the top 10 countries that have regressed the most democratically in the last decade, alongside nations such as Hungary, Poland, and Turkey (V-Dem, 2022), which raises signs of concern for the future of democracy in Brazil.

Methodologically, we combine Difference-in-Differences (DiD) and Propensity Score Matching (PSM) to estimate the impact of the coronavirus crisis on support for democracy in Brazil, using the first wave of the panel as pre-treatment period and the last wave as post-treatment time period. Our outcome variables are two continuous measures of specific and diffuse support for democracy. While specific support addresses more concrete elements of the regime, such as trust in the government or institutions, the diffuse support encompasses more abstract elements of democratic principles, such as formal preference for democracy and rejection of its relativization. Our treatment variables are three dummies that represent health experiences with the pandemic: testing positive for Covid-19; having experienced severe Covid-19 symptoms; and having close people who experienced severe Covid-19 symptoms. We also control for other possible confounders factors, such as sociodemographic characteristics and personality traits.

Most of the results obtained were not statistically significant, suggesting that the experience of the pandemic has not greatly affected support for democracy in Brazil. However, we did find some evidence that the experience of having severe Covid-19 symptoms corresponds to a small but significant decrease in the diffuse support for democracy among Brazilians. Interestingly, specific support remained largely unchanged. These results suggest that, due to the shallowness of the democratic roots in the Brazilian soil, crisis events might usually result in a tendency toward citizens to oust the regime, leaving its ailing institutions and incumbent government untouched (or even strength-

ened). Hereafter, in order to make Brazilian democracy sustainable and resilient in the face of future crises, social and political actors should strive to improve the country's democratic culture, whether through public policies or strategic actions by civil society.

The paper is organized as follows: Section 2 carries out a literature review addressing the potential impact of crises on the democratic regime, with a particular emphasis on the burgeoning empirical research studying the effects of Covid-19 on regime stability all over the world; Section 3 presents the research design, the hypotheses, a description of the survey, and model specifications; Section 4 displays the construction of our variables of interest and the main results achieved; Section 5 concludes with the discussion of the results and some final remarks on their implications and limitations.

II. Literature review

II.1 Democracy in a context of crisis

Every political regime depends on the combination of two elements: legitimacy - i.e., being recognized by the governed citizens - and strength - i.e., being able to act and enforce its deliberations (Diamond, 2015). Democracies, in particular, require greater legitimacy and voluntary obedience, so they rely primarily on popular assent to the regime (Gunther & Monteiro, 2003). Authoritarian regimes, on the other hand, rely more on strength, although they also depend to some extent on popular agreement to endure. In democracies, therefore, it is particularly important to maintain legitimacy in order to protect the democratic rule of law. Hence, it is not surprising that the phenomenon of crises is so significant in explaining the success or failure of democratic regimes (Moisés, 2019).

The quality of democracy approach contributes to this understanding, as it postulates that a high-quality democratic regime must satisfy citizens' expectations regarding the mission they assign to governments (quality of outcomes), allow citizens to enjoy extensive freedom and political equality (quality of content) and provide a context in which citizens can evaluate and judge the performance of governments through elections and checks and balances mechanisms (procedural quality) (Diamond & Morlino, 2004). The quality of democracy tends to deteriorate in times of crisis due, among other factors, to an increase in citizens' negative assessment of government responsiveness and delivery (Morlino & Quaranta, 2016). Thus, to the extent that the quality of results is not achieved satisfactorily, citizens begin to withdraw their support for the regime, harming the component of legitimacy so dear to democracy.

It must be considered, however, that legitimacy is a multidimensional phenomenon, as Easton (1965) rightly pointed out long ago from the differentiation between diffuse and specific support for political regimes. Diffuse support could be understood as attitudes towards the political community and the regime in a more abstract way, while specific support would be oriented towards the performance of political authorities (Seligson et al., 2006). Norris (1999) goes a step further in the multidimensional conceptualization of the phenomenon and proposes five basic objects to which political legitimacy may be conferred: i. Political community; ii. Regime principles; iii. Regime performance; iv. Regime institutions; and v. Political actors. Even in this conceptualization, however, it is still possible to identify the two poles proposed

by Easton: the legitimacy conferred on the political community (nation) and on the regime principles (norms and values) would be closer to diffuse support, while the legitimacy conferred on the regime performance (government functioning in practice), regime institutions (legislative and judicial institutions) and political actors (leaders in power) would come closer to specific support (Seligson et al., 2006).

With regard to the effects of crisis on legitimacy, it is worth noting that, at least in theory, they would be more directly related to specific support and its subcomponents, since these constitute the most concrete elements for citizens to evaluation. Diffuse support and its subcomponents would only be indirectly affected, given their more abstract nature and the fact that they constitute a "reservoir" built up and socialized over many years which is slowly eroded. However, the reality of young democracies, such as the Brazilian one, suggests that measures of legitimacy based on citizens' adherence to the values and ideals of the democratic regime may not be the best to appraise its stability or consolidation, since their populations do not have the prolonged experience with this political system that would be necessary for the internalization of such values (Moisés, 2010; Ribeiro, 2007).

II.2 Covid-19 pandemic and the crisis of democracy

The Covid-19 crisis is considered by many analysts to be the most dramatic event in human history since World War II. According to data from the monitoring carried out by Johns Hopkins University in the United States, by November 2022 there had been already more than 600 million cases of Covid-19 worldwide and more than 6 million deaths caused by the disease, with over 30 million cases and more than 600,000 deaths in Brazil alone. However, unlike crises of an exclusively economic nature, epidemics are events connected to the imponderable of natural disasters and catastrophes, and thus can generate sociopolitical consequences different from those expected by purely market shocks. In fact, extensive literature has already observed how events of this nature contribute to the generation of social capital in terms of solidarity, collaboration, and trust, which, in turn, help to mitigate their negative effects (Asri et al., 2017; Straub et al., 2020; Zoorob & Salemi, 2017).

