COVID-19 and Type Political Regimes

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Abstract

In this paper, we try to find the impact that the type of political regime had on the growth in the number of new infection cases and death rates per million due to the Covid-19 pandemic. We use annual democracy scores of countries along with daily level data-set on new cases per million and total deaths (caused due to COVID-19) per million, to try and establish a causal relationship by using panel fixed effects and propensity score matching. Using Difference-in-Differences approach, we also compare different political regimes across different COVID waves.

Key Words: Covid-19, Political Regimes, Democracy, Autocracy

1 Introduction

In his book, Development as Freedom (1999), in the context of talking about famines, Amartya Sen highlighted the checks and balances that democracies put in place. While democracies have often been found to be slow in recognising threats, they have been better in managing them. Autocracies on the other hand, can have the full state capacity to evade a catastrophe but can choose to ignore it. Yet, autocracies are capable of swift response in contrast to democracies. Historians can present different examples to vouch for both but it is generally agreed that while autocracies might be better in preventing crises, democracies have been better in managing them.

Current global downturn, caused by the spread of COVID-19 pandemic, is considered to have impacted more lives than any other event since the Second World War. It is an event that has made humankind rethink about all aspects of life. It is in this light that we are trying to examine the performance of autocratic vis-`a-vis democratic regimes during the COVID-19 pandemic. On one hand, the world saw democracies like New Zealand, Portugal and Greece, that managed the crisis pretty well. On the other, we also saw countries like Italy, Spain, UK and the like, where there were significant delays in taking actions. Autocracies like China after bungling with the crisis for which the whole world paid a price, managed it effectively for a certain period of time, or at least it appeared so.

Previous studies have shown that democratic countries perform better compared to autocratic countries when it comes to handling any health crisis (Besley & Kudamatsu, 2006; Justesen, 2012; Bollyky et al., 2019; Pieters et al., 2016). However, when it comes to COVID-19, Cepaluni, G. et al. (2021) and G. Cassan & M. Van Steenvoort (2021) have shown that autocratic countries maybe more efficient in putting in place policies that contain COVID-19 spread. Cepaluni, G. et al. (2021) demonstrated using instrumental variables that democratic countries experienced deaths on a larger per capita scale than less democratic countries. Whereas, G. Cassan & M. Van Steenvoort (2021) have shown that the differences in death rates, across political regimes, during the first months of pandemic were due to omitted variables and once those characteristics are accounted for, death rates equalize across political regimes. They have also shown that the later differences (a year later into the pandemic) in death rates, across political regimes, are on account of data manipulations by autocracies, hiding approximately 400,000 deaths worldwide.

We contribute in this debate by analysing a larger data set and by using different methods to answer the question, "Which kind of regime did better in **preventing/managing** the COVID-19 pandemic?". Here,

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we compare the growth rates of total deaths per million (TDPM) and new cases per million (NCPM) across political regimes. We try to estimate the causal link between growth rates of TDPM/NCPM and political regimes using panel data two way fixed effects analysis and propensity score matching, by matching countries on various potential confounders such as GDP per capita, human development index, population density and so on. We also add to the existing literature by conducting wave wise analysis across political regimes. Using Difference-in-Differences approach, we compare growth rates of TDPM and NCPM during the first two waves, across political regimes. As a rule of thumb, usually 10% positivity rate is considered "too high"; for a liberal estimate and so as not to miss the days with positivity rate fairly close to 10% we have considered that a COVID-19 wave starts when positivity rate exceeds 9%. We find that democracies in general have performed better than autocracies but the differences between the two have been blunt.

The rest of the paper is organised as follows. In section 2, we talk about the data sources used for the study. In section 3, we explain each of the methodologies used in detail. In section 4, we present the results of our analysis.

