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Political institutions and policy responses during a crisis☆

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ABSTRACT

How do countries with differing political institutions respond to national crises? We examine policy responses to the coronavirus pandemic in a sample of 125 countries, using high frequency data on two measures: (i) containment policies, i.e., closure of public spaces and restrictions on movement of people, and (ii) health policies, i.e., public information campaigns, testing, and contact tracing. We have four main findings. First, non-democracies impose more stringent policies prior to their first Covid-19 case, but democracies close the gap in containment policies and surpass non-democracies in health policies within a week of registering their first case. Second, while policy responses do not differ by governance systems (presidential or parliamentary), elected leaders who performed better in the last election, or face an election farther in the future, impose more aggressive policies. Third, democracies with greater media freedom respond more slowly in containment policies, but more aggressively in health policies. Lastly, more conducive norms (such as trust in the elected government) systematically predict a more aggressive policy response. Our results remain robust to allowing countries with different economic, social, and medical characteristics to have different evolution of policy responses. Our analysis therefore suggests that political institutions and the incentives of the political leaders embedded therein significantly shape the policy response of governments to a national crisis.

1. Introduction

Countries are often confronted with various natural, economic, and social crises that require an immediate and, in many cases, sustained policy response from its political leadership. Large-scale natural disasters (such as cyclones, tsunamis, droughts, etc.) and health and humanitarian crises (such as epidemics, ethnic conflicts, etc.) are examples of some crises that societies around the world have historically faced. Moreover, with the advent of climate change, it is argued that the frequency and scale of such crises may increase in the future (IMF, 2017). Do countries with different political institutions respond differently to such adverse events? If so, how are these responses different? These questions are relevant not only in understanding ways to mitigate the impact of a crisis, but also relevant for international organizations (such as the United Nations, World Health Organization (WHO), International Monetary Fund, etc.), who often guide countries in their policy responses.

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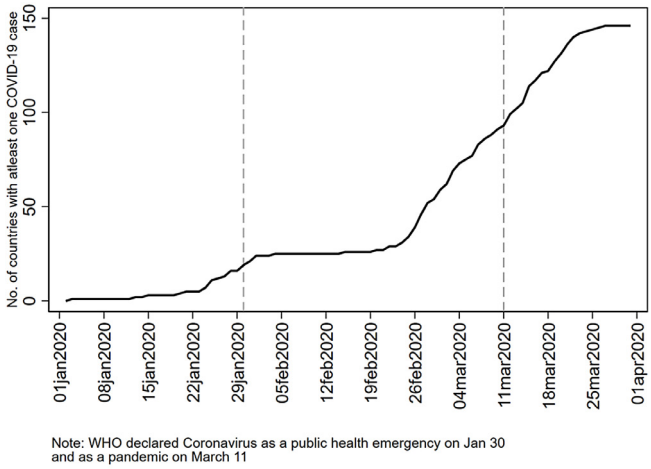
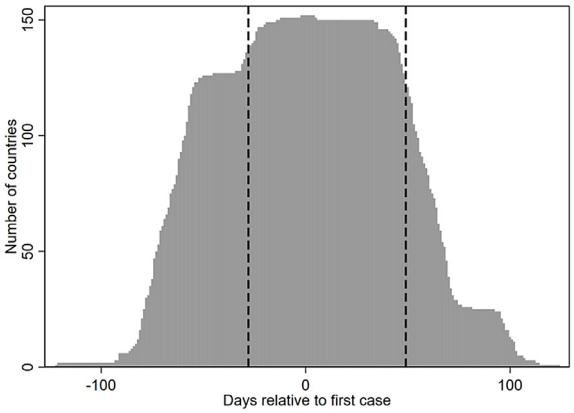


(a) Date of reporting of first case across countries



(b) Data on days relative to the first case across countries

Fig. 1. Distribution of first case across countries.

The answer to the above question is, however, not straightforward. First, crises (like the ones that we mention above) often hit a few selected set of countries at a time, making it hard to infer on the external validity of the policy response across countries. Second, the set of appropriate policy measures required to tackle a given crisis may differ across countries. For example, some governments may be willing to reduce dependency on nuclear power following a nuclear accident, while others may prefer not to change dependency but instead toughen the safety and regulatory environment around it.[1] Third, the kind of crisis that hits a country can be endogenous to its existing political institutions. For example, famines and ethnic conflicts are more likely to arise in countries with weak political institutions (Burchi, 2011; Easterly, 2001; Saideman et al., 2002; Sen, 1983). Fourth, even a crisis of the same magnitude (say an earthquake or a flood) for the same country over time can generate differential policy responses, not because of changes in political institutions, but because of other factors correlated with such changes. For example, if societies that tend to learn better from past shocks are also more likely to have a robust political institution, then the observed correlations between political institutions and their policy response may be driven by factors that are not political. Therefore, within country comparisons of responses across repeated shocks may not be ideal.

The novel coronavirus pandemic (henceforth, Covid-19) provides us with a rare context to overcome the above challenges and thus, answer the question more precisely. First, an overwhelming majority of countries were exposed to the *same* pandemic in a relatively short period. As shown in Fig. 1, less than five countries had reported a confirmed Covid-19 case on January 15, 2020. Only two months later, the WHO had declared the novel coronavirus a global health pandemic, with over 100 countries reporting at least one confirmed Covid-19 case. This helps us overcome concerns about both the

[1] In the wake of the Fukushima nuclear accident in 2011, while the Democratic Party-led government of Japan took a policy of phasing out nuclear power, the next government formed by the Liberal Democratic party in 2012, reversed it and took a more "pro" nuclear policy (Suzuki, 2019).

external validity across countries as well as the issue of endogenous sample selection. Second, epidemiologists and medical experts broadly agreed on the nature of policy responses required to contain the spread of the virus (Barbera et al., 2020). We classify these recommendations into two broad categories, namely: *'containment'*-related and *'health'*-related. The former set of policy recommendations comprised primarily of closing down public places (such as those of religious worship, malls, schools, etc.) and restricting the gathering and movement of people (through lockdowns, curfews, closure of public transport systems, etc.).[2] Health-related policy recommendations, on the other hand, ranged from the importance of testing, contact tracing, and social distancing, to awareness and practice of regular hand-washing with soap and the use of personal protective equipment (such as face masks). Finally, we use only one large and rare shock to answer our question.[3] Therefore, it does not suffer from the usual endogeneity problems that arise from using more common and repeated shocks.

The specific features of the pandemic discussed above allow us to examine whether political institutions played a role in determining how rapidly countries responded to the crisis as well as if these policy measures were more stringent and persistent over time. We use daily data on the measures of containment and health policies across 150 countries (collected by Hale et al. (2020)) to study high-frequency policy responses across countries. Using a difference-in-differences framework, we first begin by robustly showing that democracies and non-democracies differed systematically in their responses.[4] Non-democracies had, on average, more aggressive containment and health policies as compared to democracies before registering their first Covid-19 case (i.e., in the "pre" period). However, within a week of documenting the first case (i.e., in the "post" period), democracies either matched up (in containment policy) or surpassed (in health policy) non-democracies in policy aggressiveness. Moreover, these rapid policy responses were also persistent over time (for up to six weeks) after the first Covid-19 case and are robust to alternate specifications and models.

We then examine whether these differential policy responses across democracies and non-democracies can be explained by differences in the electoral environment and political institutions across these countries. For example, while political leaders of democracies face regular and competitive elections, those in non-democracies do not. More specifically, we first begin by focusing on two aspects: (i) the governance system through which a leader gets elected (presidential or parliamentary) and (ii) the electoral incentives faced, once elected. We further measure these electoral incentives in two ways: first–electoral strength– is the vote share of the chief executive in the last election in case of presidential democracies or the seat share of the largest party in the government, in case of parliamentary democracies.[5] The second measure we consider–electoral term remaining–is defined as the fraction of term remaining until the next election. We hypothesize that higher electoral strength and a more distant next election can incentivize the political leader to respond more rapidly and aggressively to the crisis. Since such incentives are absent in non-democracies, it may, therefore, explain the differential response between democracies and non-democracies.

We find that within democracies, while policy responses were not different across governance systems (presidential or parliamentary), electoral incentives did shape responses, especially for health policies. Specifically, democracies with above-median electoral strength[6] and electoral term remaining were more aggressive in their health policy, but not in their containment policies as compared to the below-median ones. Therefore, more than the structure of governance, it appears to be that the electoral incentives of its leaders were more important in shaping policy responses during this pandemic.

We then turn to examining the role of the media in shaping policy responses. In particular, we examine–'media freedom'–as measured by the Press Freedom Index across countries in 2020, prepared by the Reporters without Borders. With regard to health policies, a freer media can reveal potential hot spots for infection, forcing the government to increase testing and contact tracing. Moreover, it can also facilitate better dissemination of public information campaigns, which may encourage governments to engage in greater communication with its citizens. Consistent with this, we do robustly find that democracies with greater (above-median) freedom of the media were indeed more aggressive in their health policies. With regard to containment policies, the mechanism is unclear. On the one hand, though media freedom need not matter for the announcements of such drastic measures, a freer media could highlight the economic and humanitarian cost of a stringent containment policy, thereby reducing its stringency. We find small and statistically insignificant differences between containment policies across democracies with above- and below-median media freedom. However, using the high-frequency nature of our data, we show that the difference in containment policies, though initially small, grows larger over time. For health policies, on the other hand, democracies with better media systematically and persistently respond with a more aggressive policy. The analysis therefore provides an additional mechanism for observing differing responses across democracies and non-democracies.

Finally, we examine whether variations in existing–'political norms'–can shape differential policy responses to the pandemic. Using the sixth round of the World Values Surveys (Inglehart et al., 2014), we consider two norms, namely: (i)

[2] There is some disagreement regarding the *degree* of containment policies that governments should adopt across countries. Alon et al. (2020) and Barnett-Howell and Mobarak (2020) for example, point out that complete lockdown may not be ideal for developing countries, as it may impose a significant economic cost on the population. Regardless, they all agree on the fact that some form of containment policy would be required.

[3] The previous pandemic of this nature was the Spanish Flu of 1918, about a century ago.

[4] We define a country to be democratic if its political leader was elected in a competitive multi-party election; the rest are categorized as non-democracies.

[5] In parliamentary democracies, since the number of seats in the legislature that is controlled by the government matters more than vote share, we consider the seat share as the more appropriate measure of the electoral strength of the Prime Minister.

[6] We identify the above-median electoral strength countries for presidential and parliamentary democracies separately.

citizens' trust in the government and (ii) their preference for the independence of their leader in policymaking. We find that democracies where citizens trust their government more do respond more aggressively in both containment and health policies in the post period. However, this increase is gradual over time, stabilizing after about a month from the first case of the virus. Democracies that have a higher preference for leaders' independence in policymaking respond more vigorously in containment policies but not in health policies.

Our preferred baseline specifications have country and calendar-week fixed effects. These allow us to control for all time-invariant country characteristics that might be correlated with policy responses as well as any changes in responses to Covid-19 across the world over time. Despite this, it could still be the case that our results are explained by differential policy responses that depend on some country characteristics (such as income, access to health care, etc.) that are correlated with our political variables. Moreover, the timing of the event (i.e., the date of first reported case) could be endogenous to some of the characteristics of countries that shape their responses. To address the first concern, we interact a range of baseline characteristics of countries with flexible (non-linear) time trends. This allows the evolution of the containment and health responses to be correlated with the baseline characteristics of the countries. These characteristics span socio-economic variables (such as income, population, urbanization, access to health care, etc.), extent of international travel and trade, as well as exposure to previous health crises like SARS and MERS. We show that our results are robust to this more stringent specification (and in some cases, even get stronger). For the second concern, we estimate a change-in-changes (CIC) specification proposed by Athey and Imbens (2006), which is a generalized version of the DID estimate that we report in the main analysis. The CIC method allows for heterogeneity in treatment effects across units (or countries) and over time, and considers the possibility of endogenous timing of the treatment. We show that our results are robust to the CIC specification as well.

