Can the Regime Type (Democracy versus Autocracy) Explain the COVID-19 Recovery Rates?

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Abstract
COVID-19 is an example of worldwide and unanticipated global crisis. This study provides an example of crisis management in different countries and regime types. Previous studies provide evidence supporting reduced infant mortality as well as increased life expectancy with higher levels of democracy. These findings lead to the conventional wisdom that democracies provide conditions that promote better health for their citizens. The current study seeks to investigate health–democracy relationship in the context of recovery from COVID-19 disease. Unlike the conventional wisdom and based on 169 countries and regions around the world, for which information regarding accumulated recovery rates from coronavirus and Freedom House measures of democracy are available, findings suggest better projected prospects of recovery from COVID-19 disease in more “autocratic” countries. These findings may be explained on the grounds of (1) inefficient law enforcement in more democratic countries and (2) stronger autoimmune response (a cytokine storm, associated with COVID-19 severity) in Western countries due to excessive hygienic environmental conditions and, consequently, lack of exposure to different pathogens.

Keywords COVID-19 · Life expectancy · Democracy · Freedom house measures

JEL Classification H75 · I14

1 Introduction

A conventional assumption in political economy is that compared to “autocratic” countries, democratic countries provide conditions that promote better health for their citizens in terms of increased life expectancy and low infant mortality. Preston

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(1975) tested the relationship between average life expectancy and income per capita in different countries and selected years (1900, 1930, 1960). The author demonstrated that the largest gains in life expectancy are associated with increases in per capita income at low-income levels. Likewise, Barro (1997) demonstrated a non-linear relationship between evolvement of electoral rights and growth rates. Finally, several studies demonstrated better life expectancy in democracies and after democratization processes (Besley and Kudamatsu 2006; Kudamatsu 2012).

The incentive structure, which promotes health services in democracies, might emanate from the objective function of the politicians to maximize their prospects for re-election. Consequently, improved health services may, in turn, promote public satisfaction (e.g., Martinez-Bravo et al. 2012, who demonstrated that elections significantly increase public goods expenditure in rural China Mainland). In this context, Barro (1999) states that: “But in places that have already achieved a moderate amount of democracy, a further increase impairs growth because the dominant effect comes from the intensified concern with social programs that redistribute resources.” (page S159). Also, democracies are based on better information flow, which, in turn, permits elevated awareness and adoption of healthier lifestyle regardless of income redistribution (e.g., Wigley and Akkoynulu-Wigley 2011).

Following (Arbel et al. 2020), who demonstrated negative relationships between COVID-19 infection–population ratio and lower levels of political rights and civil liberties in 168 countries, the objective of the current study is to investigate further whether democracy indeed promotes better health for their citizens, particularly in the context of the COVID-19 pandemic. In line with Arbel et al. (2020), and unlike the conventional wisdom, research findings suggest better prospects of recovery for infected citizens of 169 countries with lower levels of political rights and civil liberties. Moreover, the conclusion that projected mortality rates (mortality–cases ratio) remain unchanged regardless of the level of democracy in terms of political rights and civil liberties is also supported empirically.

The remainder of the article is organized as follows. Section 2 provides literature review, while Sect. 3 presents a comparison between India and China Mainland. Section 4 provides the descriptive statistics of the variables, which are later incorporated in the empirical model. Section 5 describes the empirical model and Sect. 6 presents the results. Section 7 discusses the findings. Finally, Sect. 8 concludes and summarizes the article.

2 Literature Review

This section discusses the way “autocracies” and democracies address crisis management. These include: the SARS and COVID-19 crises (Schwartz 2014; Shih 2020; Burkle 2020; Greer et al. 2020); banking crises, and particularly the sub-prime crisis (Guillermo 2009); the impact of oil shocks and world recession on Taiwan and South Korea (Jeon 1994); the protest against the EU (Mullis et al. 2016).

Schwartz (2014) compares the relatively effective response to the 2002–2003 SARS outbreak in China Mainland with the relatively ineffective intervention in Taiwan, focusing on three variables that constitute China Mainland’s
‘authoritarian advantage’—centralized decision-making powers; public support; and relations with the mass media.

Referring to the COVID-19 pandemic, and based on Shih (2020), Greer et al. (2020) suggest that on the one hand, “autocratic” regimes are effective at forceful actions. On the other hand, authoritarian regimes inhibit the internal and external flow of information.

Burkle (2020) analyzes “autocratic” states and the way they address environmental and public health issues, including COVID-19: China Mainland, North Korea, Iran, Turkey and several African nations. On the one hand, the author underestimates the effect of forceful actions in “autocratic” countries. On the other hand, the author stresses the consequences of unreliable flow of information and shortage of medical and sewage infrastructure.