2 Data

We get the data on COVID-19 variables from **"Our World in Data"**, which is a project in **"Global Change Data Lab"**. The data consists of information on daily TDPM and NCPM from 1st January 2020 to 31st December 2021 for 242 countries. For the data on nature of political regimes, we use "Freedom House Democracy Scores" which classifies countries as "not free", "partially free" and "free", and provide a score ranging from 0 to 100, where higher the score more democratic the country is and vice-versa. It consists of annual data for 218 countries from 2006 to 2021. After merging the two data sets, we end up with daily data from 1st January 2020 to 31st December 2021, on TDPM and NCPM for 189 countries. The potential confounders that we include in our analysis to avoid omitted variable bias are as follows: GDP per capita, population density, total vaccinations per hundred, people fully vaccinated per hundred, total tests per case and so on.

3 Methodology

3.1 Panel Data Fixed Effects- Growth in Death Rates/New Cases (per million) and Political Regimes

We estimate the following regression equations:

$$lnY_{it} - lnY_{it-1} = \beta_0 + \beta_1 * DS_{it} + \gamma_i + \Omega_t + \mathbf{X}_{it} + \epsilon_{it} \quad (1)$$

$$Growthrate_{it1} = \beta_0 + \beta_1 * DS_{it} + \gamma_i + \Omega_t + \mathbf{X}_{it} + \epsilon_{it} \quad (2)$$

Here, subscripts i and t stand for country and days since the record of first death/positive case, respectively. Our dependent variable, Y_{it}, is TDPM and NCPM, DS_{it} is the democracy score of country i on day t since record of first death/positive case, γ_i & Ω_t are country and time fixed effects respectively, X_{it} is a vector of potential confounders and ϵ_{it} is the error term. All standard errors are clustered at the country level. We take the first difference of natural log transformation of TDPM and NCPM because both of them turned out to be non-stationary when subjected to Fisher unit root test, however, the growth rates (first difference of natural log transformation) are stationary. Moreover, the objective here is to check which type of regime prevented/managed the pandemic better, hence, we think growth rates answers the question in a better way, rather than the levels. We also do stationarity tests for the confounders- tests per cases, total vaccinations per hundred and people fully vaccinated per hundred. All three of them turn out to be stationary.

[1] $lnTDPM_{it} - lnTDPM_{it-1} = ln(\frac{TDPM_{it}}{TDPM_{it-1}}) = \ln(1 + \frac{TDPM_{it}}{TDPM_{it-1}} - 1) \approx \frac{TDPM_{it}}{TDPM_{it-1}} - 1 = Deathgrowthrate_{it}$

3.2 Propensity Score Matching (PSM)- Growth in Death Rates/New Cases (per million) and Political Regimes

In the fixed effect estimation, we were not able to estimate the effect of time invariant variables like GDP per capita, population density and the like . In the PSM analysis, we match countries on the basis of such characteristics along with the confounders used in panel data analysis and then compare autocratic regimes with democratic regimes.

For the purpose of this analysis, we needed a binary division of countries into democratic and autocratic. Since the countries in middle of the distribution of democracy scores might not concretely be called democratic or autocratic, we have taken the top 30 and bottom 30 countries as per the democracy score for this analysis. The bottom 30 countries are then considered the autocratic countries and given dummy value 0 and the top 30 democratic countries are given the dummy value 1.

Now, let D be an indicator variable, where a value of 1 represents democracy and 0 represents autocracy, and F_1 and F_0 be the corresponding outcomes (in this case, TDPM and NCPM). Let Z denote the vector of observed variables like GDP per capita, hospital beds per thousand and the like. The average treatment effects on the treated (ATT) can be computed as (Rosenbaum Rubin, 1983; Rubin, 1977):

$$ATT = E(F_1|Z,D = 1) - E(F_0|Z,D = 0) \tag{3}$$

3.3 Difference in Differences- Wave Wise Comparison

We consider the days where covid positivity rate exceeds 9% [1] to be days when a covid-19 wave is present in the country. We consider two covid waves (by taking 2 longest time spans with positivity rate more than 9%) and named them, wave 1 and wave 2, where wave 1 happens before wave 2 chronologically. We estimate the following DID specification:

$$Growthrate_{it} = \alpha_0 + \alpha_1 * W_{it} + \alpha_2 * DS_{it} + \alpha_3 * W_{it} * DS_{it} + X_{it} + \epsilon'_{it} \tag{4}$$

Here, W_{it} is a dummy variable that takes value 1 for wave 2 for country i and 0 otherwise.

