Democracy in the Face of COVID-19
Have Less Democratic Countries Been More Effective at Preventing the Spread of This Pandemic?

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Abstract

This paper attempts to answer whether democracies have been more or less effective at preventing the spread of COVID-19. The primary data points of interest were the total number of screening tests conducted within a country and the total number of positively detected cases and confirmed deaths within a country, collected from independent Ministry of Health websites and WHO situation reports respectively. Using a regression analysis model with controls, this study finds that higher scores on the democracy index are correlated with more screening tests conducted on average. However, lower democracy indices are correlated with lower death rates relating to COVID-19 on average, suggesting that less democratic countries have been better at containing the outbreak of this pandemic within their borders, despite testing less on average. Freedom of speech indices are not statistically significant in their correlation with the outcome variables of this study, suggesting that free media has not been more effectively advancing disease containment efforts than restricted media. Results are consistent across two different selected time-horizons of analysis, as well as extensions of the regression model with omitted controls. While the regression outputs do not necessarily discount the significance of testing, they point to the possibility that actions taken after issuing screening tests are more pivotal in preventing the spread of COVID-19.

Key words

COVID-19, Democracy, Regime Types, Testing, Containment Efforts

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1 Introduction

COVID-19 has been identified as the cause of a respiratory illness that found its origins in Wuhan, China back in November of 2019 (Adhikari et al., 2020). As of March 20th, 2020, this coronavirus has spread to 152 countries and 22 territories across the world (WHO). Statistics on mortality rates and characteristics of susceptible populations are constantly evolving as COVID-19 infects countries with varying levels of medical resource availability. Based on data from a study published on January 29th, the median age of a 425 patient sample population was 59 years, with 65% of this population being males (Li et al., 2020). The incubation period, defined as the period between exposure to COVID-19 and the first appearance of symptoms, was on average 5.4 days, with 95% of the population developing symptoms within 12.5 days (Li et al., 2020).

While the discreet nature of the virus in its initial stages of host infection is one of the most discussed topics of COVID-19, its rate of transmission and potential for fatality is arguably even less certain. While human-to-human transmissibility is already confirmed, the speed of transmission is still a figure up for debate. The basic reproduction (R_0) of this virus is estimated to range from 2.2 (Riou et al., 2020) to 6.47 (Tang et al., 2020) depending on the transmission model. In other words, with no intervention, an expected 2.2 to 6.47 cases will be generated by one case of COVID-19 in the population. In fact, the effective reproduction number (R) of COVID-19 is currently estimated at 2.9, a value substantially higher than the reported effective reproduction number of 1.77 for SARS in its early stage (Adhikari et al., 2020).

As for mortality rate estimates, values as high as 12% are reported in the Wuhan epicenter of the pandemic back in February (Mizumoto et al., 2020). However, when adjusted for a thirteen-day lag time from symptom onset to death, case-fatality risks were estimated at 3.5%

in China and 4.2% in the 82 other infected countries recorded in the study (Wilson et al., 2020). Even then, a broader range of 0.25%-3.0% for case-fatality risk estimates is recommended, with the upper limit more appropriate in resource poor settings with known medical constraints, or in high-income countries with limited surge capacities in hospital resources (Wilson et al., 2020).

[Current Situation]

As of March 20th, 2020, global cases of COVID-19 were reported at 234,073, with a death toll of 9840. While it took three months to reach the first 100,000 confirmed cases, reaching the next 100,000 as of March 19th, 2020 only took 12 days. In fact, in just the 24 hours of Marth 19th, the European Region confirmed another 17,506 cases. Shifting focus towards independent country statistics, World Health Organization figures show that while China still ranks highest with 81,174 confirmed cases, the total new deaths reported has tapered out to 11. In contrast, Italy, the second most severely affected country with a total case count of 41,035, reported 429 new deaths in this same 24-hour window. The United States, as the country reporting the highest number of infection cases in North America, has a total of 10,442 confirmed cases, with 50 new deaths reported on March 19th. (WHO)

With the pandemic reaching more than 150 countries, the media has been brimming with conversations comparing different governments and their responses to the coronavirus. In the US, the state of California ordered its 40 million residents to "Shelter in Place," a policy intended on keeping the population within their respective residences as of March 20th (Hutt, 2020). This took place two months after the first case of coronavirus was confirmed on January 20th in Washington, California (Holshue et al., 2020). In China, where the likely first case of coronavirus was confirmed on November 17th, 2019 (Ma, 2020), the government decided to seal off Wuhan on January 23rd, 2020 (MEE, 2020). In Italy, the government issued its first lockdown on February 23rd the President ordered the first lockdown in the country, this one affecting eleven municipalities in Lombardy (Gazzetta Ufficiale, 2020). Italy's first case was reported on January 31st, 2020 (Giovanetti, 2020).

With each country having its own unique governance system and set of initial cases to respond to, research has yet to show explicitly any relationship between the type of government and their response speed and efficacy on this matter. Yet past research has shown some trends worth noting in terms of countries and how they are affected by global pandemics. For one, developing countries are faced with a unique, preexisting challenges that lend them less prepared to tack on a pandemic in comparison to industrialized nations (Oshitani et al., 2008). In particular, healthcare systems are often inadequate in developing countries (Oshitani et al., 2008). Indeed, a country's ability to respond to surge demands for medical resources during pandemics is considered a crucial determinant in its overall ability to mitigate the effects of a pandemic within its borders (Manuell, 2011). Yet hospital readiness is not a healthcare system characteristic that perfectly correlates with a country's GDP or level of development (Blavin, 2020). Thus, both a country's level of development and pandemic preparedness should be factored into any analysis of its ability to respond to a pandemic.

Bearing in mind these key explorations, I want to focus my research on the analysis of different government types, as characterized by their levels of reported democracy, and their responsiveness thus far the COVID-19 world crisis. The intention of this paper is to hopefully shed light on how effective different governments have been in the early months of 2020 in response to this pandemic.

2 Literature

Are democratic countries more effective at responding to and consequentially controlling the current coronavirus outbreak? This section of the paper covers past research on related topics. Numerous academic sources argue that democracies are more efficient for the economy during normal times. However, confining analysis to times of pandemics, outbreaks and crisis raises interesting observations and debates.

Rugers (2005) argues that a lack of democratic institutions has impactful, negative effects on the nation's health. He takes into account three major public health events in China, namely the 1958-1961 famines, SARS and HIV/AIDS, to assert using historical statistics that censored media and information leads to gross health detriments. While the paper highlights important historical events in support of its argument, I hope to provide a more empirical analysis using data from the 2020 COVID-19 pandemic in contribution to this body of literature.

Gerring et al. (2012) look at the relationship between democracy and human development by using infant mortality rates as their main indicator variable for human development. In terms of data methodology, they conducted a series of time-series, cross-national statistical tests. The empirical test involved regressing the natural log of infant mortality rate against democracy and other controls. Their sample involved all countries for which relevant data was available during the 1960 to 2000 time period, which amounted to 149 countries in the smallest samples and 192 countries in the largest samples. To control for endogeneity, Gerring et al. added time lags to the independent variables and employed spatial controls as robustness checks for the aforementioned country fixed effects from the original regression. The paper ultimately concludes that stock of democracy in a country over the past century has a substantial effect on levels of human development as measured through infant mortality rates. Thus, this paper seems to substantiate the fact that democratic governments may be more effective at ensuring their citizen's health. This would arguably mean that democracies would respond more quickly in situations like a pandemic. Taking into account the regression model employed by Gerring et al. (2012), my paper instead focuses on a different set of dependent variables during a very specific, historical moment. I contribute to the literature here by analyzing the mid-crisis response efficacy of different governments. Rather than exploring long-term, sustained effects that democracy may have on public health, I chose instead to focus on health matters correlated with short-run resilience.

In the same body of literature, Bollyky et al. (2019) takes a panel dataset of 170 countries to assess the relationship between democracy and cause-specific mortality, thereby exploring pathways connecting democracy to health gains within the country. The paper mentions that at least four studies have found no link between democracy and infant mortality, with authors of these papers attributing the improvements in health outcomes to factors such as country income and institutional capacity. Bollyky et al. contributes to the literature by comprehensively assessing the international effect of democratic governance on non-communicable diseases and injuries. They collected information on regime type from the Varieties of Democracy project and found that democracies were more likely than autocracies to benefit from health gains for causes of mortality that aren't heavily targeted by foreign aid.