In this way, we can see a certain ambiguity about the possible impacts of the pandemic on democracies around the world, given that heterogeneous effects have already been observed in past epidemics due to differences in terms of power and political culture between nations (McLafferty, 2010). Indeed, the emergence of the coronavirus crisis in 2020 had presented us with a new social fact: while the Covid-19 pandemic has similarities to economic crises, insofar as it affects markets and material life, it generates unprecedented consequences in the political life of citizens, on the one hand by restricting social mobility, demanding public surveillance and imposing containment measures (Barriga et al., 2020; Peron et al., 2020), and, on the other, by enhancing social capital and state capacities (Ali et al., 2021; Chathukulam & Tharamangalam, 2021). Thus, one of the main current debates focuses on the implications of the current crisis for the sustainability of democracy in countries whose democratic regimes are still poorly consolidated, such as Brazil.

One conjecture could be that authoritarian governments are better able to face the coronavirus crisis and overcome it, given that they have more instruments of power and are more willing to make use of coercive forces (Ali et al.,

2021). However, preliminary empirical tests suggest that, despite their greater power and control, authoritarian regimes have not been more effective in containing the pandemic compared to democratic nations (Frey et al., 2020). Indeed, a dimension that must be considered to better understand this dynamic concerns the legitimacy of government actions towards the population. In fact, the success of social control in facing the pandemic seems to depend largely on the voluntary compliance of citizens (Ali et al., 2021), which suggests the prominent role that a democratic culture based on civic engagement and social capital may have at this time (Chathukulam & Tharamangalam, 2021).

In the Brazilian case, from an institutional point of view, democracy scholars have already observed that, despite the disastrous handling of the pandemic by the federal government, the institutional arrangement ruling in the country has been able to limit the government's negligent policies and attitudes and take measures to protect society (Barberia & Gómez, 2020). Some experts have considered that, despite the tragic human consequences of the pandemic, Brazilian democracy could emerge invigorated from this crisis, which, to a certain extent, exposes the weaknesses and anti-democratic tendencies of the Bolsonaro government and drives a coalition of opposition between political and economic elites (Smith, 2020). Therefore, the post-pandemic in Brazil could be more auspicious than one would imagine for a country with a young and poorly consolidated democracy.

However, the political culture of the masses also matters for regime survival, in addition to the functioning of institutions and the interests of elites (Moisés, 2008; Rennó, 1998). To the extent that the aggregate distribution of values and attitudes in a population shapes the patterns of human behavior and institutional design, the individual-level experiences from the coronavirus crisis could have important implications for societal-level outcomes in terms of consolidation of democracy. From this perspective, preliminary studies have already pointed to less favorable indications about the effects of the pandemic on the democratic crisis in Brazil (Rennó et al., 2021; Avritzer & Rennó 2021). In the wake of contemporary economic and political shocks, illiberal narratives tend to gain strength, especially in countries whose democratic roots are shallow (Welzel, 2021). In turn, the depth of such roots seems to be directly associated with the prevalence of a political culture that sustains the functioning and survival of democracy at a systemic level. As the Brazilians' commitment with democracy has proved unstable in the last decade, we consider vital to investigate how the experience of the pandemic has affected support for democracy in the country.

While much of the research on the impacts of disasters and traumatic events on political attitudes and behaviors has remained focused on the aggregate societal level, there is important work that have moved down to the community or individual level, more precisely measuring the impact of these events based on variable exposure between individuals. Cohen et al. (2019), for example, investigates whether block-level exposure to police violence impacts citizen´s attitudes toward the municipal government in Los Angeles while Marsh (2023) finds that individual exposure to traumatic events decreases the likelihood that the individual will vote in the following presidential election, contributing to an empirical tradition going back to Achen & Bartels (2017) who found that shark attacks influenced voting behavior in New Jersey. Support for democracy can also be influenced by short-term shocks, including terrorist attacks (Davis & Silver, 2004), sudden changes in perceived government efficiency (Magalhães, 2014), economic crisis or windfall (Facchini & Melki, 2023; Franck, 2016), or violent anti-democratic acts by political elites (Graham & Svolik, 2020).

Where there are possible society-wide values shift due to traumatic events, the first place where such movement in attitudes will appear is among those individuals who are most directly and severely impacted by the disaster. For this reason, while the Covid-19 pandemic and its countermeasures were experienced by all, we are likely to find attitudinal shifts most strongly among those who were themselves infected, or experienced severe symptoms.

III. Research design

III.1 Hypotheses

Based on various versions of existential insecurity theories, one possible hypothesis posits that the sudden emergence of existential anxieties would cause values to shift in a protective direction among those who feel these anxieties more acutely (Inglehart et al., 2006). This protective shift in values would lead people to place greater emphasis on security, order, authority, uniformity, and conformity. As a result, trust in strangers, tolerance for plurality and transcendent solidarity would be weakened, leading people to give in to the appeals of authoritarian leaders. If they persevered, the consequences of these changes in mindset for public support for democracy would be dire. This is the reason why we raised the first hypothesis:

Hypothesis 1 (H1): Experience with Covid-19 has made citizens decrease their support for democracy.