Jeon (1994) suggests that for the nondemocratic third world leaders, a crisis situation can be seen as a superb chance to strengthen or even perpetuate political power. Yet, when South Korea and Taiwan faced similar shocks in the 70s of the twentieth century (e.g., the oil shock; worldwide recession; withdrawal of US forces from South Korea; Taiwan lost seat in United Nations Security Council to the People’s Republic of China), surprisingly, the concrete modes of their crisis responses turned out to contrast each other. South Korea drastically closed the political door via Yushin (1972), overwhelmed by Park Chung Hee’s hidden motives to perpetuate his personal rule. By contrast, Taiwan adopted a progressive political opening with aimed at diffusing societal challenges and broadening its power base. Alongside, on the economic front, South Korea aggressively launched capital-intensive heavy-chemical industrialization (HCI) as a means to legitimate the illegitimate Yushin system, whereas Taiwan took a partial HCI path with a great caution and flexibility not to violate the then international division of labor. As well, such varying modes of crisis management resulted in contrasting consequences by 1979–1980; South Korea was mired in another total crisis, compounded by political turmoil and negative GNP growth, while Taiwan continued to enjoy socio-political stability and positive economic growth.

Wang (2014) exemplifies the ability to implement a forceful action based on the Chinese Communist party decision. The author discusses the “guerrilla-style” decision to radically expand Chinese college enrollment in June 1999. The top leadership ignored opposition from the Ministry of Education (MOE), overturned established policies and assumed de facto control over MOE bureaucratic power.

As can be seen from the literature review, crisis management varies over time, space and the type of the regime involved (autocracy vs. democracy).

Ran and Jian (2021) discuss one of the advantages of the “autocratic” states, namely, blame avoidance due to lack of election pressures. The conventional Chinese version of this “blame game” is to deflect the blame downward to those at the lower levels, who are in a less influential position in the administrative system. Yet, the initial outbreak stages of the COVID-19 were unusual in that the deflection of blames was targeted upward, due to public appeal for transparency.

Su et al. (2021) surveyed online the responses of Chinese citizens to the rigorous lockdown until April 8, 2020. Based on the survey outcomes, the authors argue that
local governments in many parts of the country gained more trust than usual, narrowing the trust gap with the central government.

3 A Comparison Between India (Democracy) and China Mainland (“Autocracy”)

Appendix A provides a comparison between India (democracy) and China Mainland (autocracy). It is noteworthy that the level of democracy and autocracy varies across time, government status, and government policy (information flow, strategy of addressing the pandemic).

We chose to compare between similar countries in terms of population, infrastructure, pollution levels, etc. Both countries comprise more than 37% of the world’s population. In terms of size of population, the countries are similar. Yet, regarding political rights and civil liberties, while India receives a relatively high grade (2–3) and is considered “free”, China Mainland receives the worst grades (7) and is considered “not free”.

Jiang (2021) stresses the effectiveness in addressing the pandemic via the most comprehensive lockdown in history of Wuhan Province in China. The author demonstrates the more efficient mechanism “autocracies” have to cope with pandemics. This is because of an enhanced opportunity to impose lockdowns and ensure compliance to these restrictions compared to democracies. In that respect—India and China provide an excellent opportunity for comparison.

Compared to India, and as of September 19, 2021, the number of COVID-19 cases (33,448,163 vs. only 95,189) and the number of deaths from SARS-CoV2 virus (444,869 vs. 4,636) is much smaller in China Mainland. From this perspective, and in absolute figures, China Mainland is much more efficient than India, despite the fact that both countries have comparable levels of population (1,380,004,385 vs. 1,439,323,776 persons). While India is located in the 99th percentile, China Mainland is located in the 24th percentile. This is also demonstrated by the cases–population ratio (in India—2.42377%; in China Mainland—0.006648%).

4 Descriptive Statistics

Table 1 reports the descriptive statistics applied to 169 countries. Appendix B gives the full list of countries and reports recovery rates from COVID-19 and “Freedom Levels”. Information regarding COVID-19 cases and recovered persons is from September 19, 2021. The PR and CI measures are based on the Freedom House ranking of 2019 across countries. The GDP per capita of countries are based on information from 2018 (1 year prior to the outburst of the COVID-19 pandemic—see footnote 1 and “sect. 7”).

The mean recovery–cases ratio is 75.18% and the median is 82.13% (Rec_Per). Given that unlike the median, the mean is affected by extreme values at the tail of the distribution, and the implication is a left-tailed distribution. Indeed, this is clearly demonstrated in Fig. 1, where the distribution is skewed to the left (skewness = -1.168882). Based on the joint skewness and kurtosis test for
Table 1 Descriptive statistics

| Variable  | Definition                                         | Obs | Mean   | Median  | Std. Dev | Min | Max         |
|-----------|----------------------------------------------------|-----|--------|---------|----------|-----|-------------|
| Recovered | Accumulated number of individuals who recovered from coronavirus | 169 | 182,594| 10,779  | 787,901  | 0   | 7,137,228   |
| Cases     | Accumulated number of coronavirus cases            | 169 | 238,237| 17,943  | 1,003,181| 3   | 8,725,151   |
| Rec_Per   | Recovered ÷ cases                                  | 169 | 0.7518 | 0.8213  | 0.2189   | 0   | 1           |
| PR        | Political rights on a Likert scale of 1 = the highest; 7 = the lowest grade | 169 | 3.5858 | 3       | 2.1561   | 1   | 7           |
| CL        | Civil liberties on a Likert scale of 1 = the highest; 7 = the lowest | 169 | 3.4852 | 3       | 1.8584   | 1   | 7           |
| PR10      | PR × \(\frac{10}{7}\) = political rights on a scale of 1–10 | 169 | 5.1226 | 4.2857  | 3.0802   | 1.4286 | 10          |
| CL10      | CL × \(\frac{10}{7}\) = civil liberties on a scale of 1–10 | 169 | 4.9789 | 4.2857  | 2.6549   | 1.4286 | 10          |
| Free      | 1 = entirely free countries; 0 = otherwise         | 169 | 0.3905 | 0.4893  | 0        | 1   |             |
| Partly_Free | 1 = partly free country; 0 = otherwise            | 169 | 0.2604 | 0.4401  | 0        | 1   |             |
| Not_Free  | 1 = non-free country; 0 = otherwise                | 169 | 0.3491 | 0.4781  | 0        | 1   |             |

