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Institutional and cultural determinants of speed of government responses during COVID-19 pandemic

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This article examines institutional and cultural determinants of the speed of government responses during the COVID-19 pandemic. We define the speed as the marginal rate of stringency index change. Based on cross-country data, we find that collectivism is associated with higher speed of government response. We also find a moderating role of trust in government, i.e., the association of individualism-collectivism on speed is stronger in countries with higher levels of trust in government. We do not find significant predictive power of democracy, media freedom and power distance on the speed of government responses.

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Introduction

The global outbreak of COVID-19 presents an unprecedented challenge for government performance and governance in general. Regardless of their economic and social conditions, almost all countries in the world were affected by the outbreak. Government responses varied in many ways. One of the most obvious differences was in the degree to which the various activities of the citizens were restricted. Examples of restrictions include school closures, travel restrictions and closure of shops and restaurants. Given that all countries were affected by the same pandemic, this situation essentially resembles a natural experiment, which allows us to study what determines different government responses.

While for "routine" crises, established government responses typically exist, the COVID-19 pandemic was a "novel" crisis (Schwartz, 2012): most countries never experienced such a severe pandemic to draw lessons from, perhaps with the exception of a few countries that have been affected by other, more localized outbreaks like SARS. Additionally, preventive measures to curb the spread of the disease inevitably have negative side effects on personal freedom, on the economy, and on the well-being of the population as a whole. Thus, governments were faced with difficult trade-offs, having to consider the expected preferences of their citizens at the same time as communicating to the public the priority of health over other considerations (Michie, 2020)

In our article, we focus on cultural and institutional predictors of government responsiveness during the world-wide spread of COVID-19. We define the measure of speed as the marginal rate of stringency index change by using the data from the Oxford COVID-19 Government Response Tracker (Hale et al., 2020). We find that on average, governments reacted faster in countries with stronger collectivistic culture. The data also reveals an interaction effect between collectivism and trust: The relation between collectivism and government responsiveness tends to be stronger in countries with higher levels of trust in government. We do not find significant predictive power of democracy, press freedom and power distance on speed of government responses.

Our paper is structured as follows: After a literature review in section "Literature review", we present our data and methodology in section "Data, variable, and methods." Section "Results" presents the results of our research, which we critically discuss in Section "Conclusion and Discussion." Section 5 concludes.

Literature review

Institutional factors: democracy and media freedom. Democracy and media freedom can play an interesting and somewhat ambiguous role when dealing with a novel crisis. On the one hand, democratically accountable rulers are motivated to react more quickly in order to win public support and to stay in government. There is, therefore, evidence that public health policy interventions are better in democracies (Besley and Kudamatsu, 2006), and the initial downplay of the COVID-19 outbreak in Wuhan by local governments is an example of what could go wrong in a system without democracy and media freedom. On the other hand, democratic governments need to counterbalance different interest groups and involve multiple jurisdictions and policy makers. It is possible that such democratic processes can prove to be less effective in responding to a serious novel national health crisis such as COVID-19.

COVID-19 has indeed (re)ignited public and scholarly debates on the effectiveness of democracy in crisis management (e.g., Kavanagh and Singh, 2020). In the context of government responses to SARS in 2002, Schwartz (2012) argued that there is an "authoritarian advantage" with "*centralized decision-making powers*, *public support for government initiatives*, and *government ability to shape the tone of the crisis in the mass media*" (p. 315). The fast-growing number of studies on democracy and COVID-19 offer a mixed picture: Some studies document harsher lockdown measures by countries with an autocratic past (Trein, 2020) and less effective responses by democratic countries in the early stage (Cepaluni et al., 2020). Interestingly, Sebhatu et al. (2020) find that, in more democratic countries, governments are slower to initiate restrictive policies, such as lockdowns and school closures, but they follow the policies of their neighbors. In contrast, Cronert finds that more democratic governments tend to shut down schools earlier (Cronert, 2020), and Bol et al. (2020) find that lockdown decisions actually led to *increased* support for democratic governments by voters, thus posing an incentive for proactivity.