Empirically, the paper used synthetic controls to compare observed data from countries that have undergone democratic transition to constructed counterfactual scenarios. These counterfactuals were generated from the weighted average of 55 countries that remained entirely autocratic. The main robustness analysis employed in this paper involved a manipulation of various fixed effects for sensitivity analysis. Some fixed effects they employed were democratic experience, national income, development assistance for health, urbanicity, mortality shocks and country fixed effects. Finally, to make their results more practical for policy advisory, they decomposed democratic experience into key components defining the democracy index so as to identify which ones had the most significant effect on HIV-free life expectancy. These methodologies and valuable to my research in terms of implementing robustness checks for my regression results. Taking the experience of Bollyky, I contribute to the literature by looking at how effective democracies are when hit by more abrupt health crises such as COVID-19.

Research on the question of whether more democratic countries are more effective in their response to the COVID-19 outbreak is particularly relevant because of heated debates concerning China's actions in the late months of 2019. The World Health Organization commended China on January 30th, 2020 in the Coronavirus Emergency Committee's Second Meeting for "setting a new standard for outbreak response." Yet the topic has been highly debated in various news outlets since.[1] Thus, in addition to contributing to existing literature by analyzing the response efficacy of democracies in times of health crises, this paper also seeks to provide more empirical evidence for a highly contested claim in contemporary news.

3 Data

I draw from three main sources of data to construct all the variables of interest in this study. All information concerning coronavirus positive cases and death counts by country were drawn from the World Health Organization's daily situation reports. Information about country

[1] Berengaut, Ariana A. 2020. "Democracies Are Better at Fighting Outbreaks." *The Atlantic*. https://www.theatlantic.com/ideas/archive/2020/02/why-democracies-are-better-fighting-outbreaks/606976/ (accessed March 21, 2020).
Kavanah, Matthew M. 2020. "Authoritarianism, outbreaks, and information politics." *The Lancet*, 5:3, pp. 135-136.
The Economist. 2020. "Diseases like covid-19 are deadlier in non-democracies." https://www.economist.com/graphic-detail/2020/02/18/diseases-like-covid-19-are-deadlier-in-non-democracies (accessed March 21, 2020).

population, hospital bed numbers, GDP, population density and annual tourism counts were drawn from World Bank databases. Yet the bulk of data collection concerned the government testing variable, which measures the number of tests issued by the government as of thirty days after the first-case discovery date. The data search involved looking at a combination of government health ministry websites and news sources to either create estimates or collect exact figures for the number of screening tests conducted. Much of this work launched off the efforts of Our World in Data, but this paper provides a more comprehensive list of countries under analysis. Finally, the variable concerning country shared borders[2] was measured using a combination Google Maps and WHO's daily situation reports.

To analyze how effective governments were in responding to COVID-19, a combination of case numbers at the 30-day mark as well as tests issued at the 30 day mark were used as dependent indicators. Case numbers were selected as an indicator to measure the effectiveness of a country's containment response, with death counts added as an additional layer to the analysis. The assumption drawn in this decision is that positive cases may not precisely measure the number of actual cases in a country, as it is a figure that is also contingent on the number of tests issued in the country overall. Nonetheless, it gives a window of insight into the potential spread of COVID-19 within a country. Death counts by COVID-19 on the other hand are assumed to have less variation since patients with more severe cases are more likely to visit the hospital and get tested.

Yet apart from using case counts as an indicator, this paper also seeks to focus in on government actions during this pandemic. Specifically, the number of total tests conducted was

[2] The variable called shared borders is a dummy variable defined by whether countries bordering the country of interest had already confirmed their first case of COVID-19 prior to the first day our country of interest discovers its first case.

used as an indicator variable because of the widely advertised effectiveness of such measures by numerous international entities.[3] A case study of Singapore reveals that the strong surveillance and containment measures implemented by the country may have been useful for the detection and containment of COVID-19 (Ng et al., 2020). The first step of this paper is to determine whether the controls selected for the study were actually correlated with our outcome variable. Then, test count indicators were used to characterize country differences in surveillance decisions on the testing front. The results of these regressions will be combined with that of the case count regressions to determine which governments have been more effective at containing and controlling the current pandemic.

This section of the paper clarifies the decisions made in the data collection process in terms of time frames, countries and estimations selected in the analysis. Under each topic, this section addresses some of the concerns that arose in the process of data collection, as well as the robustness checks that were implemented to alleviate these concerns.

3.1 Time frame

The time frame of indicator selected was set to thirty days after first case reported in any given country. This is a time adjustment meant to make the figures in each country more comparable. Due to the recent nature of the pandemic development, to ensure that country sample sizes remain large enough to conduct analyses, this paper chose to restrict the time horizon of indicators collected to thirty days.

The downside of this selection is that the absolute differences in country case counts will be relatively smaller, since COVID-19 case development seems to take on an exponential pattern. Furthermore, this limit in time horizon obscures observations concerning the time it

[3] Dr Tedros Adhanom Ghebreyesus, Director-General of WHO, spoke of the vital importance of testing in media briefing on COVID-19. (Wood, 2020).

takes for governments to ultimately contain COVID-19, as measured by a downturn in daily case counts. However, given the rapidly evolving and not-yet concluded nature of this event under study, analyses concerning the ultimate results of this pandemic can only be left for future research.

To account for some robustness check against the timeframe selected, this paper also uses total case counts 45 days after first case discovery as a dependent indicator. Within the limitations of a study that measures a current event, this indicator is added in hopes of providing some insights into country case developments over time.

As the ultimate goal of this paper is to analyze the effectiveness and thus speed of a country's response, 30 days after first case discovery was determined to be a reasonable comparison point. This is both enough time for most governments to have issued some form of response to the pandemic, and also a short enough window to determine characteristics of a government's response in what can be defined as the "beginning" of the pandemic.

3.2 Countries

Countries in this study were selected based on the countries that had already been infected as of February 27th, 2020 according to the World Health Organization situation reports. The reason these countries were particularly selected is due to the fact that indicators for this study are adjusted to thirty days after first case reports. Therefore, at the time of this study, only these countries would have encountered this 30-day time horizon. However, as a preliminary extension, I also included countries that had reached at least 100 confirmed cases of COVID-19 as of March 19th, 2020. The intention is to extend this project to include all countries by the end of this pandemic.

As of now, there are 68 countries included in this paper. China, however, is excluded from the segment of the study involving number of screening tests conducted 30 days after first case reported. This is for two major reasons. First, given that COVID-19 screening tests development is contingent on knowing the genetic sequence of the virus, using China's first reported patient case would not be a just comparison since the sequence was not even discovered until more than thirty days after China's first reported case. Given this, I then thought to choose Jan 10th as the first date of consideration given that this was the day China discovered and released the COVID-19 genetic sequence. However, due to limited data, I was only able to find the number of screening tests conducted for one province in China. Thus, for the sake of data consistency and comparability, China was excluded from the study.

3.3 Estimates on Government Response Variable

The government response variable in this study was chosen to be the total number of tests conducted within a given country up until 30 days after the first case reporting. While most of the data could be accurately collected from official government websites, certain governments were less transparent about their figures. Thus, to ensure comprehensiveness, I estimated testing figures based on data that was available on dates not coinciding with my time horizon of interest.

For the estimate employed in my study, I assumed a linear relationship between the number of positive cases detected and the number of total tests conducted. This assumption is based on the consideration that positive cases also grow exponentially, and thus growth trends could potentially be accounted for using this estimation method. When multiple data points were available for a country, but all not on the 30-day date of interest, an average of all estimates was selected. The specific equation used for estimation is as follows:

$$\frac{active\ cases_{t^*} \cdot total\ tests\ conducted_t}{active\ cases_t} = total\ tests\ conducted_{t^*}$$

Here, t* represents the 30-day date of interest, and t represents the date with which the actual data collected corresponds.

The downside of this estimate is that it doesn't account for unpredicted changes in testing counts that result from changes in government verdicts. For example, in the days between my date of data retrieval and the actual 30-day horizon, a government may have authorized and released and unprecedented number of tests into the economy. Similarly, if the data of data retrieval was later than the actual 30-day horizon, this estimate may capture changes in government action that occurred after my date of comparison.

To account for errors in estimation, I created an indicator variable for the quality of data collected on the government response variable. 0 represents a data point for which the data was directly collected from an official government website on the exact date of interest. 1 and 2 respectively represent data that was estimated based on data that corresponds to a date less than 10 days away from the 30-day date of interest, and data that corresponds to a date more than 10 days away from the 30-day date of interest. Three regressions are run to control for errors in estimation, excluding the lower quality data points with each iteration of regression.