Measures of democracies for 2020 are based on the Freedom House measures (2021) available at: https://freedomhouse.org/countries/nations-transit/scores
normality, the calculated \( \chi^2 \) statistic, 24.80, is greater than the critical \( \chi^2 \) statistics with two degrees of freedom at the 1% level, 9.2103.

This left-tailed distribution, which indicates the existence of outliers at the left side of the distribution, justifies the use of the least absolute deviations (LAD) estimation, which is also known as the “median regression” (Green 2012). Consequently, we run this procedure in subsequent sections as a robustness test.

Other variables in Table 2 include three measures of democracy published by The Freedom House (available at: https://freedomhouse.org/countries/nations-transit/scores). The political rights (PR) and civil liberties (CL) are measured on a Likert scale where 1 = the highest and 7 = the lowest grades, measuring political rights and civil liberties in the country. For convenience, we converted the Likert scale to a 1–10 scale, where \( 1.4286 \times 10 \) is the highest and \( 7 \times 10 \) is the lowest grade for political rights (PR10) and civil liberties (CL10). While the median of political rights and civil liberties is “3”, the mean is “3.5858” and “3.4852”, respectively. This might generate the impression of a right-tailed distribution, namely, high prevalence of countries with high level of political rights and civil liberties. Yet, when stratified by three categories, only 39.05% of the 169 countries are classified as “entirely free” (Free), 26.04% are classified as “partially free” (Partial) and 34.91% as “not free” (Not).

5 The Empirical Model

Consider the following empirical model applied separately to three Freedom House measures:
where $j = 1, 2, 3$, $\text{Rec} _{\text{Per}}$ (the dependent variable) represents the ratio between the accumulated number of recovery cases and coronavirus cases on October 25, 2020 (approximately 8 months after the outburst of the pandemic), $\text{Freedom} _{\text{House} _{\text{Measure} } _{1,j}}$, and $\text{Freedom} _{\text{House} _{\text{Measure} } _{2,j}}$ are the independent variables, $\alpha _ {1,j}, \beta _ {1,j}, \gamma _ {1,j}$ are parameters, and $\mu _ {1,j}$ is the stochastic random disturbance term.

Given that the dependent variable is bounded between 0 and 1 ($0 \leq \text{Rec} _{\text{Per}} \leq 1$ —the countries cannot have a number of recovered cases, which is greater than the number of coronavirus cases—this model is also known as the linear probability model (LPM, e.g., Johnston and Dinardo 1997: 414–418).

Referring to the independent variable(s), we use two quantitative measures and one qualitative measure of democracies ($j = 1, 2, 3$):

1) $\text{Freedom} _{\text{House} _{\text{Measure} } _{1,1}} = \text{PR} 10$ and $\text{Freedom} _{\text{House} _{\text{Measure} } _{2,1}} = \text{0}$, where 0 is a column vector of zeros. The original scale of the political rights (PR) measure is a Likert scale from PR = 1, the highest to PR = 7, the lowest grade for political rights. After rescaling to a 1–10 scale (PR10 = PR · 10), the model takes the form where PR10 = 1.4286 is the highest and PR10 = 10 is the lowest grade.

2) $\text{Freedom} _{\text{House} _{\text{Measure} } _{1,2}} = \text{CL} 10$ and $\text{Freedom} _{\text{House} _{\text{Measure} } _{2,2}} = \text{0}$, where 0 is a column vector of zeros. The original scale of the Civil Liberties (CL) meas-

Table 2: Coronavirus recovery and measures of democracies

| Method   | (1)   | (2)   | (3)   | (4)   | (5)   | (6)   |
|----------|-------|-------|-------|-------|-------|-------|
| LPM      | LPM   | LPM   | Fractional | Fractional | Fractional |
| VARIABLES| Rec_Per | Rec_Per | Rec_Per | $\Phi [\text{Rec} _{\text{Per}}]$ | $\Phi [\text{Rec} _{\text{Per}}]$ | $\Phi [\text{Rec} _{\text{Per}}]$ |
| Constant | 0.673*** | 0.668*** | 0.693*** | 0.433*** | 0.420*** | 0.505*** |
|          | (< 0.01) | (< 0.01) | (< 0.01) | (2.11 × 10⁻⁵) | (0.000105) | (5.15 × 10⁻⁹) |
| PR10     | 0.0154*** | – | – | 0.0498*** | – | – |
|          | (0.00425) | – | – | (0.00448) | – | – |
| CL10     | – | 0.0169*** | – | – | 0.0537*** | – |
|          | – | (0.00697) | – | – | (0.00746) | – |
| Partly_free | – | – | 0.0815** | – | – | 0.249** |
|          | – | – | (0.0397) | – | – | (0.0363) |
| Not_free | – | – | 0.116*** | – | – | 0.372*** |
|          | – | – | (0.00604) | – | – | (0.00623) |
| Observations | 169 | 169 | 169 | 169 | 169 | 169 |
| F-Statistics | 8.40*** | 7.46*** | 4.05** | 8.08*** | 7.16*** | 8.36** |