The advantages and disadvantages with respect to governance under democratic vs. authoritarian regimes are reflected in the tradeoff of decision-making processes and the fulfillment of responsibilities to voters. As mentioned above, the advantage of autocracy lies in its decisive power and rapid resolutions without resorting to the majority support from the public and interest groups, but an autocratic government may lack the motivation to act in the interest of the public due to the absence of democratic accountability mechanisms. In comparison, the democratic government may presumably be more motivated to act in the interest of the public for the sake of its legitimacy. However, when there is a lack of consensus in the public regarding the best solutions, it is more difficult to decide quickly, and efficiency is compromised.

In an ideal democratic system, a free media plays a key role in informing the public about government behavior (Besley and Burgess, 2002). Besley and Dray (2020) document that a free media increases the government responsiveness, as well as public compliance when deaths rates increase. Press freedom is essential to mitigate information asymmetry between the government and the public. Lack of free media and information transparency will be a hurdle for the public in monitoring government performance, resulting in sluggish government responses. On the other hand, free media will naturally have more diverse opinions and critiques of public policies, which may make politicians hesitate to react too quickly. Thus, similarly to democracy, the relationship between free media and speed of government responses is not totally unambiguous. Therefore, we explore empirically the predictive power of democracy and press freedom on government responsiveness without any clear-cut ex-ante hypotheses.

Cultural factors: individualism and power distance. We focus on two cultural dimensions from Hofstede (2001): Individualism and Power Distance. The reason is that individualism-collectivism cultural dimension reflects the tradeoff one must make between self-interests and collective interests, whereas power distance dimension reflects the attitudes towards authorities, such as government. Both aspects are important in determining public attitudes toward stringency policies during the pandemic.

In individualistic societies, personal freedom and privacy are highly valued (Hofstede, 2001; Markus and Kitayama, 1991). If a public policy maximizes collective benefits but simultaneously restricts personal freedom, it would encounter more resistance in an individualistic society as compared to a collectivistic society. In the case of COVID-19, the restrictions, such as closure of schools and public transport, canceling public events, and even lockdowns, will certainly reduce personal freedom and privacy (Ferguson et al., 2020). In an individualistic society, people tend to be more reluctant to sacrifice personal freedom to reduce

public health risk. Therefore, we can infer that in an individualistic society, the infection rate and death rate are significantly higher, which is in line with the finding that individualism is significantly associated with higher epidemic infection rates and mortality (Cao et al., 2020; Gokmen et al., 2021; Wang et al., 2021). In comparison, in a society with a high degree of collectivism, people are less tolerant of deviant behavior and are more willing to sacrifice personal freedom for the sake of collective benefits (An and Tang, 2020; Hofstede, 2001; Porcher, 2019).

Power distance reflects societal attitudes towards inequality. It reflects to some extent the perception of whether authorities tend to make decisions in an autocratic or persuasive/paternalistic style (Hofstede, 2001). A higher level of power distance could make it easier for a government to introduce stringent measures without worrying too much about compliance and resistance.

A casual look at countries such as the US and Sweden (high individualism and low-power distance), which are low in speed and proactivity as compared to countries like China or Taiwan [1] (low individualism and higher power distance) makes both relationships plausible. In general, we expect governments would react more quickly in countries with collectivistic culture and higher power distance.

Trust in government. Public trust in governments is essential to policy implementations (Fukuyama, 1995), because it helps to build a "social consensus" that is necessary to support any policy reforms (Berggren and Bjornskov, 2017; Goldsmith, 2005; Heinemann and Tanz, 2008). In particular, we expect trust to serve a moderating role between culture and government responsiveness. When public trust in government is low, the government would be less sensitive or less motivated to cater to the cultural orientation of their people. As a result, we should observe a weaker impact of culture on policy reaction in countries with low political trust. In comparison, in societies with high political trust, the policy makers will cater to the citizens' cultural orientation, which implies that in countries with collectivistic culture and higher power distance, the government will be able to react even more quickly because they expect less resistance from the public, whereas in countries with individualistic culture and lower power distance, the government will be more hesitant to constrain the freedom of citizens by imposing stringent measures. As anecdotal evidence, we could observe that during the COVID-19 pandemic, in areas with high government trust/high individualism such as Switzerland and Sweden, the government tends to refrain from proactive stringent intervention measures, whereas in societies with high collectivism and high government trust, such as Taiwan, Vietnam and China, the government tends to adopt proactive strict regulations, even though these countries are very different in terms of their political regimes.