As an alternative hypothesis, the perception of natural disasters such as pandemics does not necessarily equate to the perception of existential threats characterized by group hostilities, as in the case of wars or terrorism, when one group threatens the existence of the other (Lazarev et al., 2014). Unlike these specific threats, pandemics are inherently universal because they threaten everyone, regardless of social class, ethnicity, and religion, although individuals in a state of greater social vulnerability tend to suffer more (Silva & Mont'alverne, 2020). It is therefore a plausible hypothesis that the very universality inherent in the threat of the Covid-19 pandemic would strengthen a pervasive sense of humanity in people. In this case, trust in strangers, tolerance for plurality and transcendent solidarity would be enhanced and, consequently, there would be a decrease in the appeal of authoritarian governments. Therefore, public support for democracy would not be harmed but, on the contrary, would benefit from this moment. Hence, our alternative second hypothesis is:

Hypothesis 2 (H2): Experience with Covid-19 has made citizens increase their support for democracy.
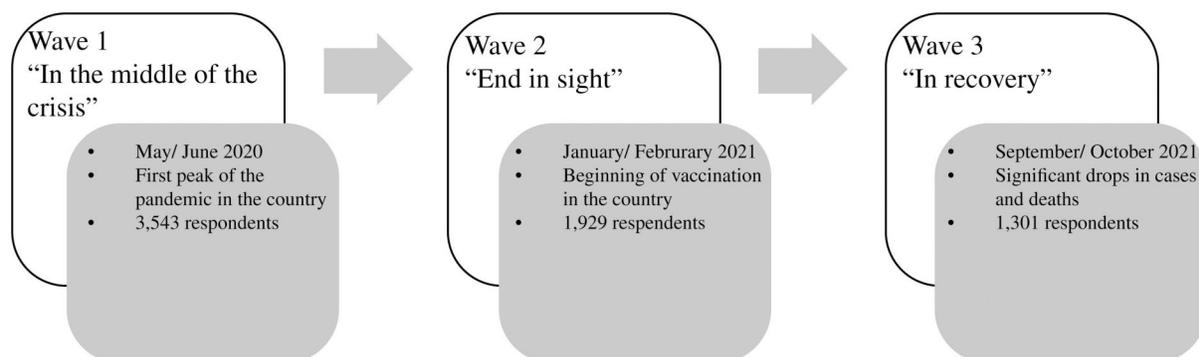
III.2 Data

In order to test these hypotheses, we implemented a longitudinal online panel study to examine the same people at different stages of the Covid-19 pandemic in Brazil. The objective was to assess how these respondents' perception of the crisis changed over time and how these changes in perspective affected their moral values and socio-political orientations. The interviewees were drawn from a non-probabilistic sample stratified by quotas that represented the main sociodemographic characteristics of the Brazilian population

in terms of gender, age group, education level, and region of residence according to information from the 2010 Brazilian Demographic Census (IBGE, 2010) and the Continuous National Household Sample Survey (Continuous PNAD) for the first quarter of 2020 (IBGE, 2020). To carry out the survey, Netquest, an online panel polling company, was hired to administer the questionnaire virtually to the sample of panelists that were selected based on the stratification criteria. The research was conducted by the Sivis Institute, a Brazilian think tank whose mission is to pursue through research and strategic social action a collaborative, honest and democratic Brazil, and the microdata is available on its website (SIVIS, 2021).

The planning of the research included the application of three waves of the panel programmed as follows: Wave 1 "In the middle of the crisis" (applied in May/June 2020, at the first peak of the pandemic in the country, when measures such as quarantines and curfews were beginning to be implemented more rigorously); Wave 2 "End in sight" (applied in January/February 2021, when vaccination started in the country), Wave 3 "In recovery" (applied in September/October 2021, when cases of infection and death started to decrease significantly and vaccination already reached about 70% of the Brazilian population). The first wave had 3,543 respondents, while in the second wave responses were obtained from 1,929 individuals, which corresponds to a retention rate of 55% of the panel. In the third wave, 1,301 respondents remained, corresponding to a retention rate of 67% in relation to the second wave and 37% in relation to the first. Figure 1 displays visually the panel timeline.
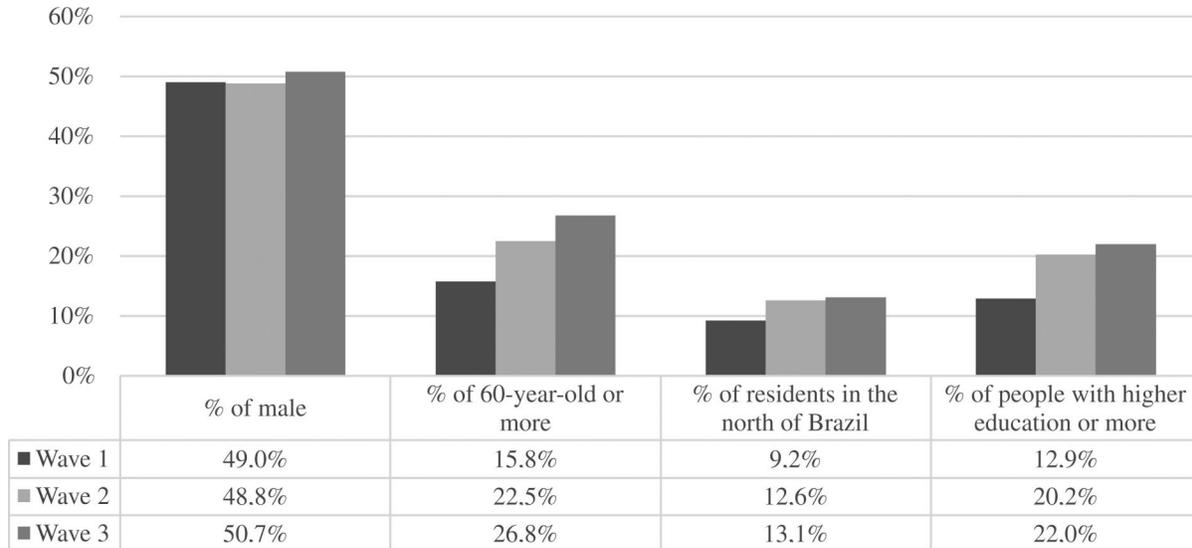
As a consequence of attrition, the individuals who remained in the panel were disproportionately older and more educated in comparison to Wave 1, so they do not reproduce some of the key socio-demographic characteristics of the Brazilian population. Graph 1 shows the main sociodemographic characteristics that have gained relevance because of attrition. However, it should be noted that this unbalance is not necessarily a problem, since this type of distortion is expected in longitudinal panel studies and the panel structure allows for effects to be measured "within-subject". Furthermore, due to the longitudinal nature of the research, the main interest lies in the analysis of individuals over time, rather than maintaining their sociodemographic characteristics static.