Worth particularly noting were estimates conducted for Canada and Slovakia. For Canada, the official data was an underestimate when compared to the sum of a subset of province data. Thus, while the estimates were calculated using a data point that lies within a five-day window from the date of interest, the quality of data was assigned a value of 2. In the case of Slovakia, given that the country announced daily testing amounts, estimates were instead calculated by adding those daily amounts to publicized data on March 20th, for which a total overall testing value was available.

3.4 Democracy Indicator

The democracy indicator was selected from a group of more than 470 indicators in the V-Dem Dataset.[4] From these indicators, this paper selects a few more detailed components to identify which ones have a stronger effect on government response efficacy during the COVID-19 pandemic. Similarily to Bollyky et al. (2019), I choose to focus primarily on the multiplicative polyarchy index from the V-Dem dataset. This indicator measures the responsiveness and accountability between leaders and citizens, which I believe is a meaningful indicator to track during this pandemic. The assumption here is that a responsive leadership can be defined as one that has its citizens interests and livelihoods at heart. Health is certainly a component of both citizen interest and livelihood. Thus, the hypothesis would be that a government that ranks high on this indicator scale responds better to the pandemic.

Furthermore, as media has been heavily involved in this pandemic, this paper also selects the freedom of expression and alternative sources of information index as an independent variable of observation. Since media has the ability to convey the government's verdicts and also spread general knowledge of facts, in one sense it should help mitigate the spread of COVID-19. However, media can also be highly politicized and thus focus its readers aspects of the pandemic that are not conducive to the active prevention of viral spread.

As popularly perceived standards of democracy often reference back to the democracy index compiled by the Economist Group, this paper uses Intelligence Unit democracy indices as

[4] Bollyky et al. (2019) similarly use this dataset, but decompose democratic experience into key components defining the democracy index so as to identify which ones had the most significant effect on their dependent indicator, HIV-free life expectancy.

well to get a grasp on whether commonly accepted democratic nations have been responding more effectively to the COVID-19 outbreak.

As an extension of this, the paper also selects the Functioning of Government Index from the Economist Group's Intelligence Unit. This index takes into account questions concerning government corruption, popular perception of citizens' freedom of choice, public confidence in the government, and government's extent of jurisdiction. By this specific breakdown of index composition, one may assume that a country with a higher Functioning of Government Index would be more effective at preventing the spread of COVID-19. Thus, this index was also included in the study for analysis.

3.5 Summary Statistics

Table 1: Summary Statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
positive test cases 30 days after first case	68	2,648	7,151	1	42,282
COVID-19 deaths 30 days after first case	68	69.82	218.3	0	1,284
positive test cases 45 days after first case	64	7,461	19,330	2	142,823
COVID-19 deaths 45 days after first case	64	298.4	687.9	0	3,294
population (millions)	68	86.92	241.0	0.0340	1,439
density	68	406.667	1280.858	3.249	79.52.998
hospital beds (per thousand)	68	3.659	2.467	0.500	13.40
GDP (millions)	68	12.72	1.657	7.398	16.84
total COVID-19 screening tests conducted in the 30 days after first case	59	34,835	69,850	54	403,266
quality of tests	68	1.721	2.962	0	9
shared border (dummy variable)	68	0.632	0.486	0	1
inbound tourism (millions)	67	17.663	20.082	0.084	89.322
Democracy index	67	6.467	2.234	1.930	9.870
Function Gov Index	67	6.159	2.374	0	9.640
Multiplicative Polyarchy Index	67	0.460	0.320	0	0.841
Freedom of Expression Index	67	0.710	0.285	0.0770	0.969
Government type	67	2.239	1.074	1	4

Table 1 above presents a comprehensive overview of the data used in this study. Note in particular that this study takes from a wide range of countries but does not cover every country due to the nature of the methodology design. Yet this does not preclude the study's ability to represent a wide range of democracies. The following two graphs illustrate the range of democracy indices assigned to the countries in this study.

Figure 1: Distribution of Democracy Indices in Dataset

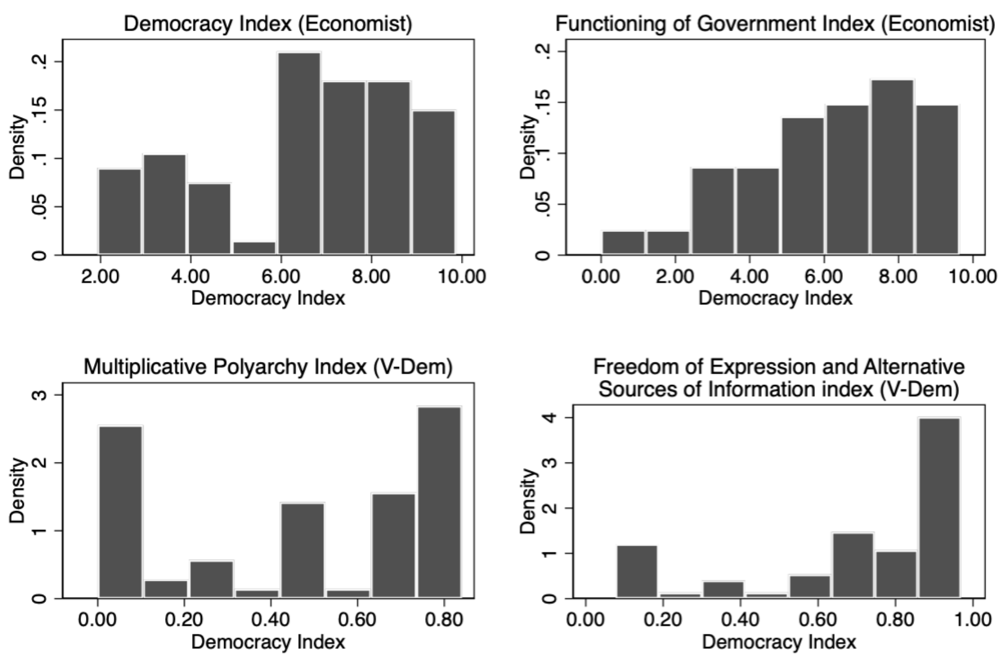
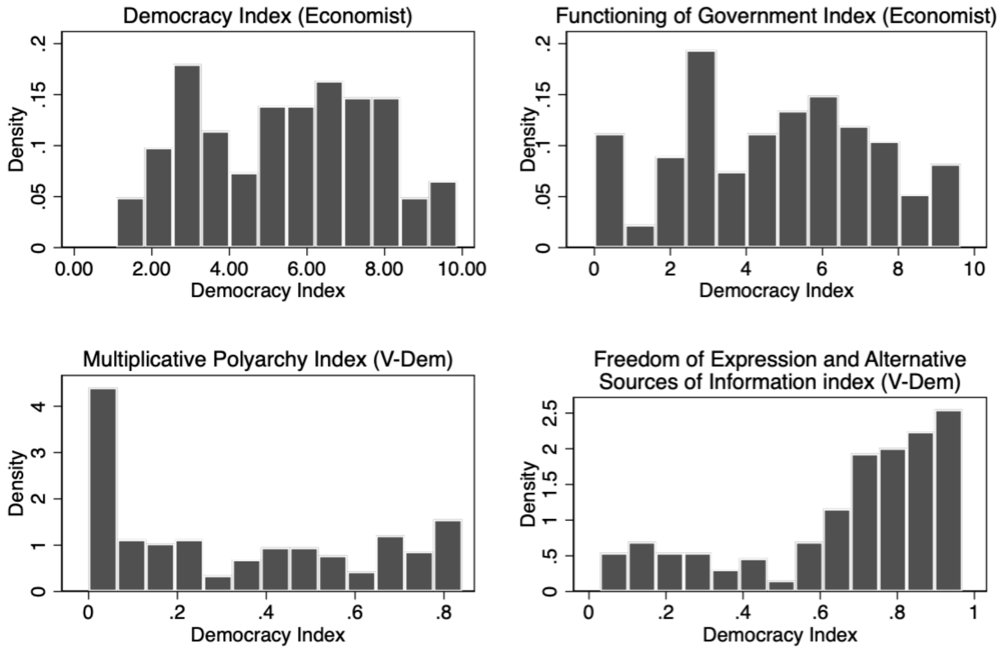


Figure 2: Distribution of Democracy Indices Globally



Note here that compared to the global distributions, this study's sample has some gaps. However, the study does cover both ends of the distribution and also has a fair representation of the overall range of indices. Thus, with the acknowledgement that improvements to methodology design could indeed be made in the future once more 30-day time-horizons transpire for countries, I proceed with the research design as presented below.