Our paper contributes to the literature that documents how political institutions shape the response of governments to various shocks to the country. Besley and Burgess (2002) and Cole et al. (2012) study how state government responses to weather/food shocks and floods in India vary by either newspaper circulation, electoral uncertainty, or potential electoral gains. Similarly, Garrett and Sobel (2003) show how disaster relief expenditures by the US government are primarily shaped by political considerations as well. Cohen and Werker (2008) use a theoretical model and case studies to argue that countries with different political environments (such as weak institutions and high ethnic fractionalization) may have different policy responses to natural disasters. We complement these studies by showing similar patterns across democracies and non-democracies, as well as within democracies, across countries with different political institutions and norms. Lastly, Kahn (2005) uses panel data across countries to show that democracies experience fewer deaths from natural disasters. Our results provide a mechanism for why that may happen.

Finally, our aim is to examine whether policy responses to Covid-19 differed systematically across countries with different political institutions and norms. We do not, however, comment on the "optimality" of the responses, since to answer that question, we would have to examine the welfare implications (in terms of prevention of death and containment of cases) of having more aggressive containment and health policies. The scope of this paper is limited to understanding whether and how institutions shape policies. The effectiveness of the policies in reducing the spread of the outbreak and its fatality rate is a separate, considerably harder research question that would require additional data collection and analysis, which we keep for future endeavors.[7]

The rest of the paper is organized as follows: Section 2 provides a short context of Covid-19, Section 3 describes the data used in the analysis, details on how we construct the variables, as well as relevant summary statistics for these variables across countries. Section 4 then outlines the empirical specification for our analysis and Section 5 discusses the results and the robustness of these results. Section 6 then offers a short conclusion.

2. The coronavirus pandemic

The spread of Covid-19 has been widespread and rapid over a short period of time, fundamentally disrupting the modern world (Zhu et al., 2020; Li et al., 2020). As shown in Fig. 1(a), while less than 5 countries reported a Covid-19 case in mid-January, around 100 countries (covering 90% of the world's population) had reported at least one case by March 11, when the WHO declared it a global health pandemic.[8] By the first week of April, 150 countries across the world had reported at least one case of Covid-19. This unexpected and rapid spread of Covid-19 necessitated an immediate policy response as well. These responses ranged from social distancing, bans on travel and social gatherings, contact tracing, and public health information campaigns to economic stimulus packages. While this remains a very unfortunate health pandemic, it also offers us a unique opportunity to examine how policy responses vary with political institutions, governance structures, media freedom, and political norms across almost all countries in the world, when the *same* shock hits them in a very narrow period of time.

[7] In fact, Kapoor et al. (2020) show suggestive evidence that the daily death data is more likely to be manipulated by non-democracies.

[8] See the entire timeline of WHO declarations here.

3. Data and descriptive statistics

We combine data from various sources and use them to construct variables for our analysis. In this section, we describe each source of data and how we construct variables relevant for our analysis. We also report the relevant descriptive statistics for these variables.

3.1. Data on Covid-19 cases

We use publicly available country-level data on confirmed Covid-19 cases from the European Centre for Disease Prevention and Control (ECDC).[9] The data is a daily panel of confirmed cases across 152 countries. At the time of writing, we use data from January 1 to May 6, 2020, and primarily focus on the date of the first reported case in a country to examine how different countries respond relative to that date. While the total number of cases and deaths reported could be endogenous, especially across democracies and non-democracies, the date of the first registered case is less prone to such endogeneity or measurement error concerns. However, it is still possible that countries endogenously reveal when they are exposed to the virus. To account for its possibility, we do our analysis at the week level, and use the first week of exposure as the event. We believe that week of first exposure is less likely to be manipulable. Additionally, we have country fixed effects in all our specifications, which differences out any time invariant characteristics of countries, such as their incentive to acknowledge exposure to the virus. Finally, in our robustness checks, we use a different method of analysis–'changes-in-changes'–that allows for such endogeneity and show that our results remain the same.

Summary statistics: Fig. 1(a) shows the number of countries that report at least one Covid-19 case before a date t. As can be seen from the figure, 19 countries (12.5% of countries and 52.2% of the world's population) reported at least one case before the WHO declared it as a public health emergency on January 30, 2020, and 93 countries (61.2% of countries covering 87.36% of the world's population) had reported at least one case before WHO declared Covid-19 to be a global pandemic on March 11, 2020. Furthermore, to examine policy responses around the date of the first confirmed case, we restrict our attention from 4 weeks (28 days) prior, to 7 weeks (49 days) after the date of the first case in a country. This allows us to maintain a consistent panel of 125 countries. As reported in Fig. 1(b), the number of available countries drops sharply as we widen this time interval due to the lack of data.

3.2. Data on policy responses

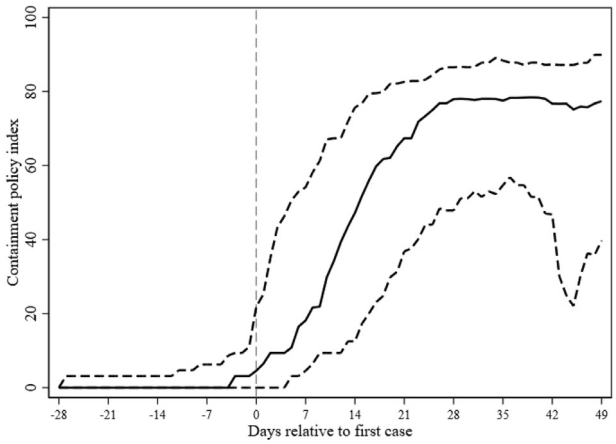
Data on policy responses to Covid-19 comes from the Oxford Covid-19 Government Response Tracker (OxCGRT) collected by Hale et al. (2020).[10] The data codify policy announcements by national governments at a daily level, collected from publicly available sources such as news articles, government press releases, and briefings. There are eight indicators (C1–C8) that code containment- and closure-related policies, namely school closing, workplace closing, canceling public events, restrictions on gathering size, closure of public transport, stay at home requirements, restrictions on internal movement, and restrictions on international travel. Health policies are measured across three indicators (H1-H3), namely public information campaign, testing policy, and contact tracing. Each indicator takes integer values with zero signifying no policy announcement and higher integers signifying announcements with greater aggressiveness. Following Hale et al. (2020), we then aggregate these indicators to form an index of containment and health policies that ranges from 0 to 100 (0 being least aggressive and 100 being most aggressive).[11]

Summary statistics: As reported in panel A of Table 1, the containment index is 3.8 and the health index is 18.57 on average across all countries in our sample one month before their first reported case. These do not differ substantially across democratic and non-democratic countries as well as parliamentary and presidential systems, both in terms of magnitude as well as statistical significance. Fig. 2 then shows the policy response across all countries in our sample for both containment policies (Fig. 2(a)) and health policies (Fig. 2(b)), before and after the first registered Covid-19 case. The solid line plots the median value of the policy index across countries while the dotted lines plot the 25–75th percentile. As we can see, the containment policy index for the median country is zero before it registers its first Covid-19 case, and gradually increases to around 80 within a month. On the other hand, policy responses in health are very different. As opposed to containment policies, where most countries respond gradually after registering their first Covid-19 case, health policies respond even before a country registers its first Covid-19 case. The median country responds around two weeks prior to the first case. Moreover, responses in health policies are more rapid and aggressive as well. The health policy index increases from almost zero, two weeks before registering its first case, to around 60 within a week of the first registered case and remains fairly stable after.

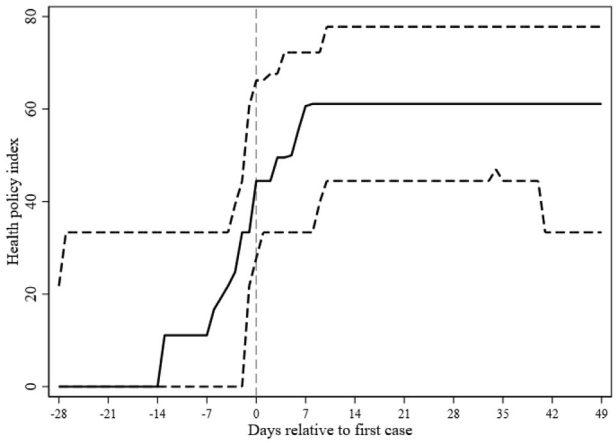
[9] See https://www.ecdc.europa.eu/en/covid-19/data.

[10] www.bsg.ox.ac.uk/Covidtracker.

[11] The index calculation takes into account the fact that some of these policies can be geographically targeted within countries. Details and exact formulae are available at https://github.com/OxCGRT/Covid-policy-tracker/blob/master/documentation/index_methodology.md.



(a) Containment policies



(b) Health policies

Fig. 2. Policy responses relative to the first Covid-19 case.

3.3. Data on political institutions and environments

We use the polity score from the Polity IV project to categorize countries into democracies and non-democracies. Data on governance systems (presidential vs. parliamentary) and other details (such as the size of the legislature, etc.) come from the Database of Political Institutions 2017 (Cruz et al., 2020). For the set of democracies, we hand code data on the date of the last election when the chief executive was elected, tenure length of the chief executive, and the date of the next election. We further compile data on the electoral performance of the chief executive in the most recent general election. For the parliamentary democracies, we record the seat share of the largest party in the incumbent government, and for the presidential democracies, we collect data on the vote share of the president in the latest election where they won.

Defining democracy: We classify all countries that have positive polity scores in 2018 (the last year for which the score is currently available) as democracies; the rest are labeled as non-democracies. The Polity IV project assigns two scores to each country based on the various democratic and autocratic features of the election procedure and power of the executive. Each score ranges from 0 to 10. The polity score, which is the difference between the democracy and autocracy scores, therefore, can range from 10 to 10. Our classification process transparently captures the relevant countries as democracies. Of the 156 countries, 116 are classified as democracies and 40 as non-democracies. In 115 of these democracies, the chief executive is chosen in competitive multi-party elections. Of the non-democracies, 39 of them have the chief executives either chosen by a coup or an arbitrary/forced manner, by political elites of a single party, or by rigged elections.[12]

[12] See Appendix B for further details on the score and classification. As discussed in Appendix C.2, our results are robust to dropping 'weaker' (non-)democracies with polity scores closer to zero.

Table 1
Summary Statistics.

	N	Whole sample	Non-democracy	Democracy	Diff.	p-value
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: All countries						
Democracy	152	0.74	0.00	1.00	1.00	0.00
		[0.44]	[0.00]	[0.00]		
Polity score	152	4.30	5.03	7.63	12.66	0.00
		[6.06]	[2.71]	[2.20]		
Media freedom	152	65.55	49.36	71.33	21.97	0.00
		[15.26]	[13.12]	[11.32]		
Trust in govt.	54	44.62	38.92	46.61	7.69	0.02
		[10.42]	[10.25]	[9.83]		
Independence of elected leader	53	2.35	2.42	2.33	0.09	0.52
		[0.44]	[0.46]	[0.44]		
Containment index	125	3.80	4.14	3.68	0.46	0.75
		[6.90]	[4.67]	[7.53]		
Health index	125	18.57	22.37	17.27	5.1	0.22
		[20.05]	[22.55]	[19.07]		
Panel B: Democractic countries						
	N	Whole sample	Presidential system	Parliamentary system	Diff.	*p*-value
	(1)	(2)	(3)	(4)	(5)	(6)
Parliamentary System	112	0.38	0.00	1.00	1.00	0.00
		[0.49]	[0.00]	[0.00]		
Polity score	112	7.63	6.97	8.74	1.77	0.00
		[2.20]	[2.03]	[2.04]		
Media freedom	112	71.33	67.70	77.38	9.68	0.00
		[11.32]	[10.26]	[10.48]		
Trust in govt.	40	46.61	48.35	43.00	5.35	0.11
		[9.83]	[9.10]	[10.67]		
Independence of elected leader	40	2.33	2.42	2.14	0.28	0.05
		[0.44]	[0.41]	[0.45]		
Electoral strength	110	50.60	56.31	41.34	14.97	0.00
		[16.80]	[14.21]	[16.67]		
Electoral tenure	98	52.05	53.51	50.11	3.4	0.58
		[30.14]	[28.53]	[32.40]		
Containment index	93	3.68	4.41	2.58	1.83	0.25
		[7.53]	[8.43]	[5.87]		
Health index	93	17.27	16.77	18.01	1.24	0.76
		[19.07]	[16.71]	[22.40]		

Notes: Panel A reports the summary statistics for all countries, while Panel B reports only for democracies. Column (2) reports the mean for the relevant sample while columns (3) and (4) report separately for the types of countries within the sample. Column (5) reports the difference between (4)-(3) and column (6) reports the p-value of a test if that difference is statistically different from zero. Standard deviations reported in parentheses.