Figure 1 - Panel timeline

Wave 1
"In the middle of the crisis"
- May/ June 2020
- First peak of the pandemic in the country
- 3,543 respondents

Wave 2
"End in sight"
- January/ Februrary 2021
- Beginning of vaccination in the country
- 1,929 respendents

Wave 3
"In recovery"
- September/ October 2021
- Significant drops in cases and deaths
- 1,301 respondents

Source: authors' elaboration, 2023.

Graph 1 - Sociodemographic characteristics that have gained weight throughout the panel survey waves

	% of male	% of 60-year-old or more	% of residents in the north of Brazil	% of people with higher education or more
■ Wave 1	49.0%	15.8%	9.2%	12.9%
■ Wave 2	48.8%	22.5%	12.6%	20.2%
■ Wave 3	50.7%	26.8%	13.1%	22.0%

Source: authors' elaboration, 2023.

III.3 Methods

As we are working with a panel dataset, a natural design is the Difference-in-Differences (DiD) estimator to assess the impact of experiences with Covid-19 on support for democracy in Brazil. This is a useful method when the treatment assignment rule (in our case, whether the individual had a particular experience with Covid-19) is largely unknown. This method compares the change in outcomes over time between a population that received the treatment (treatment group) and a population that did not (control group). The DiD approach is often associated with so-called "natural experiments", in which policy changes or natural events can be used to effectively define control and treatment groups (Imbens & Wooldridge, 2009).

Covid-19 infection probably does not represent a truly random assignment, as many beliefs and behaviors such as negating the existence or seriousness of the virus are likely endogenous to political attitudes. This is especially the case in a country like Brazil where the president at the time was highly vocal about minimizing the perceived threat of the virus and questioning the virus effectiveness. Research investigating the relationship between political party affiliation and infection in the US, for example, show that Republican voters were more likely to engage in risky behaviors than Democrats (Kiviniemi et al., 2022). Research in Brazil suggests that Bolsonaro supporters may have been similarly more exposed (Moura de Oliveira & Veronese, 2023; Scopinho et al., 2021).

However, we do not believe that this self-selection effect is necessarily a threat to inference for two reasons. First, our matching strategy described below helps to compare treated units to control units who are otherwise similar. That is, control units that are estimated to have a similar likelihood to have been infected. Since we match on several social and political attitudes that might explain self-selection into exposure to Covid-19, we are minimizing the risk of comparing dissimilar units. Second, for self-selection to bias the results of the difference-in-differences estimator, the self-selection would have to be endogenous to *both* selection into treatment and within-unit *changes* in the

dependent variable. While attitudes toward the virus that might predict exposure to Covid-19 are almost certainly endogenous to *levels* of support for democracy, we do not see a compelling reason to believe that they are also endogenous to the observed *changes* in these attitudes over the period of investigation. Therefore, while we cannot completely dismiss the danger of selection bias, we believe that our treatment indicator is adequate for the question under investigation in this paper.

The canonical setting of DiD is one in which outcomes are measured for units observed in one of two groups (treatment or control group), and in one of two time periods (pre- or post-treatment)[2]. The average outcome over time in the non-exposed (control) group is subtracted from the average outcome over time in the exposed (treatment) group. This double differentiation removes biases in second period comparisons between the treatment and control group that could be the result from permanent differences between those groups, as well as biases from comparisons over time in the treatment group that could be the result of time trends unrelated to the treatment (Imbens & Wooldridge, 2009). Put more simply, the DiD method computes the impact estimate of an intervention as follows (Gertler et al., 2016):

1. Calculate the difference in the outcome (Y) between the before and after situations for the treatment group (B - A).
2. Calculate the difference in the outcome (Y) between the before and after situations for the control group (D - C).
3. Then finally calculate the difference between the difference in outcomes for the treatment group (B - A) and the difference for the control group (D - C), or difference-in-differences (DiD = (B - A) - (D - C)). This difference-in-differences is the impact estimate.

Its mathematical specification is given by the following formula, wherein "Intervention" is a binary indicator for being in the treatment group; "Time" is a binary indicator for the period after treatment; "Intervention*Time" is the interaction term of both these variables, so that $\beta 3$ measures the impact of treatment on the treated group; and "Covariates" is a set of control variables included to address potential confounding effects:

$$Y_{it} = \beta_0 + \beta_1 * [\text{Time}]_{it} + \beta_2 * [\text{Intervention}]_{it} + \beta_3$$

$$* [\text{Intervention} * \text{Time}]_{it} + \beta_4 * [\text{Covariates}]_{it} + \varepsilon$$

Therefore, we can say that instead of comparing the outcomes between the treatment and control groups after the intervention, the DiD method compares trends between the treatment and control groups. Consequently, for the method to provide a valid estimate of the counterfactual, we must assume that there are no such time-varying differences between the treatment and control groups (Gertler et al., 2016). Another way of thinking about this is that, in the absence of the intervention, the differences in outcomes between the treatment and control groups would move together. This is the so-called "parallel trends" assumption, which puts a great burden at this method. Moreover, if any other factors are present that affect the difference in trends between the two groups and they are not accounted for in the multivariate regression ran to estimate DiD, the estimation will be invalid or biased.