4 Methodology

4.1 Principle Regression

The methodology used in this paper draws heavily on the work of Bollyky et al. (2019) in terms of modelling a regression government response against democracy indices with fixed effects. All analyses are conducted using Stata, version 15.1.

The main regression on which this paper revolves is as follows:

$$test.rate = \alpha + \beta_1 democracy + \beta_2 pop.density + \beta_3 hospital.bed + \beta_4 gdp + \beta_5 shared.border + \beta_6 tourism + \varepsilon_i$$

Description for each variable is presented below:

Table 2: Regression Variable Descriptions

Variable	Description
test.rate	the number of total COVID-19 screening tests per thousand people population conducted by the country in question up until 30 days after the date of first positive COVID-19 case discovery within the country
democracy	one of the four democracy indices chosen as part of the analysis, as described in the data section
pop.density	the population density in a given country measured in terms of persons per thousand square kilometers
hospital.bed	the number of hospital beds available per thousand people in a given country
gdp	the gross domestic product of the country in millions, 2018 figures
shared.border	a dummy variable marking whether a country's bordering nations had already experienced their first positive case of coronavirus prior to said country's first COVID-19 case discovery
tourism	a count of inflowing tourism as measured in terms of thousands of people

4.2 Control Variables

As noted above, several control variables were selected for this study. Here I will be reasoning through why these specific variables were chosen in order their appearance in Table 2. *Democracy*, as the primary independent variable of interest in the study, need not be further justified. *Pop.density* is used as a control for differences in each country's population density that may lead to variances in the total number of positive tests conducted. This variable was introduced with the understanding that COVID-19 is a human-transmitted disease and therefore proliferates faster in more densely populated areas. However, the following table illustrates that density is in fact not as highly correlated with the outcome variables in the study as expected, and thus are excluded in later extensions of the regression.

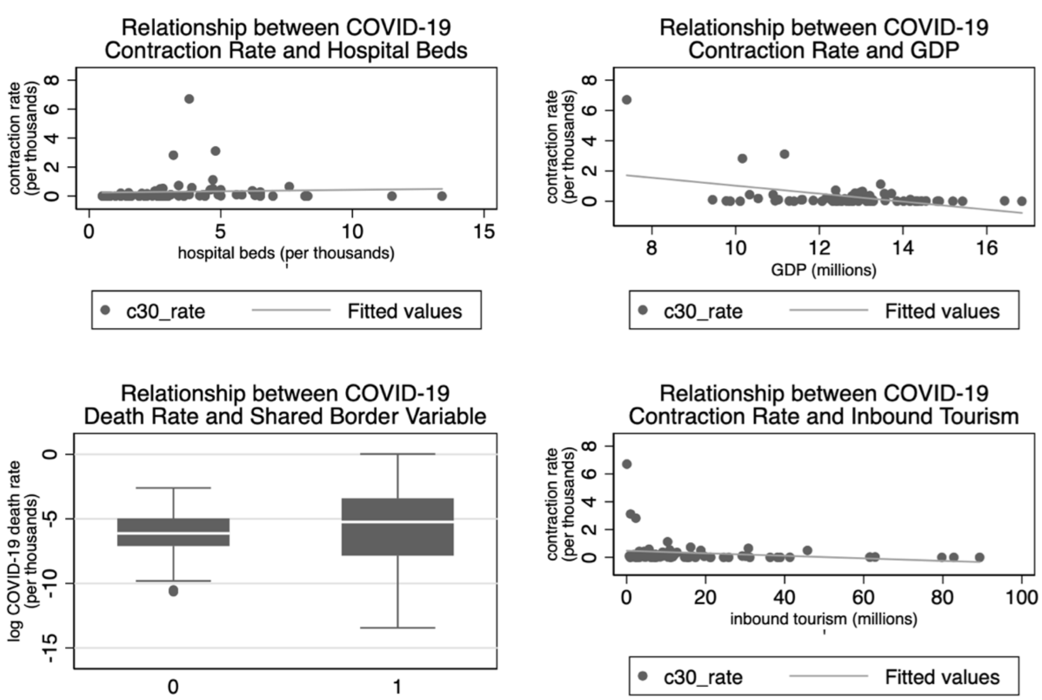
Table 3: Density Variable Correlation with Outcome Variables

	(1)	(2)	(3)	(4)	(5)
VARIABLES	c30_rate	c45_rate	d30_rate	d45_rate	test_rate
Pop.density	-1.47e-05	-5.64e-05	5.74e-07	-3.04e-07	-0.000296
	(2.11e-05)	(3.56e-05)	(1.74e-06)	(3.10e-06)	(0.000272)
Constant	0.317***	0.701***	0.0116	0.0321**	4.041***
	(0.115)	(0.201)	(0.00880)	(0.0158)	(1.081)
Observations	68	65	68	65	59
R-squared	0.000	0.002	0.000	0.000	0.003

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Here, I introduce a precursor to the rest of the variables with the following figure to illustrate the predicted effect that each control has on the outcome variables.

Figure 3: Relationship Between Control Variables and Outcome Variables



Hospital.beds is included because of the assumption that countries with more hospital beds per capita will be able to better respond to pandemics. As seen in the introduction of this paper, a country's ability to respond to surge demands for medical resources during pandemics is considered a crucial determinant in its overall ability to mitigate the effects of a pandemic within its borders (Manuell, 2011). The number of hospital beds available per capita was assumed to be a valuable indicator of this readiness to respond. The positive coefficient of Figure 3 is interesting, and perhaps illustrates the fact that countries with more hospital beds and stronger health systems actually take more care to test their populations, thereby discovering more positive cases. However, the regression below illustrates that hospital beds is in fact not significantly correlated with the outcome variables of interest in our study, and consequentially I won't put further meaning to the positive trend noted above. More importantly, to balance both sides of the argument, this variable is removed from extensions of the regression.

Table 4: Hospital Beds Variable Correlation with Outcome Variables

	(1)	(2)	(3)	(4)	(5)
VARIABLES	c30_rate	c45_rate	d30_rate	d45_rate	test_rate
Hospital.bed	0.0188	0.0394	0.000379	0.00246	0.0196
	(0.0207)	(0.0434)	(0.000687)	(0.00236)	(0.217)
Constant	0.242**	0.533**	0.0105	0.0230	3.833***
	(0.121)	(0.225)	(0.00864)	(0.0162)	(1.348)
Observations	68	65	68	65	59
R-squared	0.002	0.004	0.000	0.002	0.000

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

GDP was included as another control variable since a country that is wealthier may be able to respond more rapidly to changes in its environment. Similar regressions as above reveal that GDP is significantly correlated with the majority of our outcome variables, and thus is left as a control.

Shared.border was selected as a control variable under the assumption that countries whose neighbors were already testing positive for COVID-19 may be more alert than others due to geographic vulnerability. However, a similar regression as above reveals that there is no significant correlation between this dummy variable and the outcome variables. Thus, this control is dropped in extensions of the principle regression.

Table 5: Tourism Variable Correlation with Outcome Variables

	(1)	(2)	(3)	(4)	(5)
VARIABLES	c30_rate	c45_rate	d30_rate	d45_rate	test_rate
tourism	-0.00910*	-0.0179**	-0.000443	-0.000915	-0.0982**
	(0.00503)	(0.00847)	(0.000412)	(0.000720)	(0.0381)
Constant	0.477**	1.005***	0.0199	0.0487*	5.801***
	(0.200)	(0.335)	(0.0163)	(0.0287)	(1.618)
Observations	67	64	67	64	58
R-squared	0.037	0.050	0.014	0.019	0.065

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Finally, we are left with the *tourism* variable. Trends from Figure 3 illustrate that a higher count of annual inbound tourism is actually correlated with lower COVID-19 positive tests per thousand people populations. This is very interesting, and quite counter to my original intent in including this control variable. However, a likely explanation could be that tourism is positively correlated with a country's level of development and infrastructure, and thus countries that attract more tourism are actually better able to respond to changes. Another potentially more plausible explanation is that countries that attract more tourism have traditionally attracted more tourism, and thus have historically dealt with more cases of global epidemics. As a result, they would have more experience in dealing with a pandemic like this one. A regression similar to the ones above also show significant correlation between *tourism* and the majority of outcome variables in this study, and thus I include it in all the regression extensions.