Defining governance systems: Within democracies, we examine two main governance systems, namely presidential and parliamentary systems. In presidential systems, the chief executive of the state is the President, who is usually directly elected by the voters or an electoral college. In parliamentary systems, the chief executive is the Prime Minister, who is indirectly elected by members of the legislature from the winning party or coalition.

Constructing electoral environment variables: For parliamentary democracies, we define the electoral strength of the chief executive as the seat share of the largest party of the incumbent government, and for presidential democracies, the vote share of the President in the most recent election. We then compute a variable called 'electoral term remaining', which is the fraction of term/tenure of the chief executive remaining between the first reported Covid-19 case and the next election.

Summary statistics: As reported in Table 1, 74% of countries in our sample are democracies. 38% of democratic countries have a parliamentary governance system, while the rest are presidential. On average, the incumbent government in our sample of democratic countries has 50.6% of the votes or seats, with presidential systems having 15 percentage points more electoral strength than parliaments (p-value: 0.00). Similarly, the incumbent executive has 52.05% of its electoral tenure remaining on average with no statistical difference across presidential and parliamentary systems (p-value: 0.58).

3.4. Data on media freedom and political norms

To capture the freedom of the media, we use data on World Press Freedom Index for the year 2020 prepared by Reporters Without Borders and is a score from 0 (no freedom) to 100 (complete freedom) for each country.[13] For political norms, we

[13] The data is available for download at https://rsf.org/en/ranking_table.

Table 2
Containment and Health policies across countries.

	Log Containment Policy Index			Log Health Policy Index		
	(1)	(2)	(3)	(4)	(5)	(6)
Democracy	0.329***			0.293		
	(0.112)			(0.182)		
Post	2.314***	2.382***	0.494***	1.426***	1.452***	0.997***
	(0.134)	(0.117)	(0.110)	(0.181)	(0.132)	(0.135)
Democracy × Post	0.360**	0.312**	0.234**	0.592***	0.570***	0.452***
	(0.155)	(0.135)	(0.0946)	(0.204)	(0.153)	(0.135)
R^2	0.464	0.615	0.847	0.316	0.530	0.696
N	1463	1463	1463	1463	1463	1463
Country FE	No	Yes	Yes	No	Yes	Yes
Week FE	No	No	Yes	No	No	Yes

Notes: Democracy is a dummy that takes the value 1 if the country has a positive polity score and 0 otherwise. Post is a dummy that takes the value 1 after atleast 1 case is reported and 0 otherwise. Columns (1)-(3) has log of Containment Index and (4)-(6) has log of Health Policy Index as the dependent variable. Robust standard errors are reported in parentheses. * p< 0.1, ** p<0.05 and *** p< 0.01 level of significance.

use the Sixth Round of the World Values Survey (Inglehart et al., 2014). These data are available across 60 countries in our sample. We use them to measure first, the average trust that citizens of a country have in the government, from 0 (no trust) to 100 (complete trust), and second, the independence that citizens are willing to grant their elected leader in terms of policy decisions. This score varies from 1 (low trust) to 4 (high trust). Appendix B describes the construction of these variables in detail.

Summary statistics: From Table 1, the index of media freedom is on average 65.5 across the countries with (a) non-democracies having a 21.97 percentage point lower score than democracies (p-value: 0.00) and (b) parliamentary democracies having a 9.68 percentage point higher score than presidential democracies (p-value of 0.00). For political norms, citizens have on average 46.61% 'trust' in their government, with little difference across presidential and parliamentary democracies (p-value: 0.11). Second, citizens' preferences for an independent leader score is 2.33 out of 4 across democracies, with parliamentary democracies having a 12% lower score than presidential democracies (p-value: 0.05).

4. Empirical strategy

We now turn to describe the empirical strategy that guides our analysis. We first investigate whether democracies and non-democracies respond differently to the Covid-19 crisis and then focus only on democracies to examine specific political features in democracies (if any), play a role in explaining the difference in these policy responses. We examine three different aspects of the response: (a) changes in the policy index before and after registering the first Covid-19 case; (b) the speed of this policy response and (c) its persistence over time.

Changes in the policy response after first Covid-19 case: We analyze changes in policy response by aggregating the data at the weekly level and estimating the following difference-in-differences (DID) specification:

$$Y_{ct} = \alpha + \beta_1 Post_t + \beta_2 D_c + \gamma D_c \times Post_t + \alpha_c + \alpha_w + \varepsilon_{ct} \quad (1)$$

where Y_{ct} is the $\text{Log}(1 + \text{Index}_{ct})$ for either containment policy or health policy in country c in week t. t is the week relative to the week of the reported first case and can thus take values from 4 to +7. $Post_t$ is an indicator that takes value 1 if the total number of cases in country c is positive in week t, and 0 otherwise. D_c is a dummy variable defined for a country c and its definition depends on the specific regression we want to estimate. Initially, it is an indicator of democracy and, in subsequent analysis, is one of the six indicator variables we use for measuring political institutions and norms. The first is an indicator of the governance system and takes a value 1 for parliamentary systems (and zero for a presidential system). The next five indicators take the value 1 if a country has an above-median value of (i) electoral strength, (ii) electoral term remaining, (iii) media freedom, (iv) trust in the government, and (v) independence of elected leader in policy-making. In subsequent specifications to (1) we add country fixed effects (α_c) to account for all time-invariant differences across countries and calendar-week fixed effects (α_w) to account for all the changes over time that are common across all countries. Since the world became more aware of the appropriate policy response over time, due to more knowledge generation and learning from countries that were exposed early, the countries that were exposed later could respond differently. The calendar-week fixed effect takes that into account. Lastly, following the discussion in Cameron and Miller (2015) and Abadie et al. (2017), our preferred specification incorporates both country and calendar-week fixed effects, with heteroscedastic robust standard errors.[14] Our coefficient of interest (γ) is the DID estimate of the differential change in policy response across these political institutions, environments, and norms.

[14] In Section 5.5, we show the robustness of our results by bootstrapping standard errors clustered by country as suggested by Athey and Imbens (2006).

Speed and persistence of the policy response: Having examined the differential change in the policy response before and after the first Covid-19 case, we now utilize the high-frequency nature of the data to understand the speed and persistence of the policy responses across countries. We therefore estimate the following regression:

$$P_{ct} = \alpha + \sum_{t=-4}^{7} \beta_t I_t + \sum_{t=-4}^{7} \gamma_t D_c \times I_t + \alpha_c + \alpha_w + \varepsilon_{ct} \quad (2)$$

where I_t is the indicator for week t relative to the first Covid-19 case. β_t is therefore a 'relative week' fixed effect. As before, in alternative specifications, we add country and calendar-week fixed effects.[15] For the first set of analysis D_c is an indicator of democracy and then it is one of the six indicators, discussed above, defined for the set of democracies. γ_t are our coefficients of interest.

5. Results

We begin in Section 5.1 by discussing the difference in containment and health policy responses between democratic and non-democratic countries. We then analyze the sample of democracies and discuss heterogeneity by governance systems in Section 5.2, electoral environments in Section 5.3, and media freedom and political norms in Section 5.4. Section 5.5 then discusses the robustness of these results to alternate specifications and models.

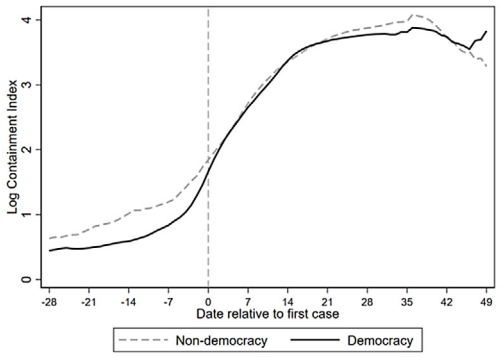
5.1. Policy responses in democracies and non-democracies

First, we examine whether policy responses to Covid-19 are different across democractic and non-democratic countries. Using the polity score, we define a dummy variable D_c that takes the value 1 if a country has a positive polity score (democracy) and 0 otherwise (non-democracy). Table 2 reports the results for specification (1). Columns 1–3 report the results for the containment policy index, while columns 4–6 report the results for the index of health policy index. Columns 1 and 4 report the results without any fixed effects. As reported, democracies were on average 0.33 log points (or, approximately 38.9%) less stringent in their containment index than non-democracies before registering their first case. While all countries increased policy stringency after their first Covid-19 case, democracies responded more aggressively on containment policies. As reported in the table, the initial difference in the containment index is reduced to a statistically insignificant 0.03 log points (p-value: 0.76) after exposure to Covid-19 cases. On health policies, democracies had a (statistically insignificant) 0.29 log-points (or approximately 25.3%) lower health policy index than non-democracies prior to their first Covid-19 case. However, unlike containment policies, democracies had a 0.30 log points (or 35%) higher health policy index than non-democracies in the post period (p-value: 0.00). In columns 2, 5, and 3, 6, we add country and calendar-week fixed effects respectively and find that this pattern remains stable.

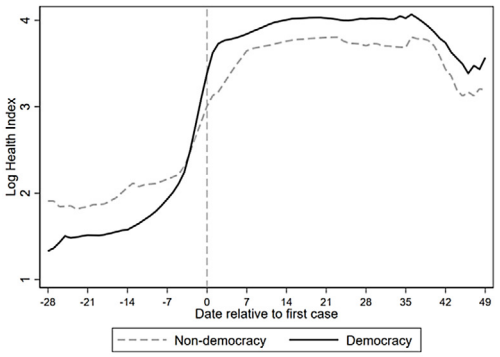
The interpretation of these differences and their magnitudes in terms of tangible policy outcomes is not straightforward. To make progress, in Fig. B1, we plot the relationship of each component of the containment and health index with the aggregate value of the index itself. For example, as can be seen from the figure, the initial increase in stringency of the containment index is driven by restrictions on international travel, followed by school/work closures and restriction on public movement. Similarly, an increase in the health policy index is initially driven by public information campaigns and testing, followed by contact tracing efforts. These are broadly consistent with the popular narratives and media reports of how public policy responded to the pandemic. Turning to interpreting the magnitudes of the results, from column 1 of panel A of Table 2, the containment index across both democracies and non-democracies is on average 40.45 after reporting their first Covid-19 case. From Fig. B1(a), this would imply (on average) a severe restriction on international travel as well as some form of restriction on domestic movement along with work/school closures. For health policies on the other hand, non-democracies and democracies had an average health index of around 33.3 and 44.5 after their first Covid-19 case respectively, which from Fig. B1(b) indicates more testing and contact testing in democracies as compared to non-democracies.