In order to minimize these shortcomings, we combine DiD and Propensity Score Matching (PSM), a very popular technique among social science scholars, although recent studies have pointed out some important flaws that can result from its misuse (King & Nielsen, 2019). The basic idea of matching is to estimate what would have happened to someone under the counterfactual state

[2] Therefore, for the main analysis in this paper, we only rely on the first and third waves of our longitudinal panel. Besides, in order to comply with the conditions that there are no units exposed to treatment in the first period and that the units in the control group are never exposed to treatment, we had to exclude from the database the individuals who underwent treatment in the first wave, which were a large minority due to the early stage of the pandemic.

(i.e., the alternative treatment status) by looking at what happened to someone just like them who actually experienced that counterfactual state. So, for instance, to estimate an intervention impact for a treated individual, the matching approach forms an estimate of that individual's outcome in the absence of receiving the treatment by using the outcome observed for a similar non-treated individual (Lance et al., 2014). PSM is a particular matching technique that estimate the counterfactual for each individual in a sample by matching them to an individual who experienced the counterfactual state and had a similar probability of receiving a treatment conditional on J observed characteristics, which mathematically can be written as:

$$\Pr(P = 1 | x_1, \ x_2 ... x_J)$$

When baseline data is available, PSM can be combined with DiD to reduce the risk of bias in the estimation, since simple PSM cannot account for unobserved characteristics that might explain why one group is treated and the other is not, and that might also affect outcomes. PSM combined with DiD takes care of any unobserved characteristics that are constant across time between the two groups (Gertler et al., 2016). Basically, it extends the conventional DiD estimator by defining outcomes conditional on the PSM and using semiparametric methods to construct the differences (Caliendo & Kopeinig, 2008). Therefore, it is superior to DiD as it does not impose linear functional form restrictions when estimating the conditional expectation of the outcome variable and it reweights the observations according to the weighting function of the matching estimator (Smith & Todd, 2005). The combination of DiD and PSM is implemented as follows (Gertler et al., 2016):

1. Perform matching based on observed baseline characteristics using a probit to obtain the propensity scores.
2. For each treated unit, compute the change in outcomes between the before and after periods (first difference).
3. For each treated unit, compute the change in outcomes between the before and after periods for this unit's matched control (second difference).
4. Subtract the second difference from the first difference; that is, apply the difference-in-differences method.
5. Finally, average out those double differences.

PSM is estimated using a probit model whose dependent variable is a treatment dummy. The kernel matching method is then applied, using weighted contributions from all individuals in the counterfactual state to form an estimate of the counterfactual outcome. We also made sure to comply with the common support condition (requiring that there is sufficient overlap in the characteristics of the treated and non-treated units to find adequate matches) by dropping treatment observations whose propensity score is higher than the maximum or lower than the minimum propensity score of the control observations. These models also included as covariates initial conditions that may affect subsequent outcomes as explanatory variables. In our case, the covariates were also used as pre-treatment covariates for the DiD models, which also have clustered standard errors at the city level. After that, we estimated the DiD models, which included the time and treatment variables, and computed the matched difference-in-differences results. Finally, we performed balancing t-tests of the difference in the means of the covariates between the control and treated groups in the baseline period to check the balancing property of the results.

IV. Variables and results

IV.1 Construction of variables

The variables used in our empirical procedures are presented in Table 1[3]. They consist of outcome variables; treatment variables; a time variable; and covariates. Our outcome variables refer to two principal components extracted from a Principal Component Analysis (PCA), which is a data reduction technique to find a few latent dimensions from the correlation of several variables (Hair et al., 2014). Our PCA encompassed four ordinal variables as proxies of support for democracy: preference for democracy (4-point scale of agreement

Table 1 - List of variables

Type	Variable	Description
Outcome	Specific support	Component extracted from a PCA with high factor loadings for two categorical variables on the individual's trust in the government and in the country's institutions as a whole.
	Diffuse support	Component extracted from a PCA with high factor loadings for two categorical variables on the individual's agreement that democracy is the best form of government and his/her disagreement with the idea that the government can override the laws, Congress, and institutions in difficult situations
Treatment	Testing positive	Whether the individual tested positively for Covid-19 (0 - No; 1 - Yes)
	Having severe symptoms	Whether the individual had severe symptoms of Covid-19 (0 - No; 1 - Yes)
	Knowing someone close who had severe symptoms	Whether the individual knows someone close to him/her who had severe symptoms of Covid-19 (0 - No; 1 - Yes)
Time	Wave	Whether the observation is from the pre-treatment period (Wave = 0 - May/June 2020) or post-treatment period (Wave = 1 - September/October 2021)
Covariates	Sex (male)	Whether the individual is female or male (0 - Female; 1 - Male)
	Age	Current age of the individual in years
	Education	Which is the highest education level attained by the individual (0 - No formal education; 1 - Incomplete primary school; 2 - Complete primary school; 3 - Incomplete secondary school; 4 - Complete secondary school; 5 - Incomplete higher education; 6 - Complete higher education; 7 - Graduate degree or more)
	Income	Which is the average nominal income bracket within the individual's household (0 - Up to 1 minimum wage; 1 - From 1 to 2 minimum wages; 2 - From 2 to 5 minimum wages; 3 - From 5 to 10 minimum wages; 4 - from 10 to 20 minimum wages; 5 - More than 20 minimum wages)
	Marital status (married)	Whether the individual is currently married (0 - No; 1 - Yes)
	Metropolitan city	Whether the individual lives in a large city/suburb of a large city (0 - No; 1 - Yes)
	Religiosity (religious)	Whether the individual considers himself/herself a religious person (0 - No; 1 - Yes)
	Openness to experience	Aggregation of two 5-point scales asking to which extent an individual would agree that he/she is someone who has an active imagination and disagree that he/she is someone who has few artistic interests
	Conscientiousness	Additive aggregation of two 5-point scales asking to which extent an individual would agree that he/she is someone who does a thorough job and disagree that he/she is someone who tends to be lazy