4.3 Extensions of Regression

Since a subset of government testing data was estimated using a linear model that takes in positive test cases as an input, I chose to run the above regression three times. Each data point on government testing is assigned a data quality level of 0, 1 or 2. 0 represents data of the highest quality, collected from an official government website on the day of interest. 1 represents data of second-tier quality, corresponding to a date that is within a 10-day window of the date of interest. 2 represents the lowest quality of data, corresponding to a date that is more than 10 days off from the date of interest. With each regression, I drop another one of the lower-quality data groups and observe the differences in outcome.

As noted in the data section, to also see how effective democratic countries were at containing COVID-19 in general, I look at the following regression as well:

$$case.rate = \alpha + \beta_1 democracy + \beta_2 density + \beta_3 hospital.bed + \beta_4 gdp + \beta_5 shared.border + \beta_6 tourism + \varepsilon_i$$

Here, the dependent indicator of interest is the total number of positive COVID-19 cases per thousand people population in a given country by the date of the 30-day time horizon. This regression is supplemented with the following, perhaps more accurate representation of how rampant COVID-19 is within a given country.

$$death.rate = \alpha + \beta_1 democracy + \beta_2 density + \beta_3 hospital.bed + \beta_4 gdp + \beta_5 shared.border + \beta_6 tourism + \varepsilon_i$$

The variable *death.rate* represents the total number of deaths per thousand people population caused by COVID-19 in a given country by the date of the 30-day time horizon. This is potentially a more insightful measure since patients who are severely affected by COVID-19 are more likely to visit the hospital, leading to less cases left undiagnosed. Thus, the data on deaths caused by COVID-19 can be assumed to be a more accurate measure of the severity of COVID-19 developments within any given country.

As the time horizon selected for analysis was somewhat arbitrary, I implement a short robustness check using COVID-19 positive test cases and death counts using a 45-day time horizon as the dependent variable of interest.

5 Results

Have democracies been more or less effective at preventing the spread of COVID-19? In this section, I first bring up the discussion of COVID-19 screening test rates. Then, I present the results on positive test rates as well as confirmed death rates pertaining to COVID-19. Finally, some extensions of the regression framework are explored to provide robustness checks on the chosen analysis framework.

5.1 Test Rate

Looking at the COVID-19 screening test rate regressions, I find that there is a positive relationship between democracy indices and test rates. The full regression output table is presented in the Appendix. Here, I pull the results from regressing all recorded test rate data.

Table 6: Regressing COVID-19 Screening Test Rate Against Various Democracy Indicators

VARIABLES	(1) test_rate	(2) test_rate	(3) test_rate	(4) test_rate
dem1	1.168*			
	(0.693)			
dem2		1.167*		
		(0.650)		
dem3			7.538*	
			(3.863)	
dem4				4.743
				(3.760)
density	-8.90e-05	-0.000189	0.000203	-0.000126
	(0.000274)	(0.000402)	(0.000289)	(0.000236)
hospitalbed	-0.176	-0.133	-0.254	-0.0722
	(0.267)	(0.271)	(0.273)	(0.256)
gdp	-1.53e-07	-1.81e-07	-1.34e-07	-1.14e-07
	(2.19e-07)	(2.33e-07)	(1.97e-07)	(1.99e-07)
share_border	-0.232	-0.704	-0.411	-0.410
	(2.418)	(2.522)	(2.483)	(2.567)
tourism	-0.0966**	-0.0863***	-0.0985**	-0.0942**
	(0.0376)	(0.0322)	(0.0388)	(0.0381)
Constant	-1.252	-0.932	3.248	2.895
	(3.427)	(2.955)	(2.520)	(2.749)
Observations	58	58	58	58
R-squared	0.149	0.157	0.133	0.090

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

What we see is that a country's overall level of democracy, as measured by the Economist's Intelligence Unit, is positively correlated with test rates at the 0.1 level. Every one-point increase in this democracy index is correlated with a 0.1168% increase in the population test rate. To better understand what the democracy index scale means in this case, note that full democracies score 8 or above on the index, flawed democracies score between 6-8, hybrid regimes score 4-6 and authoritarian regimes score between 1-4. Thus, a two-point increase in democracy index scoring differentiates two countries by entire regime categorizations under the

Economists' specifications. Interpreting these specifications in a more comprehensible manner, we find that with every one-level increase in democracy categorization, there is on average a 0.2336% increase in population test rate.

Looking at the second democracy index, which marks the functioning of government as specified by the Economist as well, we see that there is also positive and significant correlation between the index and COVID-19 screening test rates. A one-point increase in the Functioning of Government Index is correlated with a 0.1167% increase in the population test rate. As the index is taken from the same dataset as above, I will omit repeated definition of the index scales. Once again, the important takeaway is that the relationship is positive and significant. Furthermore, as with the first democracy index, this positive correlation holds across all three data quality specifications. The data significance drops off when only excluding the lowest-quality test-rate data, but once again picks up to a 0.1 significance level when excluding all but the highest tier data.

Now referencing the regression outputs in columns 3 and 4, we note first that the results need to be read slightly differently since the V-Dem indices range from 0 to 1. *Dem3* corresponds to the Multiplicative Polyarchy Index from the V-Dem dataset, an index that measures the responsiveness and accountability between leaders and citizens through the mechanism of competitive elections. Here, we also see a positive correlation, with every 0.1 increase in the index correlating to a .07538% increase in population test rate, significant at the 0.1 level. What we see is that higher scores on the Multiplicative Polyarchy Index are correlated with higher levels of population test rate.

Similarly, with the freedom of expression index, we note that although the relationship is positive, the results are not significant. Yet consistent across all extensions of the regression model here is the observation that more democratic countries seem to be testing a larger percentage of their population, confirming the hypothesis that these countries are perhaps responding more to their citizens demands through testing. As cited before, many research reports have claimed the significance of testing. Thus, countries scoring high on a "responsiveness" index should expectedly be issuing more tests for their citizens in response to demands. This is indeed what we observe here. Interestingly, freedom of expression and media doesn't seem to play as significant a role here, albeit the relationship is still positive.

Despite these positive correlations, what lies ahead in the regression results present an interesting twist to the popular view that democracies and countries that are testing more are better containing the spread of COVID-19.

5.2 Positive Cases

To compare positive case detections by COVID-19 across varies countries, I adjusted the variables in proportion to the country's population size. Thus, as my independent variable, I had a positive case detection rate, defined as the number of positive cases over a thousand persons unit of the population. I also defined COVID-19 death rate as the number of deaths due to COVID-19 over a thousand persons unit of the population. Bearing this definition in mind, the results below indicate that more democratic countries have experienced higher rates of case detection.

Table 7: Regressing COVID-19 Positive Case Detection Rate Against Various Democracy Indicators

	(1)	(2)	(3)	(4)
VARIABLES	c30_rate	c30_rate	c30_rate	c30_rate
dem1	0.0836**			
	(0.0391)			
dem2		0.0839**		
		(0.0376)		
dem3			0.579**	
			(0.262)	
dem4				0.391*
				(0.213)
density	-1.06e-05	-1.85e-05	1.38e-05	-8.66e-06
	(1.23e-05)	(2.36e-05)	(1.74e-05)	(1.14e-05)
hospitalbed	-0.00256	-0.000247	-0.00890	0.00668
	(0.0178)	(0.0184)	(0.0180)	(0.0176)
gdp	1.25e-09	-4.46e-09	0	-6.20e-10
	(1.36e-08)	(1.18e-08)	(1.29e-08)	(1.21e-08)
share_border	0.0553	0.0327	0.0380	0.0384
	(0.144)	(0.146)	(0.148)	(0.154)
tourism	-0.00566	-0.00524*	-0.00569	-0.00506
	(0.00340)	(0.00312)	(0.00352)	(0.00329)
Constant	-0.247	-0.217	0.0548	-0.0126
	(0.151)	(0.138)	(0.129)	(0.126)
Observations	66	66	66	66
R-squared	0.152	0.165	0.137	0.087

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Before launching into the analysis of death rate results, I'll first delve more deeply into Table 6 above. Based on the results, one-point increase in the Economist's overall Democracy Index is correlated with a 0.00836% increase in positive case detection in a country's overall population, significant at the 0.05 level. Similarly, a one-point increase in a country's Functioning of Government Index is correlated with a 0.00839% increase in positive case detection as a percentage of population, significant at the 0.05 level. A 0.1-point increase in the V-Dem Multiplicative Polyarchy Index is correlated with a 0.00579% increase in COVID-19 positive case detection rate, significant at the 0.05 level. Finally, a 0.1-point increase in the

Freedom of Expression Index is correlated with a 0.00391% increase in COVID-19 positive case detection rate, significant at the 0.1 level.