Given that democracies respond aggressively in terms of containment and health policies after their first Covid-19 case, we now take advantage of the high-frequency data to examine the speed and persistence of the policy response. Fig. 3(a) and (b) show a five day moving average of the containment and health policies in democratic and non-democratic countries, relative to the week of their first Covid-19 case. The raw plot indicates that democracies on average have less stringent containment and health policies before their first Covid-19 case and respond rapidly to catch up (in case of containment policies) or exceed (in case of health policies) relative to non-democracies. This is consistent with the discussion above. Fig. 3(c) and (d) then report the coefficients from estimating specification (2). The coefficients show log point differences in each week t, between democracies (treatment group) and non-democracies (control group), relative to the difference two weeks prior to exposure ($t = -2$). As reported, we see that compared to non-democratic countries, democratic countries respond more aggressively in both health and containment policies within the first week after registering their first Covid-19 case. Moreover, this difference is persistent for up to seven weeks after the first case and in fact, increases over time for containment policies.

[15] In a given calendar-week different countries are located on a different 'relative week'. Therefore, with all the fixed effects added, we effectively exploit variation within a calendar-week.

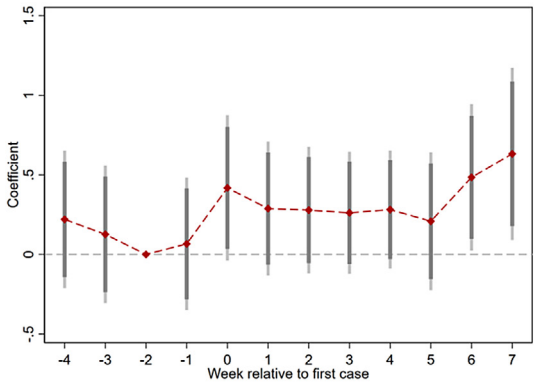


(a) Containment index (Raw)

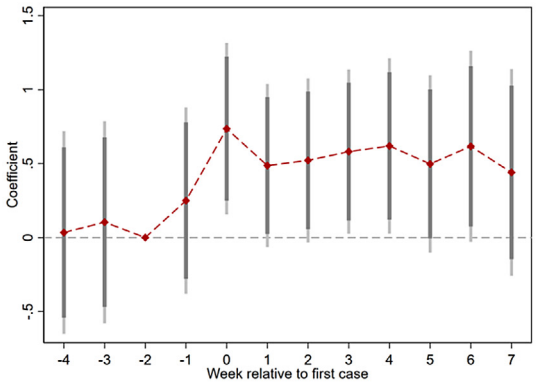


(b) Health index (Raw)

Note: The above graphs plot a five-day moving average for the containment and health policy index relative to the first registered Covid-19 case for democracies and non-democracies respectively.



(c) Containment index (Reg. Coefficient)



(d) Health index (Reg. Coefficient)

Note: The above graphs plot the difference-in-differences coefficients (γ_t) from estimating specification (2), which compares the differential policy responses of democracies to non-democracies in week t relative to two weeks before the first Covid-19 case. The point estimates along with their 90 and 95% confidence intervals are reported in the thick and thin bars respectively.

Fig. 3. Evolution of policies over time in democracies relative to non-democracies.

5.2. Policy responses across governance systems

In this section and the subsequent ones, we focus on democracies only. We begin by examining whether policy responses differ by the governance system in a country. We therefore estimate Eq. (1) where D_c is a dummy variable that takes value 1 if a country has a parliamentary system and 0 for a presidential system. We report the results in columns 1–3 of Table 3. As reported in column 1 of panel A, parliamentary systems, as compared to presidential ones, had a 0.21 log points lower containment index on average, before the first Covid-19 case. However, as reported in columns 1–3 of panel A, we find no differential responses in containment policies between these two electoral systems after registering their first Covid-19 case. On the other hand, as reported in columns 1–3 of panel B, parliamentary systems responded more aggressively in health policies as compared to presidential systems. However, these differences become small and statistically insignificant at conventional levels after controlling for country and calendar-week fixed effects, indicating that they may be driven by underlying characteristics of countries and evolution of the average policy response over time. Despite finding little difference in the change in containment and health policies, there could be differences in the speed and persistence with which these two political systems respond. This is what we examine by estimating Eq. (2). We report the results in Fig. 4(a) and (b), respectively. The coefficients plotted here have the same interpretation as in Fig. 3(c) and (d), except they now report the relative difference between a parliamentary and presidential democracy. We find that there is no differential

Table 3
Heterogeneity in policy response by electroal governance system, strength and tenure remaining.

	Governance system			Electoral strength			Electoral term remaining		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Containment policies									
Above median	0.209*			0.0264			0.114		
	(0.110)			(0.115)			(0.118)		
Post	2.707***	2.726***	0.755***	2.751***	2.772***	0.717***	2.737***	2.757***	0.719***
	(0.0997)	(0.0878)	(0.110)	(0.0988)	(0.0852)	(0.113)	(0.111)	(0.0969)	(0.127)
Above med.	0.0757	0.0786	0.120	0.197	0.196	0.0223	0.0855	0.0804	0.0390
× Post	(0.155)	(0.134)	(0.0934)	(0.159)	(0.137)	(0.0995)	(0.162)	(0.140)	(0.101)
R^2	0.489	0.630	0.854	0.486	0.630	0.854	0.489	0.635	0.855
Panel B: Health policies									
Above median	0.156			0.688***			0.477**		
	(0.181)			(0.182)			(0.186)		
Post	1.851***	1.856***	1.465***	1.805***	1.812***	1.243***	1.743***	1.754***	1.265***
	(0.122)	(0.1000)	(0.115)	(0.116)	(0.0957)	(0.114)	(0.146)	(0.119)	(0.127)
Above med.	0.414**	0.414***	0.0709	0.608***	0.601***	0.550***	0.465**	0.459***	0.302**
× Post	(0.193)	(0.159)	(0.137)	(0.196)	(0.163)	(0.141)	(0.199)	(0.164)	(0.137)
R^2	0.377	0.533	0.702	0.391	0.541	0.708	0.372	0.530	0.712
N	1091	1091	1091	1079	1079	1079	975	975	975
Country FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Week FE	No	No	Yes	No	No	Yes	No	Yes	Yes

Notes: Columns (1)-(3) report the heterogeneity in the governance system. The above median takes a value 1 if the country has a Parliamentary system and 0 for a Presidential system. Columns (4)-(6) report the heterogeneity for electoral strength. Columns (7)-(9) report heterogeneity for fraction of electoral tenure remaining. The sample is restricted democractic countries only. Above median is dummy that takes the value 1 if the relevant variable for that country is above the median value and 0 otherwise. Panel A examines the heterogeneity in containment policies with log containment index as the dependent variable. Panel B examines the heterogeneity in health policies with log health policy index as the dependent variable. Post is a dummy that takes the value 1 after atleast 1 case is reported and 0 otherwise. Country FE are country fixed effects while Week FE are fixed effects for each calendar week. Robust standard errors are reported in parentheses. * $p< 0.1$, ** $p<0.05$ and *** $p< 0.01$ level of significance.

response in either the speed or persistence with which parliamentary and presidential systems responded to the crisis as measured by the two indices.

5.3. Policy responses and electoral incentives

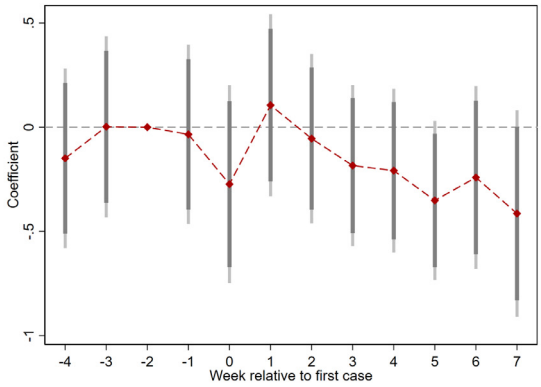
We now turn to examine the heterogeneity in policy responses by the electoral strength and electoral term remaining of the incumbent government. As reported in columns 4–9 of panel A in Table 3, there was no differential response in containment policies depending on the electoral strength or the remaining term of the incumbent government. The estimated magnitudes in our preferred specification– with country and calendar-week fixed effects, reported in columns 6 and 9– are both small in magnitude as well as statistically insignificant at conventional levels. On the contrary, as reported in panel B, governments with an above-median electoral strength and term remaining, responded relatively more aggressively in health policies with 0.55 log points and 0.30 log points higher change in their health policy index as compared to below-median countries.

Similar to the previous analysis, we now turn to examine how rapidly countries with above-median electoral strength and term remaining respond, relative to the below-median countries. We report the results in Fig. 4. Consistent with the results above, we do not find a differential response in containment policies for countries with above-median electoral strength and term remaining (relative to below-median countries), as reported in Fig. 4(c) and (e). Fig. 4(d) and (f) similarly depict the differential health response of democracies with above-median electoral strength and term remaining, respectively. As reported in the figures, countries with above-median electoral strength and term remaining respond very quickly in their health policies, in the first week of reporting their first Covid-19 case. Moreover, this response is persistent for over a month after the first case. The above results therefore suggest that more than institutional structures of the government, it is the electoral incentives that leaders in democracies face that drive their policy response.

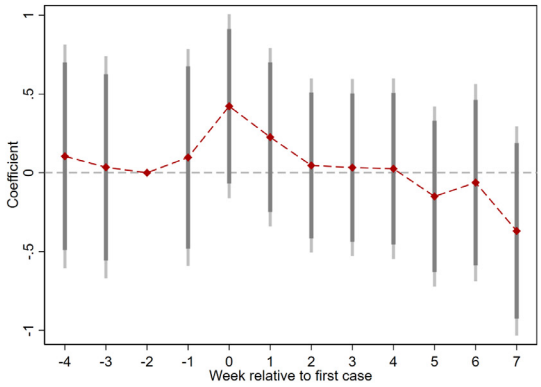
5.4. Media freedom, norms and policy responses

After discussing governance systems and electoral environments, we turn to examine whether the institution of media and political norms result in differential policy responses across democracies. We consider three indicators, namely: (a) freedom of the press; (b) trust in the government, and (c) citizen's preference for the independence of the elected leader in deciding policy.