(continued)

Table 1 - Continuation

Type	Variable	Description
	Extraversion	Additive aggregation of two 5-point scales asking to which extent an individual would agree that he/she is someone who is outgoing and sociable and disagree that he/she is someone who is reserved
	Agreeableness	Additive aggregation of two 5-point scales asking to which extent an individual would agree that he/she is someone who is generally trusting and disagree that he/she is someone who tends to find fault with others
	Neuroticism	Additive aggregation of two 5-point scales asking to which extent an individual would agree that he/she is someone who gets nervous easily and disagree that he/she is someone who is relaxed and handles stress well
	Empathy Index	Additive aggregation of four 5-point scales asking to which extent an individual considers himself/herself as someone with the following feelings towards others: 1. I often have tender, concerned feelings for people less fortunate than me. 2. When I see people being taken advantage of, I feel kind of protective towards them. 3. I am often quite touched by things that I see happen. 4. I would describe myself as a pretty soft-hearted person.
	State dummies	State dummies for each one of the 26 Brazilian states plus the Federal District wherein the individual might live.

Source: authors' elaboration, 2023.

with the notion that democracy is the best form of government), rejection of democracy relativization (4-point scale of disagreement with the notion that the government can override the laws, Congress and institutions in difficult situations), trust in government (4-point scale of agreement with the notion that the government is trustworthy), and trust in institutions (4-point scale of agreement with the notion that the country's institutions as a whole are trustworthy). As Table 2 shows, the results of PCA rendered two components (PC1 and PC2) with eigenvalues greater than 1 that explain more than 63% of the cumulative variation. As expected, there is a clear cleavage between two variables with higher factor loadings (above 0.5) and closely related to specific support (trust in government and in institutions) in PC1 and two other variables with higher factor loadings (above 0.5) and closely related to diffuse support (preference for democracy and rejection of its relativization) in PC2.

Table 2 - Principal component analysis of variables on support for democracy

N° of observations	PCs	Eigenvalue	Difference	Proportion	Cumulative
2,602	PC1	1.441	0.349	36.02%	36.02%
N° of components	PC2	1.092	0.213	27.30%	63.33%
4	PC3	0.879	0.291	21.98%	85.31%
Rho	PC4	0.588	-	14.69%	100%
1					
Variables		PC1	PC2	PC3	PC4
Preference for democracy		0.130	0.726	-0.672	0.059
Rejection of democracy relativization		-0.430	0.565	0.565	0.420
Trust in government		0.689	-0.096	0.092	0.712
Trust in institutions		0.568	0.379	0.470	-0.559

Source: authors' elaboration, 2023.

Hence, we retained these two components for use in estimating the DiD and labeled them Specific Support and Diffuse Support, respectively.

It is worth mentioning that, although the component of diffuse support encompasses variables of different natures, it follows the steps outlined by Inglehart & Welzel (2005) who proposed the creation of a similar index based on data from the World Values Survey in order to identify individuals who not only express strong support for democracy, but also register a high rejection of authoritarian forms of government. The need to work with such an index, which adds both a more classic measure of democracy support, subject to social desirability bias, and a more indirect measure of regime relativization, lies in combining a variety of possible measures to obtain greater robustness for a more abstract measurement of democratic adherence, such as done by other scholars for the Brazilian case when speaking of "non-ambivalent democrats", "democratic cohesion" or "solid democrats" (Moisés, 2008 ; Fuks et al., 2019; Mont'Alverne et al., 2023).

The treatment variables refer to three different non-exclusive potential experiences with Covid-19: testing positive, having experienced severe symptoms, and knowing someone close who has experienced severe symptoms. The time variable refers to when a particular observation was measured: pre- or post-treatment, which, in our case, is in the first or third wave of the longitudinal panel. It is also important to notice that all covariates are normally stable variables in the short to medium term, such as gender, age, education, income, marital status, living in a metropolitan area, religiosity, personality, empathy, and state of residence, so they are not expected to be affected by the change in outcome over time and by the treatment- i.e., they are exogenous control variables. To measure personality, we relied on a short version of the Big Five inventory with 10 items to capture proxies of extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience (Rammstedt & John, 2007). To measure empathy, we resort to 4 items of the Davis Empathy Scale used to measure empathic concern - i.e., "other-oriented" feelings of sympathy and concern for unfortunate others (Davis, 1983).

IV.2 Main results

Table 3 presents the results of the DiD combined with PSM for each treatment and outcome variable. Graphs 2, 3, and 4 visually show the pre- and post-treatment results for each treatment and outcome variable. Most of the results are not statistically significant, suggesting that the experience of the pandemic has not greatly impacted the support for democracy in Brazil. Nevertheless,

Graph 2 - Mean control and treated results in T0 and T1 (Treatment: Testing positive for Covid-19)
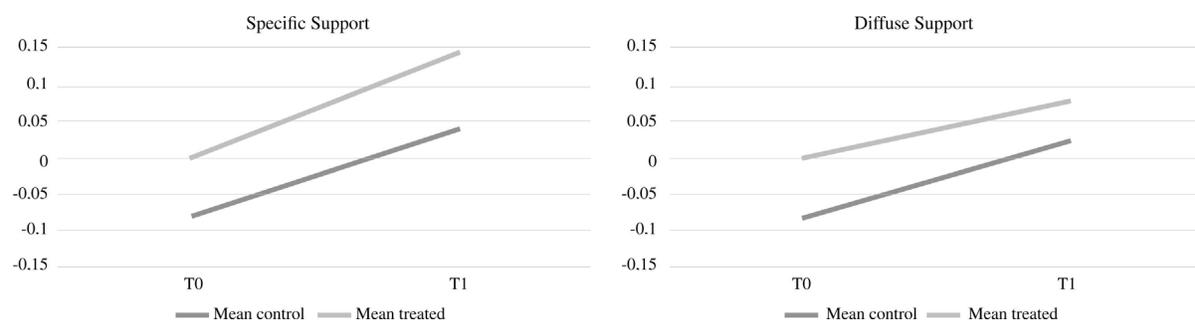
Source: authors' elaboration, 2023.