Data and Variable definitions

Data source

GV (The Government Stringency Index). In order to assess the responsiveness of government restrictions, we take the Oxford COVID-19 stringency index (Hale et al., 2020) from 2020/1/1 to 2020/4/30. The Oxford COVID-19 Government Response Stringency Index (from here on simply "stringency index") is a composite measure tracking policy on school closures, workplace closures, canceling public events, restrictions on gatherings, closing public transport, travel bans and other similar restrictions. Depending on the intensity of the above restrictions in each country, the Oxford COVID-19 Government Response Tracker (OxCGRT) scores 0-4 for every restriction, where zero means recommended restriction but four means mandatory restriction. After converting these restrictions into ordinal values, each value is adjusted according to the maximum value, and converted into a score between 0-100, and then the average score of these restrictions is calculated as the government stringency index[2].

Variable definitions

Dependent variable: stringency speed. The government stringency index obtained from OxCGRT can only reflect the intensity of a government's policy at a certain moment, but not how quickly

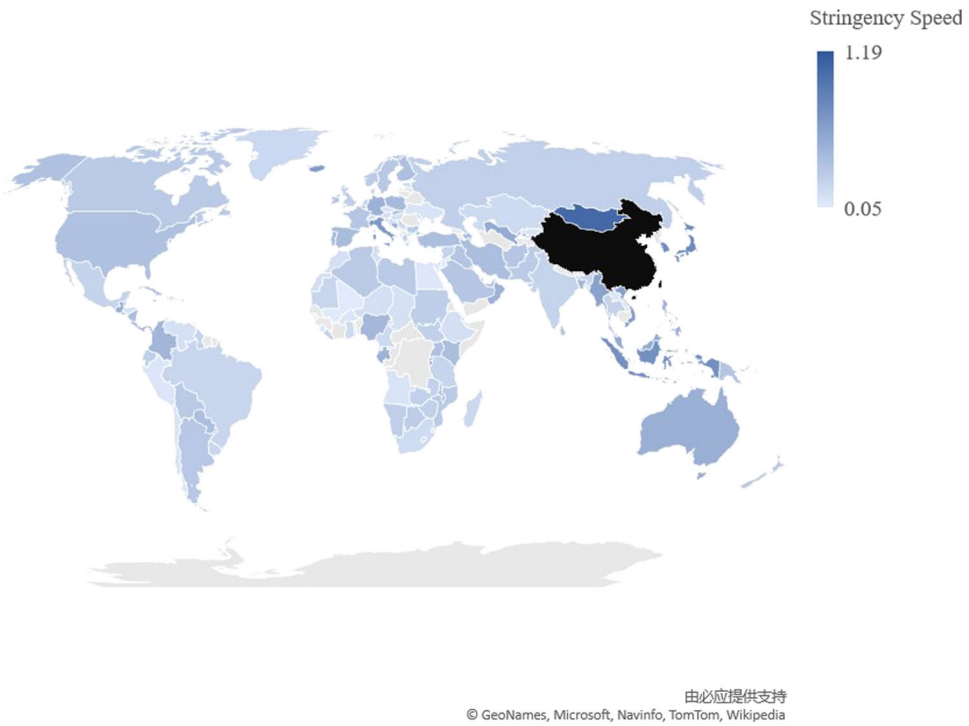

Fig. 1 Stringency speed around the world.

and proactively the stringency policies are introduced. Therefore, we construct a measurement of Stringency Speed to calculate the speed of government stringency. It is defined as the marginal rate of change of stringency index.[3]

$$\mathrm{SP} = \frac{1}{T-s+1}\sum_{t=s}^{T}\frac{\mathrm{GV}_t - \mathrm{GV}_s}{(\mathrm{GV}_T - \mathrm{GV}_s)\cdot(t-s+1)}\cdot 100$$

where GV_t is the government stringency index at time t, GV_s is its value on 2020/1/1, GV_T is the maximum value. The purpose of the term $\mathrm{GV}_T - \mathrm{GV}_s$ is to standardize GV_t. We take the $(\mathrm{GV}_t - \mathrm{GV}_s)/\ [(\mathrm{GV}_T - \mathrm{GV}_s)\cdot(t\text{-}s+1)]$ as marginal rate of stringency index change, multiplying it by 100 times to avoid the value being too small. Higher values correspond to faster government response.