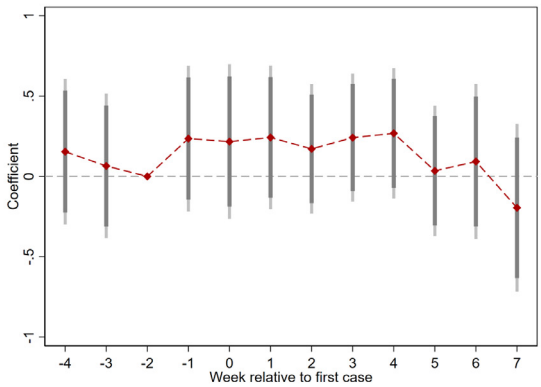
Media freedom and policy response: The media is a natural institution to examine the response of democracies to a crisis. The media is particularly important in keeping a check on the elected government as well as effectively disseminating



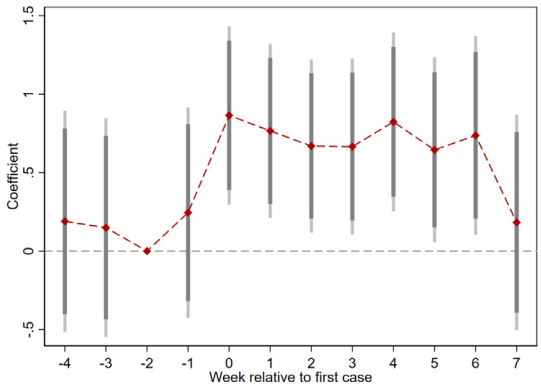
(a) Governance system and containment policies



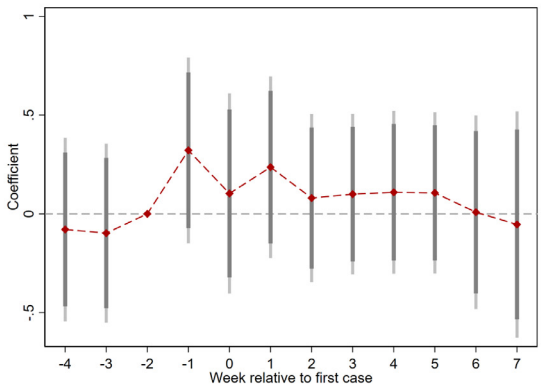
(b) Governance system and health policies



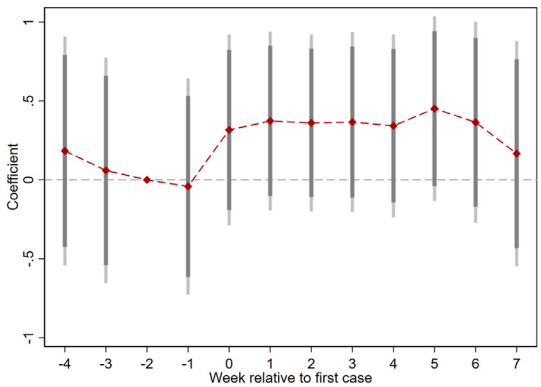
(c) Electoral strength and containment policies



(d) Electoral strength and health policies



(e) Electoral term remaining and containment policies



(f) Electoral term remaining and health policies

Fig. 4. Heterogeneity in policy responses by electoral institutions across all democracies.

information on the crisis, which could be particularly salient for a health pandemic like Covid-19. We begin by classifying democracies by above- and below-median score in media freedom and examine if containment and health policy responses differ across these countries. As reported in columns 1–3 of panel A of Table 4, countries with above-median media freedom do not respond differently in the aggressiveness of their containment policy in response to Covid-19 policies. On the other hand, as reported in columns 1–3 of panel B, countries with above-median media freedom do respond aggressively in their health policy, with a 0.40–0.70 log points higher change in the health policy index as opposed to countries with below-

Table 4
Heterogeneity in policy response by media freedom and political norms.

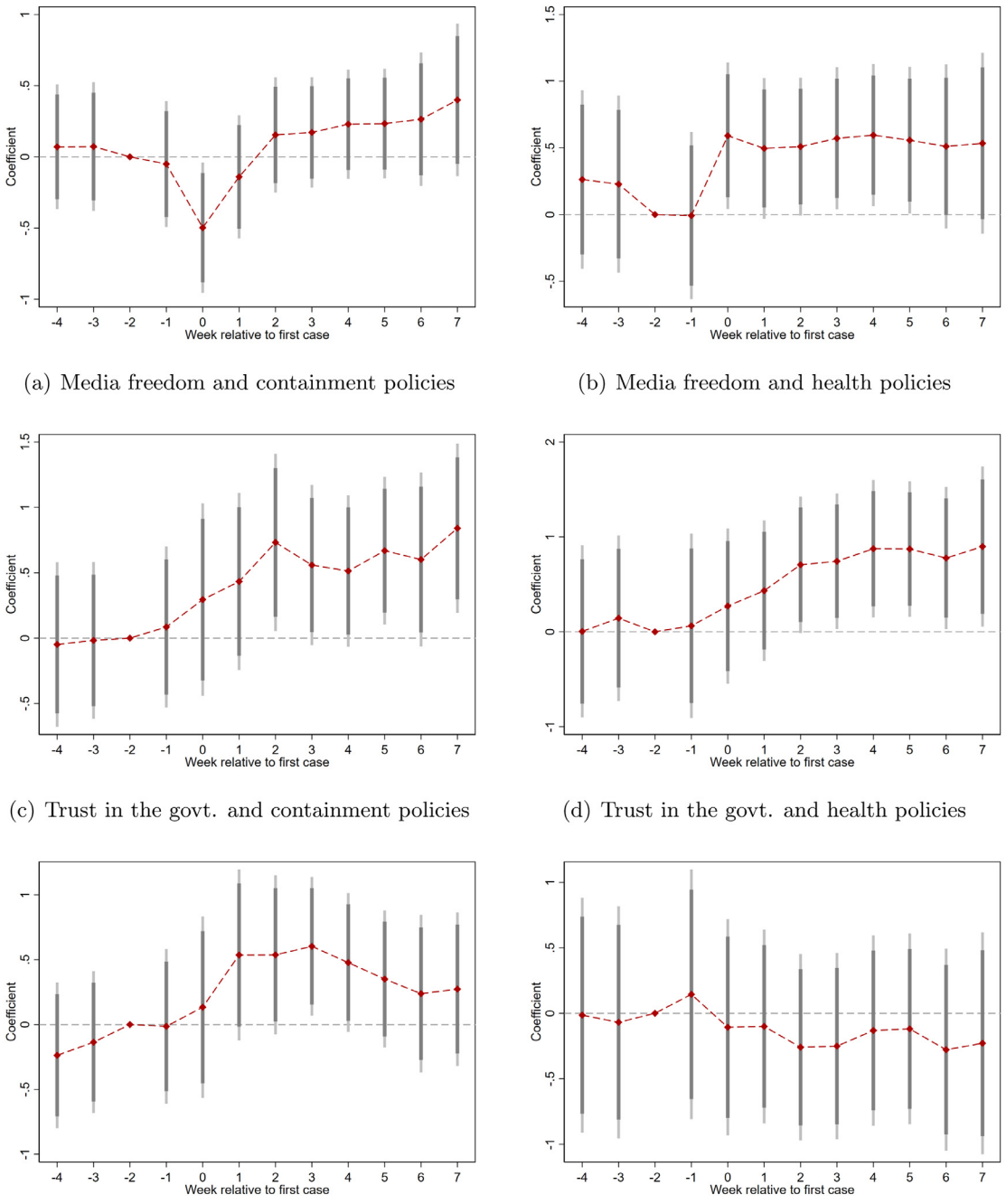
	Media freedom			Trust in govt.			Independence of elected leader		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Closure policies									
Above median	0.453***			0.566***			0.103		
	(0.110)			(0.145)			(0.141)		
Post	2.636***	2.642***	0.677***	2.292***	2.325***	0.229	2.550***	2.578***	0.401**
	(0.110)	(0.0965)	(0.116)	(0.186)	(0.141)	(0.169)	(0.164)	(0.141)	(0.179)
Above med.	0.0835	0.103	0.0812	0.852***	0.834***	0.606***	0.490**	0.478**	0.381***
× Post	(0.151)	(0.133)	(0.0944)	(0.225)	(0.188)	(0.139)	(0.218)	(0.188)	(0.131)
R^2	0.496	0.630	0.854	0.518	0.669	0.885	0.514	0.661	0.881
Panel B: Health policies									
Above median	0.569***			0.687***			0.297		
	(0.174)			(0.261)			(0.262)		
Post	1.653***	1.651***	1.263***	2.064***	2.081***	1.087***	2.518***	2.537***	1.606***
	(0.133)	(0.112)	(0.122)	(0.215)	(0.178)	(0.186)	(0.190)	(0.148)	(0.184)
Above med.	0.710***	0.719***	0.382***	0.600**	0.588***	0.675***	0.249	0.264	0.327*
× Post	(0.187)	(0.154)	(0.134)	(0.276)	(0.223)	(0.175)	(0.275)	(0.220)	(0.182)
R^2	0.385	0.541	0.706	0.537	0.667	0.793	0.524	0.661	0.786
N	1091	1091	1091	439	439	439	439	439	439
Country FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Week FE	No	No	Yes	No	No	Yes	No	Yes	Yes

Notes: Columns (1)-(3) report the heterogeneity in policy response by media freedom across countries. Columns (4)-(6) report the heterogeneity by citizens' trust in the government. Columns (7)-(9) report heterogeneity for citizens' preference on the independence of the elected leader. The sample is restricted democractic countries only. Above median is dummy that takes the value 1 if the relevant variable for that country is above the median value and 0 otherwise. Panel A examines the heterogeneity in containment policies with log containment index as the dependent variable. Panel B examines the heterogeneity in health policies with log health policy index as the dependent variable. Post is a dummy that takes the value 1 after at least 1 case is reported and 0 otherwise. Country FE are country fixed effects while Week FE are fixed effects for each calendar week. Robust standard errors are reported in parentheses. * $p<$ 0.1, ** $p<0.05$ and *** $p<$ 0.01 level of significance.

median media freedom scores. Lastly, Fig. 5(a) and (b) examine the speed and persistence of these policies over time in high (or above-median) media freedom democracies relative to the low (or below-median) media freedom ones. We see that countries with above-median media freedom do respond with relatively higher containment policies, even though the effects are gradual over time. On the contrary, countries with above-median media freedom have an immediate and large positive response in the health policies relative to the below-median ones, which remains persistent for up to seven weeks after the first Covid-19 case.

Norms and policy response: We now turn to discuss the heterogeneity in policy response across countries along with the two indicators of norms related to politics, namely citizens' trust in the government and citizens' preference for the independence of the elected leader in deciding policy. Similar to the previous analysis, we compare the differential policy response in above- and below- median countries. As reported in column 4 of panel A in Table 4, countries with above-median trust in the government start with a 0.57 log points *lower* containment index as compared to below-median countries, but have a 0.85 log points *higher* change in containment policies, after the first Covid-19 case. The magnitude of this change is robust to alternate specifications reported in columns 5 and 6. Turning to the citizens' preference for an independent leader, as reported in columns 7–9 of panel A, above-median countries saw a 0.38–0.50 log points higher change in the containment index as compared to their below-median counterparts. Turning to health policies, reported in panel B, we find that countries with above-median trust in the government had a 0.60–0.67 log points higher change in the health index, while those with above-median citizens preference for an independent leader had a (statistically insignificant) 0.25–0.33 log points *lower* change in the health policy index.

We now turn to examine the relative difference in speed and persistence of policy response for above- and below-median countries. From Fig. 5(c) and (d), we see that countries with above-median trust in the government do respond with more aggressive containment and health policies, but the increase is gradual over time and the regression coefficients are statistically significant at conventional levels only two weeks after the first registered case in a country. From Fig. 5(e) and (f), we see that countries with an above-median preference for more independence of elected leaders see a rapid response in containment policies within the first week or two of the registered Covid-19 case. This differential response is persistent for up to a month, after which even though the estimated coefficients are positive, they are comparatively smaller in magnitude and are not statistically significant at conventional levels. On the contrary, there are no differential responses in health policies. The estimated coefficients are small in magnitude and statistically insignificant at conventional levels.



(a) Media freedom and containment policies

(b) Media freedom and health policies

(c) Trust in the govt. and containment policies

(d) Trust in the govt. and health policies

(e) Independence of elected leader and containment policies

(f) Independence of elected leader and health policies

Fig. 5. Heterogeneity in media and norms across all democracies.

5.5. Robustness of the results

Alternate specifications and samples: The narrow time frame of analysis, high-frequency data, along with country and week fixed effects already allow us to control for all time-invariant country characteristics that could affect containment and health policies, as well as, the general evolution of policy responses across all countries over time. However, it is possible that aspects about a country (such as economic environment, health infrastructure, extent of globalization, etc.), could also be correlated with the political institutions as well as affect a country's policy response over time. Therefore, we modify

our preferred specification and allow for these flexible time trends of country characteristics and show that all our results are robust to these alternate specifications. We include a large set of country characteristics that range from economic and health variables (such as population, GDP, urbanization, access to health care, etc.), exposure to international travel and trade as well as exposure to prior health crises like SARS, MERS, and Ebola. We find that our results remain robust to this exercise. Appendix Section C.1 discusses these results in detail.