Here, I want to present a slight variant of the data above, using instead data collected 45-days after a given country's first-case detection date. In addition to providing a simple robustness check against the arbitrary 30-day threshold selected for this study, I also hope to shed some light on advances that can be made in this study as the pandemic progresses.

Table 8: Regressing COVID-19 Positive Case Detection Rate Against Various Democracy Indicators, 45th Day Indicators

	(5)	(6)	(7)	(8)
VARIABLES	c45_rate	c45_rate	c45_rate	c45_rate
dem1	0.187**			
	(0.0717)			
dem2		0.181***		
		(0.0662)		
dem3			1.472***	
			(0.500)	
dem4				1.091**
				(0.432)
density	-3.67e-05*	-5.50e-05	2.86e-05	-2.49e-05
	(2.09e-05)	(3.97e-05)	(3.01e-05)	(2.67e-05)
hospitalbed	-0.00365	0.00391	-0.0272	0.00819
	(0.0375)	(0.0389)	(0.0373)	(0.0374)
gdp	9.66e-09	-5.27e-09	1.02e-08	8.20e-09
	(2.71e-08)	(2.32e-08)	(2.62e-08)	(2.42e-08)
share_border	0.159	0.110	0.122	0.114
	(0.265)	(0.270)	(0.268)	(0.284)
tourism	-0.0142**	-0.0127**	-0.0152**	-0.0133**
	(0.00609)	(0.00565)	(0.00630)	(0.00605)
Constant	-0.516*	-0.425	0.122	-0.106
	(0.300)	(0.263)	(0.240)	(0.253)
Observations	63	63	63	63
R-squared	0.220	0.230	0.229	0.152

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notice that the results actually increase in significance as well as magnitude. Magnitude can be explained by the fact that technology may have been able to advance during this twoweek window, allowing countries to get more access to testing kits and hence detect more cases as a result of more widespread testing. Furthermore, as COVID-19 exhibits an exponential rather than linear growth pattern, this notable increase in magnitude of the coefficients is rather justifiable. More importantly, all results continue to remain positive and statistically significant. In fact, with the exception of the first democratic index, the statistical significance increases for each regression when using 45-day data. What can be said about this is that, as the pandemic progresses and the consequences of each country's response displays itself more prominently in these positive case-detection data points, we are able to see a statistically stronger correlation between a country's system of government and its efficacy in containing COVID-19. Apart from this, the increased level of significance in the data may also point to the possibility of time lag in indicators that allows us to see the effects of actions taken by the government more clearly only after some time has passed.

Now looping back to the discussion of the interpretation of the coefficients themselves, we first note that they are all positive. Thus, the data shows that democratic institutions have actually detected more positive cases of COVID-19. This in itself is not necessarily a negative reflection on democratic institutions. Increased rates of detection may be correlated with the positive test conduction rates since patients often do not exhibit symptoms and thus will not be accounted for in the data unless actively tested for. Thus, I will leave further interpretation on this aspect of the results to the death rates section. Another characteristic of the results worth pointing out is that there is an increase in statistical significance of the positive coefficients on the Freedom of Speech Index. One interpretation could be that media has not in fact been leveraged by more democratic institutions to promote the containment of COVID-19 more so than it has been in less democratic institutions. Noting this significance in the positive coefficient on the Freedom of Speech Index at the 45-day time horizon, we may even take this a step further in saying that the less democratic institutions may have been better leveraging the media to contain the spread of COVID-19.

Of course, these interpretations rely on a certain set of assumptions which will be explored further in later discussions of the limitations to this study. Nonetheless, the results here present a positive and significant correlation that may serve as the basis for more rigorous study of specific topics concerning this pandemic in the future.

5.3 Death Rates

Similar to my treatment of positive case rates in this study, I adjusted the death count variables in proportion to the country's population size. Specifically, I defined COVID-19 death rate as the number of deaths due to COVID-19 over a thousand persons unit of the population. The results here are to reinforce certain, perhaps stronger interpretations of the results demonstrated above. First, I present the table of outputs below.

Table 9: Regressing COVID-19 Death Rate Against Various Democracy Indicators

VARIABLES	(1) d30_rate	(2) d30_rate	(3) d30_rate	(4) d30_rate
dem1	0.000720*			
	(0.000421)			
dem2		0.000787*		
		(0.000400)		
dem3			0.00569*	
			(0.00290)	
dem4				0.00348
				(0.00259)
density	-1.24e-07	-1.90e-07	1.29e-07	-1.04e-07
	(1.84e-07)	(1.44e-07)	(2.37e-07)	(2.37e-07)
hospitalbed	3.91e-06	5.64e-06	-9.01e-05	7.86e-05
	(0.000170)	(0.000180)	(0.000163)	(0.000188)
gdp	0	-0	0	-0
	(1.58e-10)	(1.39e-10)	(1.60e-10)	(1.46e-10)
share_border	0.00280**	0.00259**	0.00263**	0.00265*
	(0.00134)	(0.00128)	(0.00129)	(0.00133)
tourism	-4.04e-05	-3.70e-05	-4.16e-05	-3.53e-05
	(3.86e-05)	(3.59e-05)	(4.09e-05)	(3.78e-05)
Constant	-0.00283	-0.00289	-0.000407	-0.000876
	(0.00264)	(0.00239)	(0.00124)	(0.00178)
Observations	66	66	66	66
R-squared	0.120	0.137	0.126	0.088

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Just as above, we find a positive correlation between various democracy indices and COVID-19 death rates as defined by number of deaths per thousand persons population. The numbers here are smaller, and so I won't walk through the interpretations line by line. Notably, the correlations are all positive and statistically significant except for that of the Freedom of Expression Index. This is very similar to the case we saw above with the positive case detection rate. Before launching into interpretations, I first present below the data outputs for 45-day time horizon indicators.

Table 10: Regressing COVID-19 Death Rate Against Various Democracy Indicators, 45th Day Indicators

	(5)	(6)	(7)	(8)
VARIABLES	d45_rate	d45_rate	d45_rate	d45_rate
dem1	0.00484**			
	(0.00183)			
dem2		0.00488***		
		(0.00183)		
dem3			0.0456***	
			(0.0143)	
dem4				0.0349***
				(0.0124)
density	-5.19e-07	-9.84e-07	1.65e-06	2.40e-08
	(1.10e-06)	(7.97e-07)	(1.17e-06)	(1.57e-06)
hospitalbed	0.00111	0.00125	8.44e-05	0.00114
	(0.00167)	(0.00162)	(0.00137)	(0.00157)
gdp	2.20e-10	-1.68e-10	3.06e-10	2.57e-10
	(7.51e-10)	(6.83e-10)	(8.16e-10)	(7.50e-10)
share_border	0.0155*	0.0142*	0.0143*	0.0140*
	(0.00796)	(0.00770)	(0.00757)	(0.00777)
tourism	-0.000298*	-0.000259	-0.000342*	-0.000285*
	(0.000164)	(0.000161)	(0.000177)	(0.000165)
Constant	-0.0232*	-0.0218*	-0.00848	-0.0161
	(0.0118)	(0.0121)	(0.00776)	(0.0100)
Observations	63	63	63	63
R-squared	0.170	0.182	0.210	0.154

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results are once again very similar to that of the positive case detection rates. The key assumption on which the rest of data interpretation in this section lies has been presented once before in the methodologies section, but I will reiterate here for sake of clarity. While case detection rate is highly contingent on a country's COVID-19 screening test policies, death rates are arguably a clearer indicator of a country's ability to contain COVID-19, as patients who fall in this category can rarely go undetected due to the severity of their condition. Thus, data in this category must more accurately reflect the actual conditions and prevalence of COVID-19 in a given country. The exception of course, is if a country actively corrupts their data. This will be a topic explored further in another section of my paper. For now, I rest my interpretations on these assumptions and proceed as follows.

In all cases, we note a positive correlation between each democracy index and death rates by COVID-19. The data is thus showing that more democratic countries have experienced numbers of death by COVID-19 in proportion to the size of their populations. This is perhaps more surprising than the other data points, as in countless past papers, democracy has been associated with higher levels of GDP and higher levels of responsiveness to citizens' needs. These, and many other characteristics of democracy, would predict a lower percentage of deaths. Having controlled for the influx of tourism, we also note that the higher flow of inbound international traffic is not correlated with these higher death rates. Thus, the question remains for further studies: why is there a higher proportion of deaths in these countries that most would predict to have had more resources to respond better?