4 Results

4.1 Pooled OLS

Table 1 shows the results of pooled OLS for four different specifications. The very first column shows that when one looks at differences in the growth in TDPM without considering confounders like tests per case, total vaccination per 100 and people fully vaccinated per 100, democracies have higher daily growth rate of TDPM as compared to autocracies. However, as soon as we include the confounders, the results change, suggesting that there was omitted variable bias in the former case. Once this bias is removed, the analysis seems to suggest that democracies managed better as far as reducing growth in TDPM is concerned. As far as the growth rate of NCPM is concerned, we do not find significant differences between autocracies and democracies in the pooled OLS analysis. It seems to suggest that neither type of regime performed better than the other type as far as prevention of new cases is concerned.

Pooled OLS however, prevents us from taking advantage of a lot many information that a large panel data can provide. Therefore we further present the panel data analysis.

[1] For robustness, we conducted the analysis at different cut offs as well, specifically, 7%, 12% and 15%, results are consisted and available on demand

TABLE 1: RESULTS OF POOLED OLS

	Growth Rate of Total Deaths (per million)		*Growth Rate of New Cases (per million)*	
VARIABLES	(1)	(2)	(3)	(4)
Democracy Score	0.000017***	-0.000023***	-0.000052	-0.0002012
	(5.47 e-06)	(2.02 e-06)	(0.00007)	(0.0001477)
Tests Per Case		-7.00 e-07***		3.51 e-06
		(7.25 e-08)		(6.53 e-06)
Total Vaccination per 100		5.58 e-07		-0.0003845
		(5.22 e-06)		(0.000377)
People Fully Vaccinated per 100		-0.000061***		-0.0008476
		(0.00001)		(0.000805)
Constant	0.011687***	0.007224***	-0.005958	0.005523
	(0.00035)	(0.00016)	(0.004695)	(0.01175)
R^2	0.0001	0.0555	0.0000	0.0001
Adjusted R^2	0.0001	0.0553	0.0000	-0.0001
Time Fixed Effect	NO	NO	NO	NO
Entity Fixed Effect	NO	NO	NO	NO

***, ** and * indicate significance at 1, 5, and 10 per cent respectively. The table reports coefficients of the variables. Brackets contain the standard errors.

4.2 Panel Fixed Effects Estimation

Besides the observed confounders, as those used above, there can always be unobserved heterogeneity across countries or time. For instance, perhaps, in some countries it might be more common for people to do large social gatherings as compared to people in other countries. Similarly, citizens of some countries might by nature be more responsible than that of others. Besides these country specific unobserved heterogeneity, there can be time specific unobserved heterogeneity. For instance, the day on which the first covid case comes in a country might not be the same as the 30th day since the first case was reported. Maybe, with passage of time, state gets better understanding of handling the pandemic or perhaps citizens become more careful/careless. We thus think that it might be worthy to look at how results change upon including time and entity fixed effects.

Table 2 shows results of panel fixed effect estimates when growth in TDPM is taken as the outcome variable. Upon including only entity fixed effects (column 1 and 2), we find that democracies have higher growth in TDPM. More so, the result is significant at 1% significance level. However, as soon as we include time fixed effects along with entity fixed effects and confounders, the sign of the coefficient changes. This seems to suggest that if we take into consideration how many days have passed since the reporting of first death case in the country, on average, democracies have less growth rate in TDPM. This again suggests that democratic regimes have been better in managing the crisis as far as controlling growth in TDPM is concerned.