Second, we then examine whether our results are driven by 'strong' or 'weak' democracies, as measured by the polity score of a country. As discussed in appendix Section C.2, we sequentially estimate (1) by restricting our sample of countries with a |Polity Score|>X where $X = \{1, \ldots, 5\}$, comparing the differential policy responses across stronger democracies and non-democracies. We find that the differential responses in containment policies are driven mainly by the weak (non-)democracies, whereas the differential responses in health policies are robust across all countries in our sample.

Change-in-changes model: Lastly, we test the robustness of our results using a change-in-changes (CIC) model, a more generalized non-parametric version of the DID model, proposed by Athey and Imbens (2006). In particular, CIC allows for the effect to differ both across units (countries in our case), as well as time. Moreover, the model considers the possibility that the timing of the exposure to the treatment (Covid-19 in our case) could be endogenous to the baseline characteristics of the units (i.e., countries). Standard errors (both for the DID and CIC estimates) are bootstrapped within the unit of analysis (countries) for statistical inference. We discuss the robustness of our results to the CIC specification. Tables A1–A3 report the coefficients for the DID and CIC specifications. As reported in Table A1, for both closure and health indices, the DID and CIC estimates in columns 1 and 2 respectively, are similar in magnitude and statistical significance. The results for the electoral environment in a democracy are reported in Table A2. Columns 1 and 2 report the results for containment policies (i.e., log containment index), while columns 3 and 4 report the results for health policies (i.e., log health index). Each row shows the result for an indicator of the electoral environment, as discussed in the paper. We find that the results are robust. Similarly, Table A3 reports the results for media freedom and political norms. We find that the DID estimate on the trust in the elected leader for both containment and health policies is robust to the CIC specification. However, the DID estimates for media freedom and independence of elected leader, while robust in both magnitude and statisitcal inference to the CIC specification in containment policies, are not statistically significant at conventional levels for health policies. Nevertheless, the estimated coefficients are comparable in both size and sign.

6. Conclusion

This paper uses high-frequency data on health and containment policy responses to the Covid-19 pandemic to examine whether policy responses during a national crisis differ across democracies and non-democracies and whether differences in political institutions and norms, along with other institutions like the media, are important in explaining these differences. The nature of the Covid-19 pandemic is particularly useful to study this question as the crisis was similar across all countries and hit them over a very short period (two months). Using a difference-in-differences framework, we find robust patterns that while non-democracies are more aggressive on both containment and health responses than democracies before the pandemic hits, democracies catch up to non-democracies in the stringency of their containment policy and surpass them in the aggressiveness of health policy within a week after registering their first Covid-19 case. We further find that while the governance system (presidential vs. parliamentary) does not affect policy responses, the electoral incentives of the leader do matter significantly. More specifically, elected leaders who have performed well in the previous election or those who have a longer tenure remaining before the next election are significantly more aggressive in their policy responses. Since leaders in non-democracies do not face regular and competitive elections, this may explain why we observe democratic leaders responding more vigorously. Additionally, we find that democracies with greater freedom of the press respond more slowly and gradually in containment policies, while more aggressively and persistently in health policies. Finally, we find that democracies with more conducive political norms, in terms of trust in government and preference for the independence of leader, also tend to respond more rapidly and aggressively to the pandemic

Taken together, these results strongly suggest that political institutions, and the incentives and norms embedded therein, significantly shape the policy responses. More broadly, it highlights the importance of examining them while analyzing how countries respond to a national crisis. Global agencies that often guide these countries during such times must be cognizant of these details and make their recommendations, taking into account the political economy of the government's response.

Declaration of Competing Interest

This statement affirms that I have no financial interests that may be potentially impacted by the findings in this paper. I have not received any significant financial support frominterested parties who may have a financial, ideological, or political stake related to the article. I maintain no positions in any organization whose policy positions, goals, or financial interests relate to the article.

Appendix A. Appendix tables

Table A1
Containment and health policies across countries.

	N	DID Estimate (1)	CIC Estimate (2)
Log Closure Index	1463	0.234***	0.190**
		(0.0823)	(0.0899)
Log Health Index	1463	0.452***	0.387***
		(0.109)	(0.132)

Notes: Column (1) reports the difference-in-differences estimate from our preferred baseline specification in the paper. Column (2) reports the change-in-changes estimate for the same specification as proposed by Athey and Imbens (2006). All specifications have country and calendar-week fixed effects. Bootstrapped standard errors clustered by country are reported in parentheses. * p< 0.1, ** p<0.05 and *** p< 0.01 level of significance.

Table A2
Containment and health policies by electoral governance, strength and tenure remaining.

	N	Containment policies		Health policies	
		DID Estimate	CIC Estimate	DID Estimate	CIC Estimate
		(1)	(2)	(3)	(4)
Electoral governance	1091	0.120	0.153	0.0709	0.183
		(0.087)	(0.099)	(0.107)	(0.113)
Electoral strength	1079	0.0223	0.00364	0.550***	0.356***
		(0.0827)	(0.0887)	(0.117)	(0.125)
Electoral term remaining	975	0.0390	0.0302	0.302***	0.160
		(0.0887)	(0.100)	(0.105)	(0.107)

Notes: Column (1) reports the difference-in-differences estimate from our preferred baseline specification in the paper. Column (2) reports the change-in-changes estimate for the same specification as proposed by Athey and Imbens (2006). All specifications have country and calendar-week fixed effects. Bootstrapped standard errors clustered by country are reported in parentheses. * p< 0.1, ** p<0.05 and *** p< 0.01 level of significance.

Table A3
Containment and health policies by media freedom and political norms.

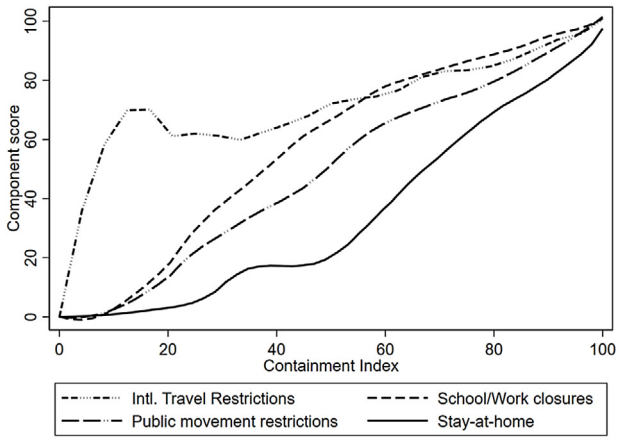
	N	Containment policies		Health policies	
		DID Estimate	CIC Estimate	DID Estimate	CIC Estimate
		(1)	(2)	(3)	(4)
Media freedom	1091	0.0812	0.0154	0.382***	0.130
		(0.0752)	(0.0725)	(0.100)	(0.120)
Trust in the elected leader	439	0.606***	0.882***	0.675***	0.476***
		(0.114)	(0.254)	(0.141)	(0.144)
Independence of elected leader	439	0.381***	0.405***	0.327**	0.209
		(0.105)	(0.139)	(0.147)	(0.156)

Notes: Column (1) reports the difference-in-differences estimate from our preferred baseline specification in the paper. Column (2) reports the change-in-changes estimate for the same specification as proposed by Athey and Imbens (2006). All specifications have country and calendar-week fixed effects. Bootstrapped standard errors clustered by country are reported in parentheses. * p< 0.1, ** p<0.05 and *** p< 0.01 level of significance.

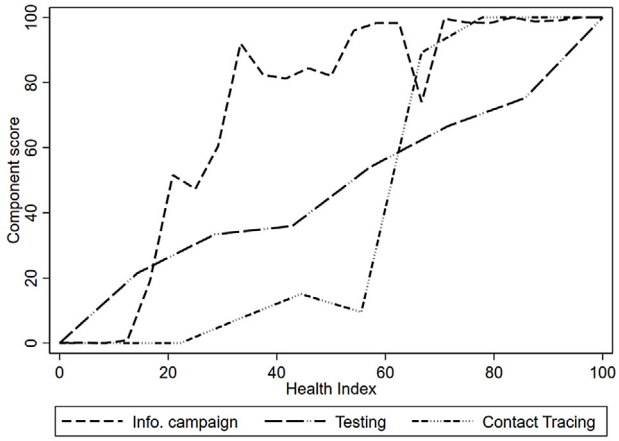
Appendix B. Data description

Here we describe the construction of variables used in the analysis of this paper.

Containment and Health policy indices: The raw data is collected by Hale et al. (2020). Containment and closure policies are measured across eight indicators (C1-C8) namely: school closing, workplace closing, canceling public events, restrictions on gaterhing size, closure of public transport, stay at home requirements, restrictions on internal movement and restrictions



(a) Containment Index



(b) Health Index

Fig. B1. *Note*: The above graphs plots the containment and health index on the horizontal axis and the average value of each of the components of the index on the vertical axis. We normalize each component to have a range from 0-100.
Components of the containment and health indices.

on international travel. Health policies are measured across three indicators (H1-H3), namely: public information campaign, testing policy and contact tracing. We follow Hale et al. (2020) exactly to create two measures of health and containment policies by taking the ordinal score for each measure along with weighting it if the policy is general or targeted and rescale the score to lie between 0–100.

Fig. B1 shows how the different components of each index changes as the index value increases. Specifically, for each value of an index (containment of health), it reports the average of each component, where we normalize the range of each component to go from 0 to 100. For example, as shown in Fig. B1(a), an initial increase in the containment index (from 0 to 20) is driven by restrictions on international travel. A further increase in the policy stringency is driven by school and work closures and restrictions on public movement. Finally, an extremely stringent containment index is driven by stay-at-home orders in addition to the other restrictions. Similarly, as shown in Fig. B1(b), stringency of the health index is initially driven by public information campaigns and testing, followed by contact tracing efforts. Broadly, these are consistent with narratives in the media about how public policy (both closure and health) responded to the pandemic.

Democracies and non-democracies: The Polity IV dataset provides information on the process of selecting the chief executive in the countries. According to this information, 113 out of the 116 countries have their chief executives selected in competitive multi-party elections (the value of the variable `xrcomp` is 2 or 3). The three countries left out are Algeria, Ethiopia, and Fiji. All three countries have held regular multi-party elections, at least in recent history. Historically, the elections in Algeria have not been very competitive. However, it has experienced changes in power, both in the positions of president and prime minister, including in the latest presidential elections in 2019. Fiji has also had changes in power through elections. Moreover, in the recent general elections in 2018 the winning party, FijiFirst, won 27 out of the 51 seats,

while the main opposition party won 21 seats. Therefore, these two countries have had competitive elections after the Polity IV dataset was created. The elections in Ethiopia are, however, generally not competitive. In the most recent general elections in 2015, the winning party won 512 out of the 547 seats in parliament, similar to its performance in the previous election. The same party is in power since the first multi-party elections in 1995. Consequently, it is has a polity score of one, the smallest score in our sample of democracies. Singapore is the only country that we classify as a non-democracy, despite having multi-party elections. Since its founding in 1965, all elections have been overwhelmingly won by the People's Action Party. Even in the last general election in 2015, it won 83 out of 89 seats in the parliament. Consequently, it has a polity score of -2.

World Values Surveys: We use the Sixth Round of the World Values Surveys (Inglehart et al., 2014) to construct two variables with respect to the citizens' trust in the government and citizens' preferences on independence of elected leader in policy-making. We use the following questions (survey available here) to construct these two variables.

Trust in the government: The question is *"on a scale of 1–4 (1 a lot of confidence and 4 being no confidence at all), how much confidence do you have in the institution mentioned"* where these institutions are: the government (V115), political parties (V116), parliament (V117), civil service (V118). We then weight this by V98 *"how much responsibility should the government take to ensure that everyone is provided for"*, which takes a value from 1 (government should provide everything) to 10 (people responsible for themselves). The index of government trust is therefore calculated as:

$$\text{Govt. trust}_c = (11 - V98_c) \times \frac{1}{4} \sum_{x_c=V115}^{V118} (5 - x_c)$$

where x_c is the average score across respondents for question x in country c. Lastly, the score can take a value between 1 and 40. So, we normalize this by a factor 100/40 so that the score takes a value between 1 and 100.