Figure 1 is a world map of the Stringency Speed. As China and Taiwan have a much higher value than the rest of the world, we distinguish them with a black color. Overall, the highest values of *stringency speed* can be found in East and Southeast Asia. Italy and Germany are the highest in Europe.

In addition, we have constructed an alternative proactivity measure (PRO) as a robustness test. Proactivity is defined as the average stringency from the start of stringency index to its maximum between 2020/1/1 and 2020/4/30.[4]

$$\mathrm{PRO} = \frac{\sum_{t=0}^{T_s}\mathrm{GV}(t)}{T_s}$$

where $\mathrm{GV}(t)$ is the government stringency index at time t. T_s is the time that the government stringency reaches its maximum value from 1/1 to 4/30 in the corresponding country. In other words, it is the average value from the start of the stringency index to its maximum. Higher value corresponds to a more proactive tendency of the government when imposing stringency policies.

This alternative measurement is correlated with the measure of speed ($r = 0.69$, $p < 0.01$, Table 1 in Supplementary Appendix B). The general results remain robust with this proactivity measure (Supplementary Appendix B). We will focus on the speed measure in the following analysis.

Institutional variables. ***Democracy.*** The *democracy* index is taken from Economist Intelligence Unit (Unit, 2020). It is based on sixty indicators grouped in five categories, measuring electoral process and pluralism; civil liberties; the functioning of government; political participation; and political culture.

Press freedom. The *press freedom* index is compiled and reported by Reporters without Borders (Borders, 2020). It is an annual ranking that assesses the degree of press freedom based on six general criteria; pluralism, media independence, environment and self-censorship, legislative framework, transparency, and infrastructure.

Cultural variables. ***Individualism.*** *The individualism index* comes from a cross-country survey by Geert Hofstede (Hofstede, 2001). The individualism vs. collectivism dimension reflects the degree to which individuals are integrated into groups, as well as their perceived obligations and dependence on groups. Personal value is more emphasized in individualistic societies, whereas commitments to groups are more important in collectivistic societies.

Power distance index. This index has also been measured by Hofstede (2001). It describes how hierarchical a society is. The power distance index (Hofstede, 1980, 2001) is the extent to which a society accepts the fact that power in institutions and organizations is distributed unequally. The larger the power distance index, the stronger the tendency of the society to accept inequality and difference between those with power and higher status vs. those without.

Moderator. ***Government trust.*** Previous studies have defined political trust as citizens' belief or confidence that the political system will work to produce outcomes consistent with their expectations, including army forces, courts, government, the civil service, parliaments and the political parties (Newton, 2001). In the case of the COVID-19 pandemic, the restrictions were almost exclusively imposed by governments. Therefore, we use the variable *Government Trust* as measured in the World Value Survey (Association, 2014), which included about 300,000 respondents from 100 countries. The variable *Government Trust* was defined as the percentage of the answers "A great deal of confidence for government" and "Quite a lot of confidence for government" by country level.

Table 1 Variable definitions.

Code	Name	Data source	Definition
Dependent Variable	*Stringency speed*	Hale et al. (2020)	Equation (1)
Institutional variables	*Democracy*	Economist Intelligence Unit (Unit, 2020)	Based on five categories: electoral process and pluralism; civil liberties; the functioning of government; political participation; and political culture.
	Press freedom	Reporters Without Borders (Borders, 2020)	Based on six general criteria: pluralism, media independence, environment and self-censorship, legislative framework, transparency and infrastructure. The higher the index, the more press freedom
Cultural Variables	*Individualism*	Hofstede (2001)	See Hofstede (Hofstede, 2001)
	Power Distance	Hofstede (2001)	See Hofstede (Hofstede, 2001)
Moderator	*Government trust*	World Values Survey Association (Association, 2014)	The percentage of answers "A great deal of confidence for government" and "Quiet a lot of confidence for government" by country.
Control variables	*Ln (GDP/Cap)*	World Bank (Bank, 2020)	The natural log of GDP per capita
	Ln (Population)	World Bank (Bank, 2020)	The natural log of population
	Healthcare Access and Quality Index (HAQ)	Fullman et al. (2018)	The higher the index, the higher medical quality
	Ln (first case)	Johns Hopkins University (University, 2020)	The natural log of the number of days from 2020/1/1 to the day of the first confirmed COVID-19 case
	Ln (first death)	Johns Hopkins University (University, 2020)	The natural log of the number of days from 2020/1/1 to the day of the first COVID-19 death

Table 2 Summary statistics.