Table 3 - Results of DiD with PSM

| Treatment variable	Testing positive for Covid-19		Having experienced severe symptoms of Covid-19		Knowing someone close who had severe symptoms of Covid-19	
Outcome variable	Specific Support	Diffuse Support	Specific Support	Diffuse Support	Specific Support	Diffuse Support
Diff-in-diff	0.022	-0.025	0.188	-0.236*	0.001	0.004
	(0.082)	(0.074)	(0.145)	(0.141)	(0.083)	(0.068)
Mean control t(0)	-0.079	-0.082	-0.086	-0.130	-0.020	-0.110
Mean treated t(0)	-0.001	-0.002	-0.144	0.016	-0.038	0.006
Diff t(0)	0.078	0.080	-0.058	0.146	-0.019	0.116[*]
	(0.091)	(0.068)	(0.141)	(0.140)	(0.072)	(0.068)
Mean control t(1)	0.041	0.024	0.013	-0.003	0.074	0.003
Mean treated t(1)	0.141	0.079	0.144	-0.094	0.056	0.123
Diff t(1)	0.100	0.055	0.131	-0.091	-0.018	0.120[*]
	(0.082)	(0.077)	(0.140)	(0.133)	(0.072)	(0.071)
Observations (total)	2,514	2,514	2,192	2,192	2,254	2,254
Control (pre and post)	1,034	1,034	1,031	1,031	695	695
Treated (pre and post)	223	223	65	65	432	432
R-squared	0.004	0.003	0.010	0.003	0.002	0.010
Robust standard errors in parentheses (clustered at city level).						

***p < 0.01, **p < 0.05, *p < 0.1
Source: author's elaboration, 2023.

Graph 3 - Mean control and treated results in T0 and T1 (Treatment: Having experienced severe Covid-19 symptoms)
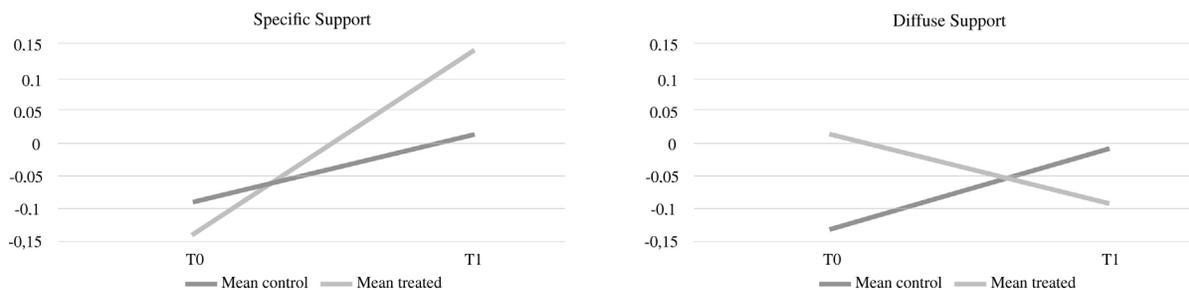
Source: authors' elaboration, 2023.

Graph 4 - Mean control and treated results in T0 and T1 (Treatment: Knowing someone close who had severe Covid-19 symptoms)
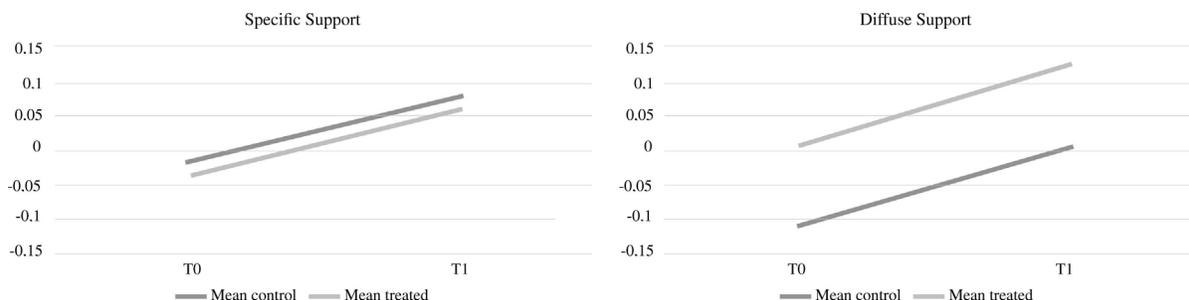
Source: authors' elaboration, 2023.

the few significant results might be indicative of important trends for the future of democracy. Most of the results show that the experience of having severe Covid-19 symptoms is likely to have contributed to a decrease in the diffuse support for democracy among Brazilians. In the pre-treatment survey, the control group was less supportive of democracy in diffuse terms (preference and non-relativization of the regime) than the treatment group, but this relation was reversed in the post-treatment survey, so that treated individuals became less supportive of democracy. This indicates a negative effect of this particular experience with the pandemic over one crucial dimension of the support for democracy in Brazil. In addition, there were also statistically weak significant results for the first and second differences in the diffuse support for democracy as concerns the experience of knowing someone close who had severe Covid-19 symptoms. However, in this case, both differences revealed a greater support among treated individuals and, as both the treated and control groups increased their support in the post-treatment survey, the DiD result was insignificant.