Independence of elected leader: From V127, *Having a strong leader who does not have to bother with parliament and elections. On a scale of 1 (very good)–4 (very bad), what you think about this way of governing the country?"* The independence of elected leader variable is therfore 5-x_c where x_c is the average response to this question in a country c.

Appendix C. Robustness of the main results to alternate specifications

C1. Time trends of country characteristics

Given the high frequency of the data, country fixed effects already allow us to control for country-specific confounders in our baseline model specification (given in Eqs. (1) and (2)). However, as discussed in the paper, there might be characteristics about the country that could be correlated with being a democracy and affect the policy response over time. We modify our baseline specifications to include flexible time-trends of these country-level characteristics as follows:

$$P_{ct} = \alpha + \beta_1 Post_{ct} + \beta_2 X_c \times Post_t + \gamma D_c \times Post_t + \alpha_c + \alpha_w + \varepsilon_{ct} \tag{3}$$

$$P_{ct} = \alpha + \sum_{t=-4}^{7} \beta_t I_t + \sum_{t=-4}^{7} \gamma_t D_c \times I_t + \sum_{t=-4}^{7} \delta_t X_c \times I_t + \alpha_c + \alpha_w + \varepsilon_{ct} \tag{4}$$

where X_c is a vector of country-specific controls as follows: (a) from the latest World Bank Open Database[16] we use log-GDP per-capita, fraction of population in rural areas, fractionalization, fraction of population with access to basic health and sanitation services, and the labor force participation for each country in our sample; (b) from the same dataset, we use the air transport passengers and international trade as a fraction of GDP to control for the exposure to the virus from being integrated globally; (c) we use data from the World Health Organization to create an indicator variable on if a country had been previously exposed to either SARS, MERS or Ebola in the past. In Section C.1.1 we begin by showing the robustness of our results between democracies and non-democracies, followed by parliamentary and presidential democracies. In Sections C.1.2 and C.1.3, we examine the robustness in heterogeneity across political and social institutions within democracies respectively.

C.1.1. Democratic, parliamentary systems and policy responses

In panel A of Table C1, we provide the results of policy responses across democracies as estimated from Eq. (3). Columns 1–2 report the results for containment policies, while 3–4 for health policies. Columns 1 and 3 report the baseline specification as in Table 2. Columns 2 and 4 report the results with country-specific controls. As we can see from the table, the results are similar in magnitude and statistical significance at conventional levels.

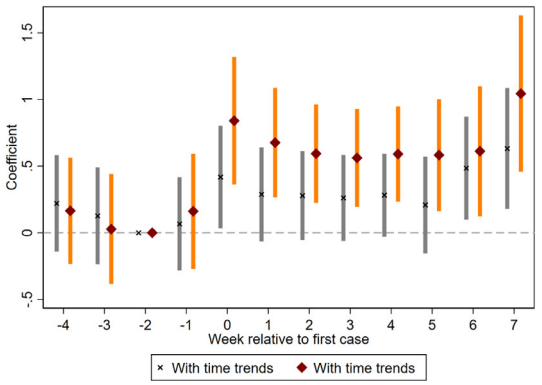
We now report the results from Eq. (4) in Fig. C1. Fig. (a) and (b) report the result for containment and health policies across democracies and non-democracies, while in Fig. (c) and (d) report the estimates for parliamentary and non-parliamentary systems. The grey line reports the baseline specification from the main paper, while the orange line reports the results after adding the country-specific trends. As we can see, the coefficients are robust to including time trends of country-level characteristics and are similar to the baseline specification. The interpretation of the results does not change.

[16] Data can be downloaded from: https://data.worldbank.org/.

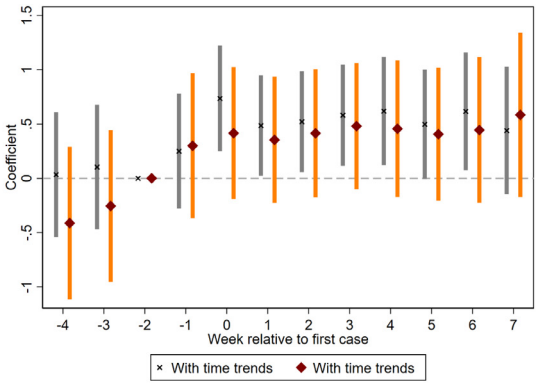
Table C1
Containment and Health policies across countries.

	Log Containment Policy Index		Log Health Policy Index	
	(1)	(2)	(3)	(4)
Panel A: Democracies and non-democracies				
Democracy × Post	0.234**	0.583***	0.452***	0.530***
	(0.0946)	(0.113)	(0.135)	(0.164)
R^2	0.847	0.864	0.696	0.714
N	1463	1306	1463	1306
Panel B: Presidential and Parliamentary systems				
Parl. × Post	0.120	0.0303	0.0709	0.121
	(0.0934)	(0.120)	(0.137)	(0.178)
R^2	0.854	0.878	0.702	0.721
N	1091	978	1091	978
Sample	Baseline	Trends	Baseline	Trends

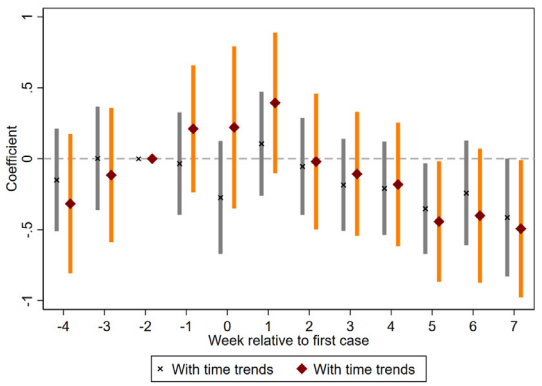
Notes: Democracy is a dummy that takes the value 1 if the country has a positive polity score and 0 otherwise. Post is a dummy that takes the value 1 after atleast 1 case is reported and 0 otherwise. Parliament is a dummy that takes the value 1 if the country has a Parliamentary system and 0 otherwise. The sample of countries in Panel B is restricted to democratic countries only. Columns (1) and (3) report the baseline results as in Table 2, while columns (2) and (4) report the results with country-specific trends as discussed in Eq. (4). All specifications have country and calendar-week fixed effects. Robust standard errors are reported in parentheses. * $p< 0.1$, ** $p<0.05$ and *** $p< 0.01$ level of significance.



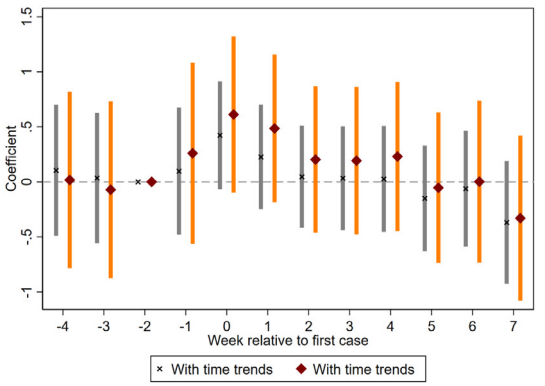
(a) Democracy and containment policies



(b) Democracy and health policies



(c) Parliamentary system and containment policies



(d) Parliamentary system and health policies

Fig. C1. Evolution of policies over time in democracies and parliamentary systems.

Table C2
Heterogeneity in policy responses and political institutions within democracies.

	Electoral strength		Electoral term remaining	
	(1)	(2)	(3)	(4)
Panel A: Containment policies				
Above med.	0.0223	0.0553	0.0390	0.117
× Post	(0.0995)	(0.0949)	(0.101)	(0.0958)
R^2	0.854	0.879	0.855	0.879
Panel B: Health policies				
Above med.	0.550***	0.712***	0.302**	0.0434
× Post	(0.141)	(0.147)	(0.137)	(0.139)
R^2	0.708	0.730	0.712	0.736
N	1079	966	975	872
Spec.	Baseline	Trend	Baseline	Trend

Notes: Columns (1)-(2) report the heterogeneity for electoral strength and columns (3)-(4) report heterogeneity for fraction of electoral tenure remaining. The sample is restricted only to democractic countries. Above median is dummy that takes the value 1 if the relevant variable for that country is above the median value and 0 otherwise. Panel A examines the heterogeneity in containment policies with log containment index as the dependent variable. Panel B examines the heterogeneity in health policies with the log health index as the dependent index across countries. Post is a dummy that takes the value 1 after atleast 1 case is reported and 0 otherwise. Columns (1) and (3) report the baseline results as in Table 3, while columns (2) and (4) report the results with country-specific trends as discussed in Eq. (3). All specifications have country and calendar-week fixed effects. Robust standard errors are reported in parentheses. * p< 0.1, ** p<0.05 and *** p< 0.01 level of significance.

Table C3
Heterogeneity in policy responses and social institutions within democracies.

	Media Freedom		Trust in govt.		Independence of elected leader	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Log containment index						
Above med.	0.606***	0.220	0.381***	0.359*	0.0812	0.609***
× Post	(0.139)	(0.148)	(0.131)	(0.190)	(0.0944)	(0.128)
R^2	0.885	0.911	0.881	0.911	0.854	0.881
Panel B: Log health index						
Above med.	0.675***	0.649***	-0.327*	0.446*	0.382***	1.182***
× Post	(0.175)	(0.162)	(0.182)	(0.244)	(0.134)	(0.186)
R^2	0.793	0.854	0.786	0.850	0.706	0.736
N	439	403	439	403	1091	978
Spec.	Baseline	Trend	Baseline	Trend	Baseline	Trend

Notes: Columns (1)-(2) report the heterogeneity in trust for the government. Columns (3)-(4) report heterogeneity in the freedom and strength of elected leader. Columns (5)-(6) report heterogeneity in media leader. The sample is restricted to democractic countries only. Above median is dummy that takes the value 1 if the relevant variable for that country is above the median value and 0 otherwise. Panel A examines the heterogeneity in containment policies, while Panel B examines the heterogeneity in health measures across countries. Post is a dummy that takes the value 1 after atleast 1 case is reported and 0 otherwise. Columns (1), (3) and (5) report the baseline results as in Table 4, while columns (2), (4) and (6) report the results with country-specific trends as discussed in Eq. (3). All specifications have country and calendar-week fixed effects. Robust standard errors are reported in parentheses. * p< 0.1, ** p<0.05 and *** p< 0.01 level of significance.