Columns (1), (2) and (3) [(4), (5) and (6)] report the outcomes obtained from LPM, which is a simple OLS procedure [the fractional probit regression estimation]. The dependent variable $\text{Rec} _{\text{Per}}$ is the ratio between the number of recovered and coronavirus cases. In columns (3) and (6), the base category is “Free”. Robust $p$ values are given in parentheses

** $p < 0.05$

*** $p < 0.01$
ure is a Likert scale from \( CL = 1 \), the highest to \( CL = 7 \), the lowest grade for political rights. Once again, we rescaled the model to 1–10 scale, \((CL10 = CL \cdot \frac{10}{7})\), so that \( CL10 = 1.4286 \) is the highest and \( CL = 10 \) is the lowest grade.

3) Freedom_House_Measure_{1,3} = PARTLY_FREE and Freedom_House_Measure_{2,3} NOT_FREE are dummy variables, which receive 1 if the country was defined as “partly free” or “not free” and zero otherwise. The base category is “free”, so that the constant term \((\alpha_{1,3})\) represents the projected probability of coronavirus infection in the case that the country is free and \( \beta_{1,3}\gamma_{1,3} \) represent the projected probability differences with respect to the base category.

Referring to the linear probability model, a major weakness of the linear probability model is that it does not constrain the predicted value to lie between 0 and 1 (Johnston and Dinardo 1997: 417). Consequently, consider the following model (e.g., Papke and Woldridge 1996; Woldridge 2010):

\[
\Pr(0 < \text{Case}_\text{Per} < 1) = F(\alpha_{1,j} + \beta_{1,j}\text{Freedom_House_Measure}_{1,j} + \gamma_{1,j} + \text{Freedom_House_Measure}_{2,j}').
\]

where \( F(\text{Case}_\text{Per}) = \Phi(Z) = \frac{\exp(-\mu/2\sigma^2)}{\sqrt{2\pi}\sigma^2} \) (the cumulative normal distribution function). Given the disadvantage of this model (interpretation of the coefficients is not straightforward), we converted the estimation results obtained from this model to figures describing projected probabilities of recoveries on the vertical axis and Freedom House measures on the horizontal axis.

Finally, as a robustness test, we replace the LPM, namely, the simple OLS procedure, by the least absolute deviation (LAD) procedure, also known as a “median regression”. Recall that our dependent variable Rec_Per is skewed to the left, namely, OLS estimation outcomes are affected by outliers. The median regression is the conventional tool to address this concern (e.g., Green 2012: 243–244).

6 Results

Table 2 reports the regression outcomes based on the LPM and the fractional probit. The table demonstrates that a one-point increase in PR10 and CL10 is associated with an anticipated rise in the probability of recovery from coronavirus by 1.54\% \((p=0.00425)\) – 1.69\% \((p=0.00697)\). The indication is that worsening the political rights and civil liberties is associated with an anticipated improvement in recovery rates. A shift from entirely free countries (the base category) to partly free countries is associated with an 8.15\% \((p=0.0397)\) rise in the projected prospects of recovery from coronavirus. A shift from entirely free countries (the base category) to countries that are not free is associated with an 11.6\% \((p=0.00604)\) rise in projected prospects of recovery from coronavirus.

Figures 2 and 3 are based on the regression outcomes obtained from columns 4 and 5 in Table 3 and gives the projected probability of recovery vs. the political rights [civil liberties] measure on the 1–10 scale. As the figure demonstrates, for the best countries in political right [civil liberties] terms, the projected likelihood to recover from coronavirus is 68.55\%
For the worst countries in political rights [civil liberties] terms, the projected likelihood to recover from coronavirus rises to 82.41% [83.07%]—a 20.22% increase in projected recovery rates. Moreover, the 95% projected upper bound for the best classified democracies $PR_{10} = 1$ [$CL_{10} = 1$] is a 74.63% [74.58%] projected likelihood of recovery. The 95% projected lower bound for the worst classified democracies, $PR_{10} = 10$ [$CL_{10} = 10$], is a 77.23% [77.21%] projected likelihood of recovery. Still, the 3.53% better projected recovery prospects is still preserved even under these circumstances.