I leave my hypothesized response to this question for the conclusion of this paper. However, as they are merely conjecture at this point in the study, I will first conclude the presentation of data and a reiteration of limitations before delving into postulations that may aid in future studies.

5.4 Extensions of the Regression Model

As mentioned in the methodologies section, to ensure the results shown above are actually consistent when removing control variables that aren't significantly correlated with the outcome variables, I've included the analysis below. In different iterations of the regression, I separately removed the variables *density*, *hospital.bed* and *shared.border*. In all cases, the results either remain equally significant or increase in statistical significance. Here I will present just the regression results upon removing all three variables mentioned above.

The results for COVID-19 screening test rates remain largely similar and thus are presented in Table 5B of the Appendix for reference rather than included in this section. Notably, the statistical significance of each coefficient remains exactly the same, though magnitudes of each coefficient increased. This is expected of removing control variables from the regression model, and thus does not add further information to the interpretation presented in previous paragraphs. Nonetheless, the results confirm that the regression model chosen in this study is sound in that the results are not drastically uprooted by the addition of these control variables.

In the case of COVID-19 positive case detection rates and death rates, the regression results after removing the controls for *density*, *hospital.bed* and *shared.border* for the 45th-day time horizon indicators are presented below.

Table 11: Extensions of the Regression Model, 45th Day Indicators

	(5)	(6)	(7)	(8)	(5)	(6)	(7)	(8)
VARIABLES	c45_rate	c45_rate	c45_rate	c45_rate	d45_rate	d45_rate	d45_rate	d45_rate
dem1	0.188***				0.00533***			
	(0.0655)				(0.00187)			
dem2		0.185***				0.00547***		
		(0.0617)				(0.00204)		
dem3			1.362***				0.0455***	
			(0.420)				(0.0146)	
dem4				1.157***				0.0408***
				(0.399)				(0.0141)
gdp	5.32e-09	-6.71e-09	2.83e-09	5.80e-09	-3.25e-10	-6.65e-10	-3.45e-10	-2.22e-10
	(2.53e-08)	(2.05e-08)	(2.30e-08)	(2.25e-08)	(6.63e-10)	(5.63e-10)	(6.84e-10)	(6.93e-10)
tourism	-0.0143**	-0.0128**	-0.0151**	-0.0133**	-0.000258*	-0.000219	-0.000304*	-0.000248
	(0.00611)	(0.00573)	(0.00614)	(0.00598)	(0.000151)	(0.000151)	(0.000162)	(0.000151)
Constant	-0.450	-0.388*	0.165*	-0.0623	-0.0132	-0.0129	0.00138	-0.00768
	(0.277)	(0.227)	(0.0915)	(0.165)	(0.00836)	(0.00829)	(0.00298)	(0.00571)
Observations	63	63	63	63	63	63	63	63
R-squared	0.212	0.222	0.221	0.148	0.122	0.139	0.172	0.117

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Here we notice that not only do the magnitudes of the coefficients increase as expected, the statistical significance of some of the figures increase as well. Overall, interpretations of results remain largely the same. Iterations of these regressions in which I remove each variable independently of one another reveal the same results.

6 Limitations

The results illustrate that higher levels of democracy are correlated with higher rates of testing, but also higher rates of death as a result of COVID-19. Yet to preface any conclusions that may result from this paper, I must point out some of the limitations to this study. First of all, of widespread concern is that countries, regardless of their levels of democracy, may not have the most accurate data on COVID-19 at the moment. This could be due to corruption, which is unfortunately an inevitable possibility at any point in time. However, in this particular period of time, data on these indicators may be especially inaccurate since, understandably, all countries have more urgent matters to deal with than accurate data reporting. A concern that is also relevant for the first thirty days of the pandemic spread in any given country is that there may not have been enough systems in place to even properly detect and account for the cases of death that may fall under the category of COVID-19.

Data quality thus becomes a very valid concern when perusing the results of this study. This concern may be mitigated in future extensions of the study in several ways. First, at this future point in time, countries may have more time to spend on updating their databases and reporting more accurate figures. Second, one could look into other studies that have accounted for corruption in data reporting to get a more accurate estimate on the effectiveness of democracies during this global pandemic.

Yet another potential limitation of the study is that it only identifies the existence of a statistically significant correlations between democracies and a measure of effective COVID-19 containment in the first 30 days. To specifically identify the reasons why these correlations exist would require further studies. I propose some ideas in the conclusion of this paper for reference. The contribution of this paper is in collecting the data necessary to identify this positive and statistically significant relationship, as well as to set the foundations for iterations of analysis once the pandemic is over. Bearing these limitations in mind, I conclude the findings below.

7 Conclusion

The paper began by exploring whether more democratic countries have responded more effectively in face of the COVID-19 pandemic. In one respect, the study chose to focus on analyzing which countries were conducing more screening tests by the 30-day mark since many case studies have shown that screening tests lead to more effective containment. However, while more democratic countries have in fact conducted more screening tests on average, they have not been more effective at containing the spread of the disease. The latter is measured using two indicators, death rates and positive case detection rates. In both cases, a higher democratic index significantly correlates with higher rates of positive case detection and death. Based on the results, a one-point increase in the Economist's overall Democracy Index is correlated with a 0.00836% increase in positive case detection in a country's overall population, significant at the 0.05 level. The same one-point increase in this Democracy Index is correlated with a 0.000072% increase in death rates as a percentage of overall population in a given country on average, significant at the 0.1 level. These figures also jump to 0.0187% for positive case detection rates and 0.000484% for death rates when looking at the 45-day time horizon indicators. Respectively, the significance levels lie at 0.05.

Arguably, the results concerning positive case detection could just mean that the more democratic countries have been more effective at detecting asymptomatic carriers. This makes sense in light of the regression results on screening test rates as well, since the results show that every one-point increase in the Economist's Democracy Index is correlated with a 0.1168% increase in the population test rate, significant at the 0.05 level. Thus, a positive correlation between democracy and positive test rates could just be reflecting better data collection capabilities on the part of more democratic nations. However, the study addresses this limitation by using the death count indicator as well. The assumption here is that death counts will be a more accurate indicator of the spread of COVID-19 since the majority of patients at this level of infection must be reporting to hospitals for treatment, and thus will be included in any data recordings. The statistically significant positive correlation thus indicates that more democratic countries have been less effective at containing the spread of COVID-19.

This interesting set of results gives rise to an even more interesting set of questions. If on average, more democratic countries have been testing more, and yet have also experienced higher death rates as a result of COVID-19, what drives the containment of this disease? The paragraphs to follow involve questions that may invite future research on the topic.

By simple observation, one will notice that the COVID-19 pandemic has been politically and racially charged. The virus originated in China late last year. Even before it physically spread to other countries, COVID-19 had ignited a slew of racially charged misconceptions. Similarly, the media has frenzied to blame the Chinese government for its inadequacies in initial containment efforts. Yet with millions worldwide suffering from this infectious disease, sitting at my desk in my final semester of undergraduate studies, I can't help but feel that the focus of media and at times even government decisions have been misguided. What is truly driving better containment efforts worldwide? Why is it that, at least according to this study, democracies have not been able to contain the spread of the disease as well despite issuing more widespread testing? Perhaps it's the fact that these less democratic countries are willing to enact more marshal laws that ultimately benefit their people in these extreme times? Perhaps in these times, state control over media has some benefits in the diffusion of important information? Perhaps it's a question of the culture that develops as a consequence of democracies? Are stay-at-home laws being received in the same manner by citizens in every country?

Of course, drawing back these questions with more empirical reasoning, this paper can only conclude in conjectures on these topics. The results of this study do not discount the fact that screening tests may be an effective tool in containing the disease, but rather point out the possibility that actions taken after issuing screening tests are more pivotal in preventing the spread of COVID-19. To gain more insight on this point, one would have to collect more indicators on these actions, such as an index on how strictly the government reinforces quarantine for those who test positive. What this study suggests is that whatever these specific measures taken beyond just screening the population may be, less democratic countries seem to be pushing forth better results. The questions of what aspect of these less democratic countries are most important in realizing more effective responses and what specific actions they're taking to more efficiently contain COVID-19 are left as the subject of future research.