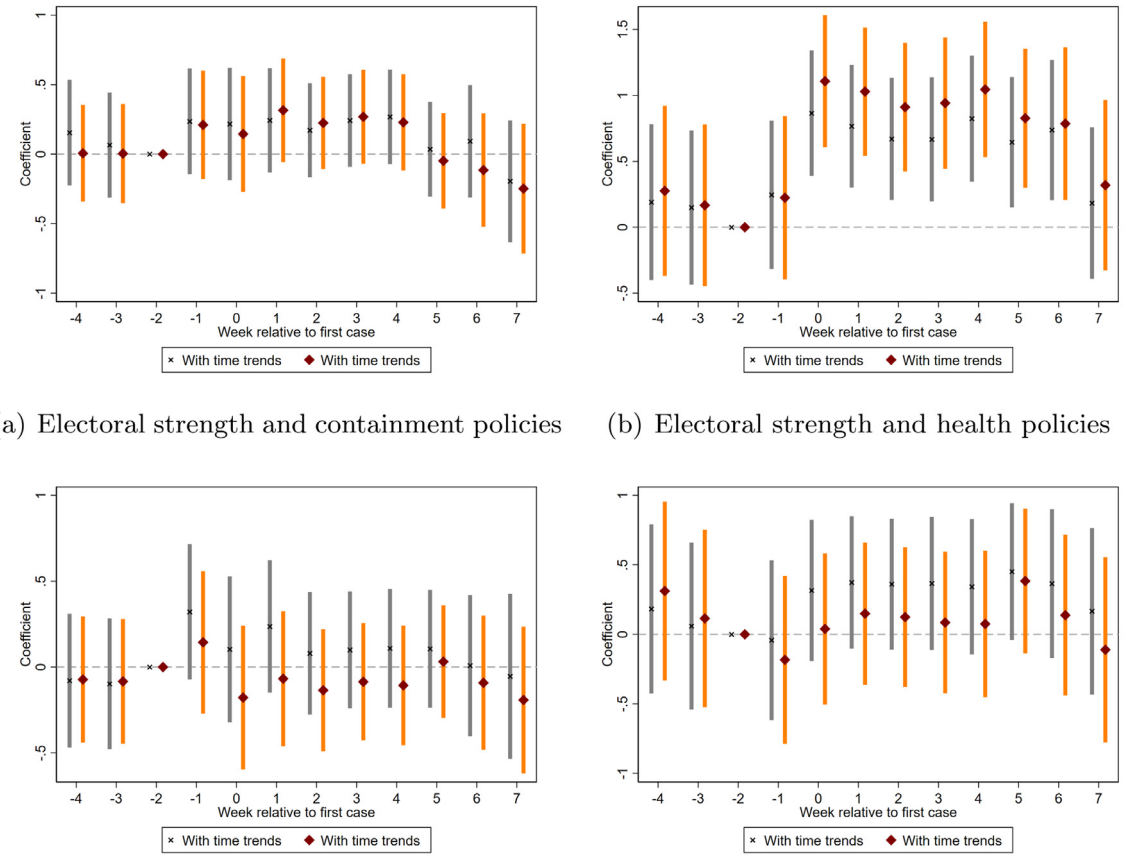
C.1.2. Electoral strength, tenure and policy responses

Table C2 examines the heterogeneity in containment and health policies within democracies across the two indicators political institutions, namely the electoral strength of the largest party and the fraction of electoral tenure left before the next election. Columns 1 and 3 report the baseline results as in Table 3, while columns 2 and 4 report the results with country-specific trends as discussed in Eq. (4). As we can see, the results are robust to controlling for country-specific characteristics interacted with the Post dummy. The interpretation from our baseline specifications do not change.

Fig. C2 then reports the heterogeneity in policy responses at a weekly level as specified in Eq. (4) across the three indicators. As before, the grey line reports the baseline specification from the main paper while the red line reports the results after adding the country-specific trends. As we can see, the coefficients are similar to the baseline specification and the interpretation of the results does not change.

C.1.3. Media, norms and policy responses

Table C3 examines the heterogeneity in containment and health policies within democracies across the three indicators of trust in government, freedom and strength of the elected leader and freedom of the media. Columns 1,3 and 5 report



(a) Electoral strength and containment policies

(b) Electoral strength and health policies

(c) Electoral term remaining and containment policies

(d) Electoral term remaining and health policies

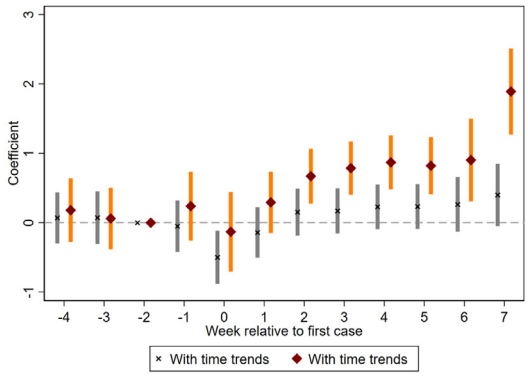
Fig. C2. Evolution of policies over time in democracies.

the baseline results as in Table 4, while columns 2,4 and 6 report the results with country-specific trends as discussed in Eq. (4). As we can see, the results are robust to controlling for country-specific time trends. The interpretation from our baseline specifications do not change.

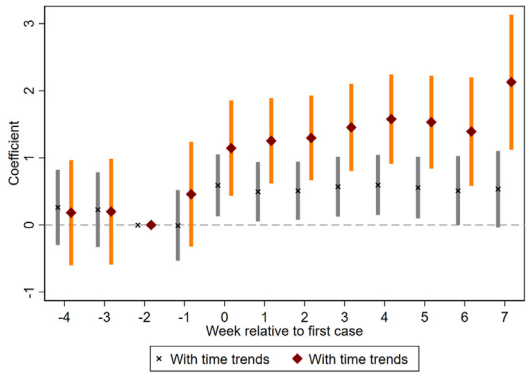
Fig. C3 then reports the heterogeneity in policy responses at a weekly level as specified in Eq. (4) across the three indicators. As before, the grey line reports the baseline specification from the main paper while the red line reports the results after adding the country-specific trends. As we can see, the coefficients are similar to the baseline specification and the interpretation of the results does not change. If anything, it makes the interpretation stronger by improving the statistical significance of the coefficients.

C.2. Strong democracies and non-democracies: |polity score|>X

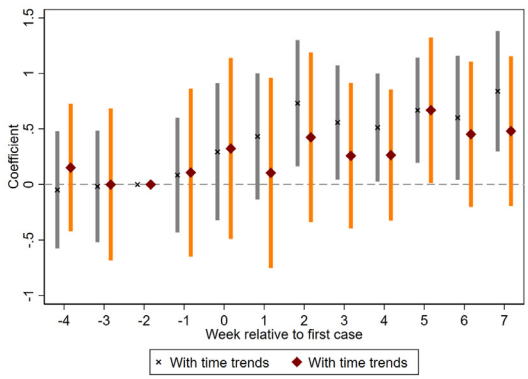
The polity score ranges from −10 to +10 with −10 being strong autocracies and +10 being strong democracies. We re-estimate our regressions by sequentially restricting our sample to countries with |Polity score|> *X*. This allows us to examine whether the differential response in containment and health policies is driven by weak or strong (non)-democracies. As reported in panel A of Table C4 and Fig. C4(a), the differential effect in containment policies is driven by countries with weak political institutions, where weak democracies respond more aggressively as compared to non-democracies. In fact, there is no difference in the containment policy response between countries with strong political institutions before and after the first Covid-19 case. On the contrary, the differential responses in health policy are robust across countries with both strong and weak political institutions as reported in panel B of Table C4 and Fig. C4(b).



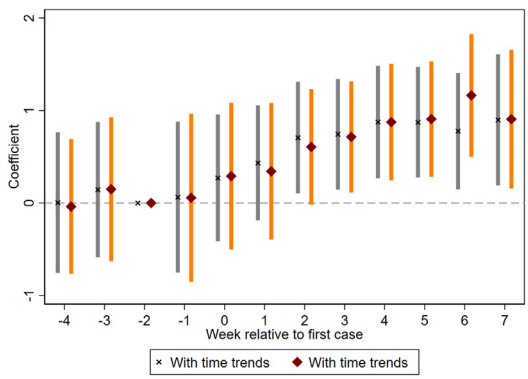
(a) Media freedom and containment policies



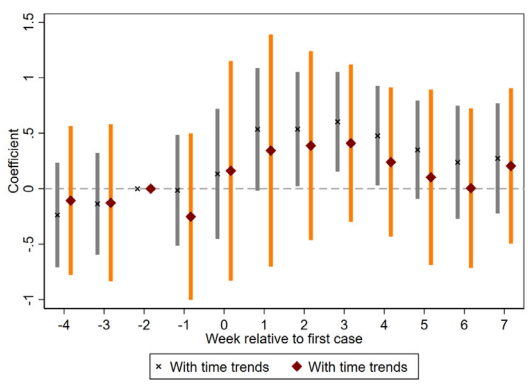
(b) Media freedom and health policies



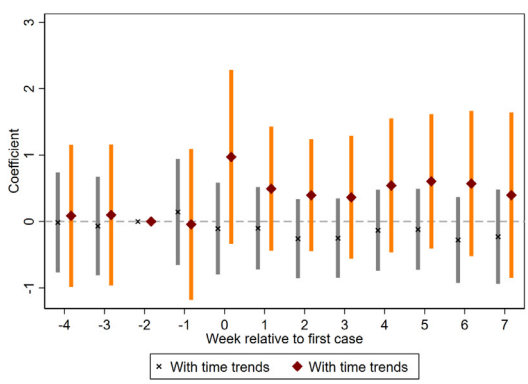
(c) Trust in govt. and containment policies



(d) Trust in govt. and health policies



(e) Independence of elected leader and containment policies



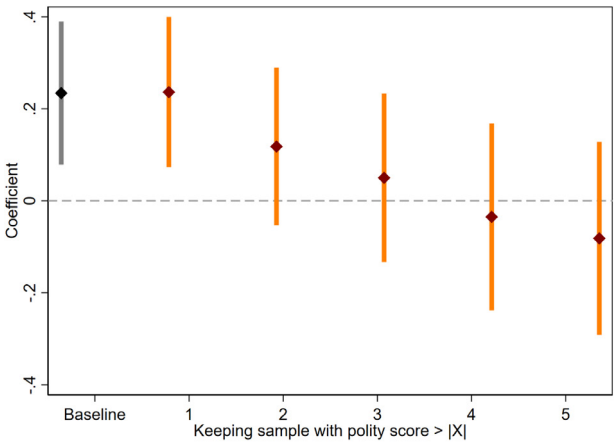
(f) Independence of elected leader and health policies

Fig. C3. Media, cultural norms and policy responses over time.

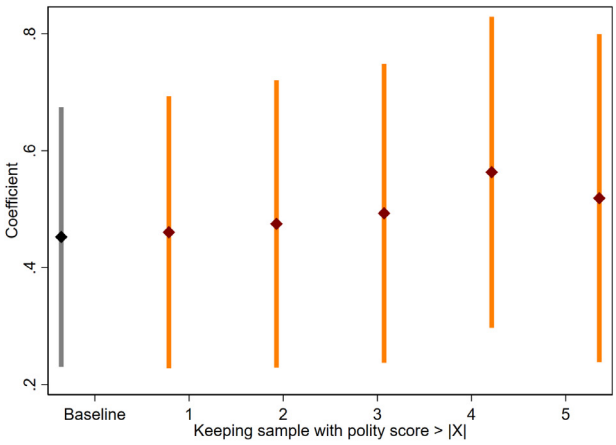
Table C4
Countries with |polity score|>X.

|Polity|>X	Baseline (1)	1 (2)	2 (3)	3 (4)	4 (5)	5 (6)
Panel A: Log Containment Policy Index						
Democracy	0.234**	0.236**	0.118	0.0498	-0.0351	-0.0819
× Post	(0.0946)	(0.0992)	(0.104)	(0.111)	(0.123)	(0.127)
R^2	0.847	0.846	0.849	0.852	0.849	0.850
Panel B: Log Health Policy Index						
Democracy	0.452***	0.460***	0.475***	0.493***	0.563***	0.519***
× Post	(0.135)	(0.141)	(0.149)	(0.155)	(0.162)	(0.170)
R^2	0.696	0.696	0.692	0.691	0.696	0.704
N	1463	1418	1360	1267	1172	1105

Notes: Democracy is a dummy that takes the value 1 if the country has a positive polity score and 0 otherwise. Post is a dummy that takes the value 1 after atleast 1 case is reported and 0 otherwise. The sample of countries in columns (2) and (4) are restricted to those with a absolute polity score greater than 5. Columns (1) and (3) report the baseline results as in Table 2. All specifications have country and calendar-week fixed effects. Robust standard errors are reported in parentheses. * p< 0.1, ** p<0.05 and *** p< 0.01 level of significance.



(a) Containment Index



(b) Health Index

Fig. C4. Robustness with a sample of countries with |polity score|>X.

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