V. Discussion and conclusion

The results attest to the limited impact of the Covid-19 experience on support for democracy in Brazil. Contrary to some international diagnostics pointing out to a "great reset" in the wave of populism all over the world after the pandemic (Foa et al., 2022), our results indicate that the configuration of support for democracy in Brazil has remained largely unaffected by the health experiences with the coronavirus, except for a sole statistically significant decrease in diffuse support under a single health experience. Hence, H1 was only partially confirmed, while H2 was totally rejected. Particularly, the mild experience of having tested positive for Covid-19 has not shown any significant impact on either dimension of support for democracy in the country. The more critical experience of knowing someone close who had severe Covid-19 symptoms only showed significant results as concerns diffuse support in the preliminary difference stages, but not in the final DiD estimation.

The only significant DiD result obtained was the decrease in diffuse support for democracy as a result of having experienced severe Covid-19 symptoms. Interestingly, contrary to the expectations of the theoretical background, such a result suggests that the more abstract principles of democracy have proved more fragile in the face of the coronavirus crisis than the more concrete elements of the regime. As mentioned in the literature review, this could be explained by the limited experience of the Brazilian population with the norms and values of the democratic regime, which has prevented a deeper internalization of the democratic ethos in the country. Hence, it is easier to a population with a lack of political socialization in democracy to get rid of the regime principles during a crisis than to reform some of its malfunctioning institutions or to turn down the incumbent government and politicians in the next elections.

In the opposite direction, the individuals who underwent the same treatment have substantially increased their specific support for democracy after being treated, as can be observed in Graph 3. As one can see, the untreated individuals also increased their specific support in the post-treatment measurement, so the DiD result was not significant. Nevertheless, it is still interesting that Brazilians who went through the same health experience with Covid-19 had opposite reactions in terms of specific and diffuse support for democracy. This result reinforces the idea that, due to the shallowness of the democratic

roots in the Brazilian soil, crisis events might usually result in a tendency among citizens to oust the regime, leaving its ailing institutions and the government in office untouched (or even strengthened). These results imply that, in order to make Brazilian democracy sustainable and resilient in the face of future crises, social and political actors should strive for enhancing the country's democratic culture, whether through public policies or strategic actions by civil society. However, it should be borne in mind that, due to attrition, the individuals in our panel are disproportionately older and better educated, which makes the sample more right-leaning than would be expected for the whole population and could partially explain the resilience of specific support and the fragility of diffuse support found in this study.

To conclude, it is important to highlight that this paper is subject to some limitations that future work should try to correct. First, the fact that our post-treatment period refers to the second half of 2021 means that the pandemic had not yet ended, and the long-term consequences of infections and pandemic policies might not yet be apparent. However, the treatment was operationalized as individual infection, meaning that divergence between treatment and control groups that emerged on the basis of individual exposure should present themselves before population-level infection rates decline below pandemic levels. The fact that we were able to detect a weak effect on one dimension of democratic culture in such a short period of time is also notable, and suggests that further study may find stronger effects over time.

Second, our focus on health experiences is oblivious to other material consequences of the pandemic, such as unemployment and starvation. Studies that address these economic outcomes will be very relevant to appraise the full impact of the pandemic over the Brazilian political landscape.

Finally, more consistent panel datasets, which truly represent the Brazilian population and have less attrition, could probably provide more robust evidence on the impacts of the pandemic in the country, which could also benefit from international comparative analysis that puts side by side countries with different traditions of political culture and democratic consolidation in order to scrutinize the potential variability of the coronavirus crisis effect in different contexts.

Overall, our results provide further evidence of long-standing ideas about ideological beliefs. Namely, that they are "sticky" and incredibly difficult to change. Even one of the most disruptive global events, the Covid-19 pandemic, seems to have had a weak impact on democratic culture among our panel study respondents. However, we did find some evidence that the experience of being severely infected with the Covid-19 virus had a weak, negative impact on diffuse support for democracy. These findings suggest that while concerns about the impact of the Covid-19 pandemic on democratic attitudes may be exaggerated, social and political leaders should still be deliberate in reaffirming and supporting continued democratic governance in the post-pandemic recovery period.

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Avaliando o impacto da Covid-19 sobre o apoio à democracia no Brasil: um estudo de painel

RESUMO **Introdução:** Embora uma mudança considerável de valores políticos e sociais normalmente só aconteça através de substituição geracional, eventos perturbadores importantes podem, por vezes, desencadear mudanças rápidas de valores. Este artigo investiga se a pandemia de Covid-19 alterou o apoio à democracia entre os cidadãos brasileiros. **Materiais e métodos:** Esta investigação utiliza um estudo de painel longitudinal online de três ondas (N = 1.301) que mede as atitudes dos cidadãos brasileiros em relação à democracia em três momentos distintos durante a pandemia de Covid-19. O instrumento de pesquisa mediu diversas dimensões de atitudes em relação à democracia e perguntou sobre a experiência da Covid-19 do(a) entrevistado(a) e do seu círculo próximo. Utilizando uma combinação de correspondência de pontuação de propensão e um design de diferença em diferenças, estimamos um efeito causal robusto da experiência do coronavírus no apoio "difuso" e "específico" à democracia. **Resultados:** Descobrimos que a exposição ao vírus teve pouco efeito nas nossas medidas de apoio à democracia, mas houve algumas evidências de que a exposição grave teve um impacto negativo numa medida, o apoio difuso. **Discussão:** Os nossos resultados fornecem mais provas da persistência de crenças e valores ideológicos duradouros. Especificamente, a pandemia da Covid-19, um dos acontecimentos globais mais perturbadores da memória recente, teve um impacto apenas fraco na cultura democrática. Esses resultados sugerem que, embora as preocupações sobre o impacto da pandemia nas atitudes democráticas possam ser exageradas, líderes sociais e políticos ainda devem agir de forma consciente, reafirmando e apoiando a continuidade da governança democrática no período de recuperação pós-pandemia.