Table 3 shows the panel fixed effect estimates when the outcome variable is the growth in new cases per million. Upon including entity fixed effect without confounders, we find that democracies have higher growth in NCPM. This result is significant at 1% level. The relationship holds true even upon including confounders and time fixed effects, though the significance level reduces to 10%. This seems

to suggest that democracies have perhaps been no better, if not worse, in preventing new cases as compared to autocracies.

TABLE 2: PANEL DATA FIXED EFFECT ESTIMATION WITH GROWTH IN DEATH RATES (PER MILLION) AS OUTCOME VARIABLE

VARIABLES	(1)	(2)	(3)	(4)
Democracy Score	0.0030041***	0.0006721***	0.000107	-0.0009447**
	(0.0007059)	(0.0002281)	(0.0003472)	(0.0004696)
Tests Per Case		-1.08 e-06**		-9.55 e-07**
		(5.04 e-07)		(4.54 e-07)
Total Vaccination per 100		-0.0000386*		-0.0000358
		(0.000023)		(0.0000336)
People Fully Vaccinated per 100		-3.46 e-06		5.01 e-06
		(0.000046)		(0.0000465)
Constant	-0.1595826***	-0.0412776**	0.138104***	0.0768481**
	(0.0404768)	(0.0167147)	(0.0312214)	(0.035733)
R^2 :				
Within	0.0029	0.0750	0.1853	0.2366
Between	0.0085	0.0105	0.0630	0.0262
Overall	0.0001	0.0052	0.1817	0.0312
Time Fixed Effect	NO	NO	YES	YES
Entity Fixed Effect	YES	YES	YES	YES
Clustered Standard Errors	YES	YES	YES	YES

***, ** and * indicate significance at 1, 5, and 10 per cent respectively. The table reports coefficients of the variables. Brackets contain the standard errors.

4.3 Propensity Score Matching

Table 4 shows the results of Propensity Score Matching. The covariates used for matching are- (a) tests per case (b) total vaccination per 100 (c) people fully vaccinated per 100 (d) GDP per capita (e) Human Development Index (f) population density (e) days since the record of first death/positive case.

The results for growth in TDPM is consistent with the results in previous analyses. We again find that democracies did better in controlling growth in TDPM. However, unlike previous analyses, where we found either less significant difference in ability of democracies vis-`a-vis autocracies in preventing new cases or democracies performing comparatively worse, here we find that democracies perform better. The explanation for the difference in results could be the fact that in the PSM we have taken top 30 and bottom 30 countries as per the democracy score. That is, we have taken the extreme ends of the distribution of democracy score. That is, we are comparing very autocratic countries to very democratic countries. The panel data analysis can be considered an analysis comparing comparatively democratic countries to comparatively autocratic countries. Hence, the difference in the results across the panel data fixed effect and the PSM analysis need not be surprising. We can say that in better functioning democracies, the growth rate in both TDPM and NCPM have been lower.

TABLE 3: PANEL DATA FIXED EFFECT ESTIMATIOWITH GROWTH IN NEW CASES (PER MILLION) AS OUTCOME VARIABLE

VARIABLES	(1)	(2)	(3)	(4)
Democracy Score	0.0040824***	0.0066474*	-0.0005607	0.0078956*
	(0.0013722)	(0.003937)	(0.0011208)	(0.004483)
Tests Per Case		2.83 e-06		2.53 e-06
		(0.0000113)		(0.000012)
Total Vaccination per 100		-0.0005701**		-0.0011174***
		(0.0002642)		(0.0003266)
People Fully Vaccinated per 100		0.0011608**		0.0018411***
		(0.0005565)		(0.000591)
Constant	-0.248415***	-0.478633*	0.04666805**	-0.5608312
	(0.0804676)	(0.282127)	(0.1853465)	(0.4304998)
R^2 :				
Within	0.0000	0.0147	0.0095	0.0170
Between	0.0000	0.0001	0.0102	0.0216
Overall	0.0000	0.0001	0.0095	0.0020
Time Fixed Effect	NO	NO	YES	YES
Entity Fixed Effect	YES	YES	YES	YES
Clustered Standard Errors	YES	YES	YES	YES

***, ** and * indicate significance at 1, 5, and 10 per cent respectively. The table reports coefficients of the variables. Brackets contain the standard errors.