Finally, as a robustness test, Table 3 reports the regression outcomes based on the LPM and the median regression procedures, where the latter approach better addresses outliers. The estimated coefficient of $PR_{10}$ [$CL_{10}$] rises by 40.91% = $\begin{pmatrix} 0.0217 \\ 0.0154 \end{pmatrix} - 1$ from 1.54% ($p=0.00425$) [1.69% ($p=0.00697$)] to 2.17% ($p=0.000662$) [2.41% ($p=0.000524$)]—with a shift from OLS to the median regression procedure. Finally, referring to the classifications to “entirely free”, “partially free” and “not free”, the median regression procedure reduces the estimated coefficient of the dummy variable “Partial” from 8.15% ($p=0.0397$) to 8.00% ($p=0.118$), but raises the estimated coefficient of the dummy variable “Not_Free” by 33.62% = $\begin{pmatrix} 0.155 \\ 0.116 \end{pmatrix} - 1$—from 11.6% ($p=0.00604$) to 15.5% ($p=0.00293$).
Fig. 3 Projected recovery rates from coronavirus vs. civil liberties. Figure 3 is based on the regression outcomes obtained from column (5) in Table (2) and gives projections and 95% confidence intervals. The regression analysis is based on information obtained from 169 countries. According to the Freedom House measure for democracies, CL is the initial for political rights. The original measure was constructed on a Likert scale where 1 = countries with the highest political rights and 7 = countries with the lowest political rights. PR10 is a scaling to 1–10. Worsening the civil liberties from 1 to 10 is associated with a rise in recovery rates \( \frac{\text{Recovery}}{\text{Cases}} \) from 68.20% to 83.07%.

Table 3 Coronavirus recovery and measures of democracies: OLS vs. median regression

| Method | (1) | (2) | (3) | (4) | (5) | (6) |
|--------|-----|-----|-----|-----|-----|-----|
| LPM    | LPM | LPM | Median | Median | Median | Median |
| Variables | Rec_Per | Rec_Per | Rec_Per | Rec_Per | Rec_Per | Rec_Per |
| Constant | 0.673*** | 0.668*** | 0.693*** | 0.694*** | 0.690*** | 0.741*** |
| (p < 0.01) | (p < 0.01) | (p < 0.01) | (p < 0.01) | (p < 0.01) | (p < 0.01) | (p < 0.01) |
| PR10   | 0.0154*** | – | – | 0.0217*** | – | – |
| (0.00425) | – | – | (0.000662) | – | – |
| CL10   | – | 0.0169*** | – | – | 0.0241*** | – |
| – | (0.00697) | – | – | (0.000524) | – |
| Partly_free | – | – | 0.0815** | – | – | 0.0800 |
| – | – | (0.0397) | – | – | (0.118) |
| Not_free | – | – | 0.116*** | – | – | 0.155*** |
| – | – | (0.00604) | – | – | (0.00293) |
| Observations | 169 | 169 | 169 | 169 | 169 | 169 |
| F-Statistics | 8.40*** | 7.46*** | 4.05** | 4.05** | 4.05** | 4.05** |

Columns (1), (2) and (3) [(4), (5) and (6)] report the outcomes obtained from the LPM, which is a simple OLS procedure [median regression]. The dependent variable Rec_Per is the ratio between the number of recovered and coronavirus cases. In columns (3) and (6), the base category is “Free”. Robust p values are given in parentheses.

** p < 0.05
*** p < 0.01
Further statistical evidence, available upon request, supports the conclusion that the projected mortality rates (defined as mortality–cases ratio) remain unchanged regardless of the level of democracy in terms of political rights and civil liberties. The respective calculated $p$ values are: $p=0.288$ for the estimated coefficient of $PR10$, $p=0.204$ for the estimated coefficient of $CL10$. Finally, estimation by median regression yields $p=0.161$ for the estimated coefficient of “Partially_Free” and $p=0.984$ for the estimated coefficient of “Not_Free”. The projected mortality rates remain around 1.71%-1.77% regardless of the grades given to political rights and civil liberties.

7 Discussion

Several interpretations may justify our findings. One possibility is non-compliance to social distancing rules and lockdown guidelines in democratic countries even after COVID-19 infection due to the incentive to defect and the preference of personal utility maximization over cooperation. In contrast to “autocratic” countries, deterrence of law enforcement system in democratic countries is ineffective (Arbel et al. 2020).

Another possible explanation is higher exposure to a variety of microbial organisms during early life in less developed countries, which happen to be more “autocratic”. In fact, 40% of the world’s population suffers from moderate-to-high water stress (Lewis and Tietenberg 2012). Moreover, the UN water development report for 2019 stresses that: “Safe drinking water and sanitation are recognized as basic human rights, as they are indispensable to sustaining healthy livelihoods and fundamental in maintaining the dignity of all human beings.”

The medical literature has long hypothesized that lack of hygienic environmental conditions (running water, sewage systems) exerts a protective effect in newborns in less developed countries (Tamburini et al. 2016). In Western countries, on the other hand, more favorable environmental factors (apparently, excessive hygienic environmental conditions and, consequently, lack of exposure to different pathogens) are suspected to have increased the penetrance of autoimmune diseases, such as celiac disease and type 1 diabetes. (Verdu and Danska 2018). Autoimmune response is closely related to COVID-19 (Hu et al. 2020; Ye et al. 2020; Gao et al. 2021).

Democracies typically help reduce mortality rates from cardiovascular disease, traffic accidents and cancer. Prevention of these non-communicable diseases requires a substantial allocation of funding for health-care delivery and transportation infrastructure, and treatment requires considerable budgets for medicine or sophisticated medical procedures. With the exception of tuberculosis, which requires expensive types of treatment, the advantage of democracies vanishes in many forms of infected diseases (Bollyky et al. 2019). As long as there is no efficient immunity against COVID-19 disease, and as an infected disease with inexpensive treatment, the advantage of democracy disappears.