On a larger scale, different systems of governments have much to learn from each other despite their differences, as evidenced by the patterns we're observing in the outcomes of this global pandemic. There is no absolute right, so instead of focusing on who is right and who is wrong, maybe with the gentlest of nudges, this paper can help us focus on what exactly is going to help save more lives.

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9 Appendix

Table 6A : Regressing COVID-19 Screening Tests Against Various Democracy Indicators, All Data Quality Levels

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
VARIABLES	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate
dem1	1.168*				1.170				2.203*			
	(0.693)				(0.730)				(1.249)			
dem2		1.167*				1.229				2.141*		
		(0.650)				(0.752)				(1.207)		
dem3			7.538*				7.328*				9.937*	
			(3.863)				(3.865)				(5.739)	
dem4				4.743				3.803				5.971
				(3.760)				(3.741)				(4.715)
density	-8.90e-05	-0.000189	0.000203	-0.000126	0.000300	0.000475	0.000620	9.28e-05	-6.49e-05	0.000287	0.000425	-0.000297
	(0.000274)	(0.000402)	(0.000289)	(0.000236)	(0.000552)	(0.000512)	(0.000502)	(0.000439)	(0.000390)	(0.000548)	(0.000570)	(0.000294)
hospitalbed	-0.176	-0.133	-0.254	-0.0722	-0.282	-0.251	-0.371	-0.153	-0.345	-0.305	-0.432	-0.201
	(0.267)	(0.271)	(0.273)	(0.256)	(0.320)	(0.340)	(0.334)	(0.301)	(0.408)	(0.441)	(0.444)	(0.363)
gdp	-1.53e-07	-1.81e-07	-1.34e-07	-1.14e-07	1.29e-07	7.04e-08	6.19e-08	1.75e-07	5.49e-08	-1.16e-08	3.21e-08	1.93e-07
	(2.19e-07)	(2.33e-07)	(1.97e-07)	(1.99e-07)	(2.66e-07)	(2.57e-07)	(2.66e-07)	(2.58e-07)	(3.22e-07)	(3.04e-07)	(3.16e-07)	(2.75e-07)
share_border	-0.232	-0.704	-0.411	-0.410	-1.210	-1.792	-1.714	-1.674	-0.223	-1.337	-1.235	-0.675
	(2.418)	(2.522)	(2.483)	(2.567)	(3.077)	(3.200)	(3.233)	(3.315)	(3.522)	(3.952)	(4.195)	(4.129)
tourism	-0.0966**	- 0.0863***	-0.0985**	-0.0942**	-0.172*	-0.153*	-0.155*	-0.177*	-0.145	-0.123	-0.139	-0.170
	(0.0376)	(0.0322)	(0.0388)	(0.0381)	(0.0923)	(0.0809)	(0.0897)	(0.0929)	(0.105)	(0.0870)	(0.103)	(0.108)
Constant	-1.252	-0.932	3.248	2.895	0.718	0.576	5.392	5.750	-7.466	-6.192	3.615	3.508
	(3.427)	(2.955)	(2.520)	(2.749)	(4.224)	(3.852)	(3.713)	(4.119)	(5.875)	(4.967)	(4.419)	(5.085)
Observations	58	58	58	58	46	46	46	46	35	35	35	35
R-squared	0.149	0.157	0.133	0.090	0.176	0.181	0.157	0.113	0.260	0.271	0.179	0.125

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6B: Extensions of the Regression Model, Regressing COVID-19 Screening Test Rate Against Democracy Indicators with Reduced Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
VARIABLES	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate	test_rate
dem1	1.110*				1.085				2.090*			
	(0.636)				(0.704)				(1.134)			
dem2		1.123*				1.110				2.020**		
		(0.585)				(0.694)				(0.964)		
dem3			6.386**				5.603*				7.853**	
			(3.164)				(3.221)				(3.629)	
dem4				4.599				3.419				5.358
				(3.372)				(3.695)				(4.183)
gdp	-1.42e-07	-1.47e-07	-1.25e-07	-9.44e-08	1.62e-07	1.22e-07	1.34e-07	2.46e-07	7.67e-08	3.93e-08	1.15e-07	2.60e-07
	(2.07e-07)	(2.14e-07)	(1.96e-07)	(1.77e-07)	(2.51e-07)	(2.37e-07)	(2.50e-07)	(2.50e-07)	(2.96e-07)	(2.65e-07)	(2.78e-07)	(2.77e-07)
tourism	-0.0998**	-0.0908**	-0.101**	-0.0967**	-0.175*	-0.156*	-0.163*	-0.183*	-0.152	-0.129	-0.153	-0.183
	(0.0409)	(0.0364)	(0.0416)	(0.0416)	(0.0880)	(0.0775)	(0.0867)	(0.0921)	(0.103)	(0.0871)	(0.106)	(0.112)
Constant	-1.673	-1.638	2.730**	2.435	-0.494	-0.655	3.935**	4.389	-8.223	-7.387	2.388	2.739
	(3.407)	(2.949)	(1.140)	(1.969)	(3.777)	(3.713)	(1.727)	(2.650)	(6.616)	(5.100)	(1.962)	(3.004)
Observations	58	58	58	58	46	46	46	46	35	35	35	35
R-squared	0.146	0.153	0.126	0.089	0.163	0.163	0.134	0.102	0.248	0.258	0.159	0.118

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11A: Extensions of the Regression Model, COVID-19 Positive Case Detection Rate Indicators

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	c30_rate	c30_rate	c30_rate	c30_rate	c45_rate	c45_rate	c45_rate	c45_rate
dem1	0.0832**				0.188***			
	(0.0358)				(0.0655)			
dem2		0.0845**				0.185***		
		(0.0348)				(0.0617)		
dem3			0.539**				1.362***	
			(0.222)				(0.420)	
dem4				0.423**				1.157***
				(0.199)				(0.399)
gdp	-6.02e-10	-4.93e-09	-2.52e-09	-1.44e-09	5.32e-09	-6.71e-09	2.83e-09	5.80e-09
	(1.24e-08)	(1.02e-08)	(1.13e-08)	(1.08e-08)	(2.53e-08)	(2.05e-08)	(2.30e-08)	(2.25e-08)
tourism	-0.00566*	-0.00529*	-0.00563	-0.00494	-0.0143**	-0.0128**	-0.0151**	-0.0133**
	(0.00338)	(0.00314)	(0.00344)	(0.00326)	(0.00611)	(0.00573)	(0.00614)	(0.00598)
Constant	-0.221	-0.208*	0.0719*	0.00797	-0.450	-0.388*	0.165*	-0.0623
	(0.141)	(0.122)	(0.0386)	(0.0679)	(0.277)	(0.227)	(0.0915)	(0.165)
Observations	66	66	66	66	63	63	63	63
R-squared	0.149	0.162	0.134	0.084	0.212	0.222	0.221	0.148

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, *
p<0.1

Table 11B: Extensions of the Regression Model, COVID-19 Death Rate Indicators

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	d30_rate	d30_rate	d30_rate	d30_rate	d45_rate	d45_rate	d45_rate	d45_rate
dem1	0.000731*				0.00533***			
	(0.000424)				(0.00187)			
dem2		0.000824*				0.00547***		
		(0.000418)				(0.00204)		
dem3			0.00552**				0.0455***	
			(0.00270)				(0.0146)	
dem4				0.00420				0.0408***
				(0.00265)				(0.0141)
gdp	-1.00e-10	-1.39e-10	-1.15e-10	-1.05e-10	-3.25e-10	-6.65e-10	-3.45e-10	-2.22e-10
	(1.45e-10)	(1.30e-10)	(1.46e-10)	(1.40e-10)	(6.63e-10)	(5.63e-10)	(6.84e-10)	(6.93e-10)
tourism	-3.60e-05	-3.35e-05	-3.74e-05	-3.01e-05	-0.000258*	-0.000219	-0.000304*	-0.000248
	(3.66e-05)	(3.42e-05)	(3.86e-05)	(3.64e-05)	(0.000151)	(0.000151)	(0.000162)	(0.000151)
Constant	-0.00114	-0.00151	0.00109	0.000536	-0.0132	-0.0129	0.00138	-0.00768
	(0.00222)	(0.00197)	(0.000912)	(0.00147)	(0.00836)	(0.00829)	(0.00298)	(0.00571)
Observations	66	66	66	66	63	63	63	63
R-squared	0.077	0.099	0.088	0.050	0.122	0.139	0.172	0.117

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, *
p<0.1