TABLE 4: RESULTS OF PROPENSITY SCORE MATCHING

	Growth in Total Deaths per Million	*Growth in New Cases per Million*
ATT	-.0016299***	-.134172***
Standard Errors	.0001827	.0522121

***, ** and * indicate significance at 1, 5, and 10 per cent respectively

4.4 Difference in Differences

To get an idea about how democracies and autocracies differed in the way they prepared themselves for the pandemic after the first wave, we did the difference in differences analysis. The results of the same have been shown in Table 5. As evident, there are no significant differences in growth rates of total deaths and new cases (per million) between the first and the second wave for either autocracies or democracies. This seems to suggest that neither prepared better than the other for the second wave after the first wave. This again asserts the finding of having insignificant differences between autocracies and democracies in preventing the Covid crisis.

TABLE 5: DIFFERENCE IN DIFFERENCES ESTIMATES

	Growth Rate of Total Deaths (per million)		*Growth Rate of New Cases (per million)*	
VARIABLES	(1)	(2)	(3)	(4)
Democracy Score	0.0002***	0.00002	0.00003	0.001
	(0.00004)	(0.0001)	(0.001)	(0.002)
Wave Dummy	0.003	-0.006	-0.010	-0.104
	(0.004)	(0.009)	(0.059)	(0.141)
Tests Per Case		0.003***		0.001
		(0.0005)		(0.008)
Total Vaccination per 100		0.001***		0.004
		(0.0001)		(0.002)
People Fully Vaccinated per 100		-0.001***		-0.007
		(0.0003)		(0.005)
GDP per capita		0.000		0.000
		(0.000)		(0.000)
Human Development Index		-0.054**		0.403
		(0.024)		(0.390)
Population Density		0.00001		0.00003
		(0.00001)		(0.0001)
Wave Dummy * Democracy Score	-0.0001*	0.0001	0.0003	0.002
	(0.0001)	(0.0001)	(0.001)	(0.002)
Constant	0.011***	0.022	-0.001	-0.328
	(0.003)	(0.017)	(0.040)	(0.278)
R^2	0.001	0.013	0.00002	0.002
Adjusted R^2	0.001	0.011	-0.0001	0.001

***, ** and * indicate significance at 1, 5, and 10 per cent respectively. The table reports coefficients of the variables. Brackets contain the standard errors.

4.5 Conclusion

On the basis of the above results, one can say that the checks and the balances that democracies put have indeed yielded results in the form of lower growth rate of TDPM in democracies vis-`a-vis autocracies. However, as far as the growth in new cases per million is concerned, the advantages to democracies as compared to autocracies have been blunt. Moreover, no regime seemed to have improved its performance better than the other, as far as comparison between first and second wave is concerned. Presently, there is a huge debate going on in the sphere of political science regarding why the advantages that democracies had in earlier times have become blunt since the start of this century. The control over information systems have weakened the check and balance systems in democracies. However, the advantages have not yet clearly vanished and better functioning democracies still have significantly better outcomes.

A major limitation of this study was the lack of data about the type of Covid variant that affected a country in a particular wave. As the transmission rate and fatality rate of the virus varied according to the variant, it is important to consider the same while analysing data about deaths and new cases. However, proper data about variant of virus in each country, in each wave was not available. Moreover,

we suspect huge under reporting of figures of deaths and new cases. It is not difficult to think about such under reporting being done by autocracies. This, if true, would firstly, strengthen our results that find democracies having lower growth in TDPM and perhaps make the other insignificant results, significantly in favor of democracies. Again, recent row created by certain democratic countries denying WHO's estimates of death rates, raises doubts about truthful reporting by democracies as well but, nothing concrete regarding this can be said until more refined estimates estimates are available.

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