In dealing with the pandemic, the following references provide further support to the differences between democratic and autocratic countries. Gerber and He (2021) discusses Sino-phobia in Russia and Kyrgyzstan prior to the COVID-19 pandemic. The authors concluded that: “Some evidence suggests that race plays a role in driving anti-Chinese views. Namely, Russian attitudes have been consistently less hostile toward European groups such as Jews and Ukrainians, even accounting for a short-term
increase in anti-Ukrainian sentiments following Russia’s annexation of Crimea and its initiation of support for violent secessionist in Eastern Ukraine in 2014.” (page 13). Qian and Hanser (2021) found that despite strong emotions initially, Wuhan residents quickly adapted to life under unprecedented lockdown. Jiang (2021) discussed the high effectiveness of the hardest lockdown in history in Wuhan province—considered to be the source of the pandemic. In sum, these references provide further support to our conclusion that coping with pandemics is easier in more “autocratic” countries.

8 Summary and Conclusions

Following the COVID-19 pandemic, the objective of the current study is to investigate whether democracy indeed promotes health. Unlike conventional thinking, research findings suggest better prospects of recovery for infected citizens of 169 countries with lower levels of political rights and civil liberties. Findings support the conclusion of the same projected mortality rates (mortality–cases ratio) regardless of the level of democracy in terms of political rights and civil liberties is also supported empirically.

One limitation of this study is the uncertainty regarding the methodology employed for measuring the number of persons who recovered from COVID-19 across countries. It could certainly be the case that the definition and identifications of COVID-19 recovered persons are different across countries. Nevertheless, this problem is typical in the literature that deals with international comparisons. Barro (1999), for example, investigates the relationship between the GDP and the level of democracy in different countries. It is not clear, however, how the reader could be certain that the GDP data in different countries are comparable and measured by the same statistical methodologies.

A second limitation is the data structure and the lack of additional important control variables. Given the data structure, there are no sufficient degrees of freedom to capture cultural (generic) differences across countries.

A third limitation is the fact that the measure of democracy employed in this study might not fully reflect all the subtle cultural features of every country. Any measure is an attempt to condense and weigh different characteristics into a single number and accordingly might miss important characteristics.

Appendix A (See Table 4)

Appendix B (See Table 5)

1 As a robustness test, and to control the wealth of the country, we supplemented the GDP per capita of 158 countries in the regression analysis. The outcomes remain robust, and, moreover, demonstrate the higher contribution of the regime type to the recovery rate compared to the GDP per capita. These findings stress further our interpretation, and particularly the importance of the regime type to the COVID-19 recovery rate.
Table 4 A comparison between India (democracy) and China Mainland (autocracy)

| Variable  | Definition                                                                 | India                          | China Mainland        |
|-----------|---------------------------------------------------------------------------|-------------------------------|-----------------------|
| Cases     | Accumulated number of infected in SARS-CoV2 virus as of September 19, 2021 | 33,448,163                    | 95,689                |
| Deaths    | Accumulated number of deaths from COVID-19 as of September 19, 2021        | 444,869                       | 4,636                 |
| Population| Population of the country                                                 | 1,380,004,385                 | 1,439,323,776         |
| Cases_Per | Cases ÷ population                                                        | 2.42377%                     | 0.006648%             |
| Deaths_Per| Deaths ÷ cases                                                             | 1.3300%                      | 4.844862%             |
| PR        | Political rights on a Likert scale of 1 = the highest; 7 = the lowest      | 2                             | 7                     |
| CL        | Civil liberties on a Likert scale of 1 = the highest; 7 = the lowest       | 3                             | 6                     |
| PR10      | PR × 10 = political rights on a scale of 1–10                             | 2.8571                        | 10                    |
| CL10      | CL × 10 = civil liberties on a scale of 1–10                              | 4.2857                        | 8.5714                |
| Free      | 1 = free countries; 0 = otherwise                                        | Yes                           | No                    |
| Partly_free| 1 = partly free country; 0 = otherwise                                   | No                            | No                    |
| Not_free  | 1 = non-free country; 0 = otherwise                                       | No                            | Yes                   |

Information is taken from World Meter by countries (2021) available at: https://www.worldometers.info/coronavirus/#countries (Accessed on September 19, 2021)

In terms of the number of coronavirus cases, and despite the fact that the populations of both countries are similar in magnitude, of 223 countries India is located in the second place (the 99.103 percentile) and China Mainland is located on the 169 place (the 24.215 percentile). In terms of political rights, China Mainland receives the worst grade (7 points).
| Num | Country/Region       | Recovered | Freedom |
|-----|----------------------|-----------|---------|
| 1   | Andorra              | 67.58%    | Free    |
| 2   | Antigua and Barbuda  | 82.79%    | Free    |
| 3   | Argentina            | 82.05%    | Free    |
| 4   | Australia            | 91.52%    | Free    |
| 5   | Austria              | 71.60%    | Free    |
| 6   | Bahamas              | 61.59%    | Free    |
| 7   | Barbados             | 91.63%    | Free    |
| 8   | Belize               | 61.85%    | Free    |
| 9   | Botswana             | 20.25%    | Free    |
| 10  | Brazil               | 89.65%    | Free    |
| 11  | Bulgaria             | 48.44%    | Free    |
| 12  | Canada               | 83.95%    | Free    |
| 13  | Cape Verde           | 86.77%    | Free    |
| 14  | Chile                | 95.26%    | Free    |
| 15  | Costa Rica           | 60.18%    | Free    |
| 16  | Croatia              | 68.17%    | Free    |
| 17  | Cyprus               | 43.57%    | Free    |
| 18  | Czech Republic       | 37.73%    | Free    |
| 19  | Denmark              | 79.26%    | Free    |
| 20  | Dominica             | 82.86%    | Free    |
| 21  | East Timor           | 100.00%   | Free    |
| 22  | Estonia              | 79.16%    | Free    |
| 23  | Finland              | 66.00%    | Free    |
| 24  | France               | 9.62%     | Free    |
| 25  | Germany              | 72.44%    | Free    |
| 26  | Ghana                | 98.32%    | Free    |
| 27  | Greece               | 32.45%    | Free    |
| 28  | Grenada              | 96.00%    | Free    |
| 29  | Guyana               | 74.40%    | Free    |
| 30  | Iceland              | 76.33%    | Free    |
| 31  | India                | 90.23%    | Free    |
| 32  | Ireland              | 42.01%    | Free    |
| 33  | Israel               | 94.57%    | Free    |
| 34  | Italy                | 50.63%    | Free    |
| 35  | Jamaica              | 49.14%    | Free    |
| 36  | Japan                | 92.41%    | Free    |
| 37  | Latvia               | 32.25%    | Free    |
| 38  | Liechtenstein        | 57.54%    | Free    |
| 39  | Lithuania            | 39.99%    | Free    |
| 40  | Luxembourg           | 63.96%    | Free    |
| 41  | Malta                | 64.88%    | Free    |
| 42  | Mauritius            | 90.45%    | Free    |
| 43  | Monaco               | 79.74%    | Free    |
| Num | Country/Region                  | Recovered | Freedom |
|-----|--------------------------------|-----------|---------|
| 44  | Mongolia                        | 95.12%    | Free    |
| 45  | Namibia                         | 85.14%    | Free    |
| 46  | New Zealand                     | 93.75%    | Free    |
| 47  | Norway                          | 66.49%    | Free    |
| 48  | Panama                          | 81.45%    | Free    |
| 49  | Peru                            | 90.88%    | Free    |
| 50  | Poland                          | 44.39%    | Free    |
| 51  | Portugal                        | 58.94%    | Free    |
| 52  | Romania                         | 71.42%    | Free    |
| 53  | Saint Kitts and Nevis           | 100.00%   | Free    |
| 54  | Saint Lucia                     | 50.00%    | Free    |
| 55  | San Marino                      | 87.42%    | Free    |
| 56  | Slovakia                        | 22.72%    | Free    |
| 57  | Solomon Islands                 | 0.00%     | Free    |
| 58  | South Africa                    | 90.26%    | Free    |
| 59  | South Korea                     | 92.10%    | Free    |
| 60  | Suriname                        | 97.33%    | Free    |
| 61  | Switzerland                     | 53.83%    | Free    |
| 62  | São Tomé and Príncipe           | 95.96%    | Free    |
| 63  | Taiwan                          | 91.27%    | Free    |
| 64  | Trinidad and Tobago             | 74.12%    | Free    |
| 65  | Tunisia                         | 10.31%    | Free    |
| 66  | United States                   | 62.07%    | Free    |
| 67  | Albania                         | 55.61%    | Partly  |
| 68  | Armenia                         | 65.40%    | Partly  |
| 69  | Bangladesh                      | 79.01%    | Partly  |
| 70  | Bhutan                          | 89.77%    | Partly  |
| 71  | Bolivia                         | 77.14%    | Partly  |
| 72  | Bosnia and Herzegovina          | 64.70%    | Partly  |
| 73  | Burkina Faso                    | 82.04%    | Partly  |
| 74  | Colombia                        | 90.11%    | Partly  |
| 75  | Comoros                         | 96.61%    | Partly  |
| 76  | Dominican Republic              | 82.43%    | Partly  |
| 77  | Ecuador                         | 87.70%    | Partly  |
| 78  | El Salvador                     | 86.72%    | Partly  |
| 79  | Fiji                            | 90.91%    | Partly  |
| 80  | Georgia                         | 37.87%    | Partly  |
| 81  | Guatemala                       | 89.91%    | Partly  |
| 82  | Guinea                          | 90.02%    | Partly  |
| 83  | Guinea-Bissau                   | 75.66%    | Partly  |
| 84  | Haiti                           | 81.69%    | Partly  |
| 85  | Honduras                        | 40.76%    | Partly  |
| 86  | Hungary                         | 26.79%    | Partly  |
Table 5 (continued)

| Num | Country/Region      | Recovered | Freedom |
|-----|---------------------|-----------|---------|
| 87  | Indonesia           | 80.85%    | Partly  |
| 88  | Ivory Coast         | 98.51%    | Partly  |
| 89  | Jordan              | 14.14%    | Partly  |
| 90  | Kenya               | 68.80%    | Partly  |
| 91  | Kosovo              | 84.09%    | Partly  |
| 92  | Kuwait              | 92.71%    | Partly  |
| 93  | Kyrgyzstan          | 85.41%    | Partly  |
| 94  | Lebanon             | 48.75%    | Partly  |
| 95  | Lesotho             | 50.10%    | Partly  |
| 96  | Liberia             | 92.13%    | Partly  |
| 97  | Madagascar          | 96.46%    | Partly  |
| 98  | Malawi              | 89.83%    | Partly  |
| 99  | Malaysia            | 64.50%    | Partly  |
| 100 | Maldives            | 91.47%    | Partly  |
| 101 | Mali                | 75.81%    | Partly  |
| 102 | Mauritania          | 96.36%    | Partly  |
| 103 | Mexico              | 72.98%    | Partly  |
| 104 | Moldova             | 73.13%    | Partly  |
| 105 | Montenegro          | 76.06%    | Partly  |
| 106 | Morocco             | 82.64%    | Partly  |
| 107 | Mozambique          | 77.20%    | Partly  |
| 108 | Nepal               | 70.64%    | Partly  |
| 109 | Niger               | 93.07%    | Partly  |
| 110 | Nigeria             | 92.70%    | Partly  |
| 111 | North Macedonia     | 69.11%    | Partly  |
| 112 | Pakistan            | 94.67%    | Partly  |
| 113 | Papua New Guinea    | 93.48%    | Partly  |
| 114 | Paraguay            | 66.68%    | Partly  |
| 115 | Philippines         | 88.33%    | Partly  |
| 116 | Senegal             | 91.66%    | Partly  |
| 117 | Seychelles          | 98.01%    | Partly  |
| 118 | Sierra Leone        | 76.08%    | Partly  |
| 119 | Singapore           | 99.81%    | Partly  |
| 120 | Sri Lanka           | 48.31%    | Partly  |
| 121 | Thailand            | 94.66%    | Partly  |
| 122 | Togo                | 72.73%    | Partly  |
| 123 | Ukraine             | 40.85%    | Partly  |
| 124 | Zambia              | 94.18%    | Partly  |
| 125 | Zimbabwe            | 82.13%    | Partly  |
| 126 | Afghanistan         | 83.58%    | Not     |
| 127 | Algeria             | 69.63%    | Not     |
| 128 | Angola              | 37.39%    | Not     |
| 129 | Azerbaijan          | 82.63%    | Not     |
Table 5  (continued)

| Num | Country/Region                | Recovered | Freedom |
|-----|-------------------------------|-----------|---------|
| 130 | Bahrain                       | 95.67%    | Not     |
| 131 | Belarus                       | 89.67%    | Not     |
| 132 | Brunei                        | 96.62%    | Not     |
| 133 | Burundi                       | 92.72%    | Not     |
| 134 | Cambodia                      | 97.90%    | Not     |
| 135 | Cameroon                      | 94.88%    | Not     |
| 136 | Central African Republic      | 39.64%    | Not     |
| 137 | Chad                          | 86.97%    | Not     |
| 138 | China Mainland                | 94.29%    | Not     |
| 139 | Cuba                          | 91.35%    | Not     |
| 140 | Djibouti                      | 97.58%    | Not     |
| 141 | Egypt                         | 92.83%    | Not     |
| 142 | Equatorial Guinea             | 97.75%    | Not     |
| 143 | Eritrea                       | 89.86%    | Not     |
| 144 | Eswatini                      | 93.99%    | Not     |
| 145 | Eswatini                      | 50.93%    | Not     |
| 146 | Gabon                         | 95.44%    | Not     |
| 147 | Iran                          | 79.99%    | Not     |
| 148 | Iraq                          | 84.42%    | Not     |
| 149 | Kazakhstan                    | 95.67%    | Not     |
| 150 | Laos                          | 95.65%    | Not     |
| 151 | Libya                         | 54.86%    | Not     |
| 152 | Myanmar                       | 55.66%    | Not     |
| 153 | Nicaragua                     | 77.75%    | Not     |
| 154 | Oman                          | 87.91%    | Not     |
| 155 | Qatar                         | 97.66%    | Not     |
| 156 | Russia                        | 74.85%    | Not     |
| 157 | Rwanda                        | 94.94%    | Not     |
| 158 | Saudi Arabia                  | 96.07%    | Not     |
| 159 | Somalia                       | 81.24%    | Not     |
| 160 | South Sudan                   | 44.85%    | Not     |
| 161 | Sudan                         | 49.22%    | Not     |
| 162 | Syria                         | 32.41%    | Not     |
| 163 | Tajikistan                    | 91.77%    | Not     |
| 164 | Turkey                        | 86.90%    | Not     |
| 165 | Uganda                        | 64.24%    | Not     |
| 166 | United Arab Emirates          | 95.05%    | Not     |
| 167 | Venezuela                     | 93.73%    | Not     |
| 168 | Vietnam                       | 90.50%    | Not     |
| 169 | Yemen                         | 65.34%    | Not     |
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Declarations

Conflict of Interest  All the four co-authors have no potential conflicts of interest, financially or non-financially, directly or indirectly related to this work.

Ethical Approval  This research does not require an IRB approval, since it does not involve any experiment or manipulation of subjects.

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