Variable	mean	median	Std. dev.	min	max	N
Stringency speed	0.3	0.3	0.3	0.1	2.1	152
Healthcare Access and Quality Index (HAQ)	64.5	68	21.5	25	97	152
Press freedom	65.6	68.6	15.2	21.5	92.2	152
Power distance	64.6	68.5	20.9	11	100	98
Individualism	37.6	30	22.1	6	91	98
Democracy	5.8	6.3	2.2	1.1	9.9	152
Ln (GDP/Cap)	9.6	9.7	1.2	5.5	11.8	152
Ln (Population)	16.1	16.2	1.9	10.4	21.1	152
Ln (first case)	4.1	4.2	0.5	0	4.8	152
Ln (first death)	4.4	4.4	0.3	2.4	4.8	152
Government trust	47.8	46.9	18.8	12.6	98.1	87

Table 3 Pearson's correlation of democracy and individualism with stringency speed of specific policies.

Government restrictions	Democracy	Individualism
School closing	−0.039	−0.228**
Workplace closing	−0.018	−0.097
Canceling public events	−0.052	−0.093
Restrictions on gathering	−0.035	0.001
Close public transport	−0.287***	−0.326***
Staying at home	−0.124	−0.103

***, **, and * indicate significance levels below 1%, 5%, and 10% levels (two-tail tests), respectively. We omit other subindexes (domestic travel ban, international travel ban, public information campaign, testing policy, and contact tracing) because they are less comparable across countries. Speed is measured as marginal rate of stringency change based on Stringency Index by Hale et al. (2020).

Control variables. This paper focuses on the proactivity and speed of government policy implementation during the pandemic, and is conceptually similar to previous research on policy reforms. Previous literature suggests that the economic development level and population size are directly related to the effectiveness of policy reforms (Giuliano et al., 2013; Gokmen et al., 2018). Therefore, we control for the country wealth level and population size.

We have also controlled for the level of medical care in the region and the severity of infectious diseases in the region (Stojkoski et al., 2020). See Table 1 for specific variable definitions.

Results

Descriptive statistics. Table 2 presents the descriptive statistics on the *Stringency Speed* and other variables related to institutions, culture, socio-economic conditions, and pandemic situations. The mean value of the *Stringency Speed* is 0.3 with the standard deviation of 0.3, showing a large variation of government reactiveness across countries, as also shown in the world map of the stringency speed (Fig. 1). We also report the Pearson correlation between variables in Supplementary Appendix B Table 1.

Democracy, individualism, and specific restriction policies. Before conducting the analysis based on the aggregate stringency measure, we would like to take a closer look at the differences in terms of specific policy responses. Table 3 shows that democratic and individualistic countries tend to be slower in closing public transport. In addition, individualistic countries also tend to be slower in closing schools. This is the first hint that governments in democratic regimes and individualistic societies do indeed hesitate more in introducing restrictions that have more impacts on individual freedom and mobilities, as discussed in the introduction. It also shows that individualism vs. collectivism culture seems to have even more impacts as compared to democracy vs. autocratic regimes. In the following, we will conduct more systematic analysis on institutional and cultural predictors of government responsiveness with controlling for other country-level variables, such as GDP/cap, health care quality, and so on.

Regression results on institutional and cultural factors

Democracy and press freedom. Table 4 shows that democracy and press freedom are not significant in predicting *Stringency Speed* (columns 2, 4, and 5). The lack of significant predictive power of these two variables seems to reflect the paradoxical functions of democratic regimes and media freedom in management of novel crises such as the COVID-19 pandemic, as discussed in the introduction.

Individualism and power distance. Individualism is significant all regression models in Table 4 (columns 3, 4, and 5). Consistent with our expectations, the countries with stronger individualistic orientation tend to be slower in stringency measures. Power distance, however, is not significant in predicting stringency speed. Interestingly, above results can explain the statistical results of Gokmen et al. (2021) and Wang et al. (2021). Both Gokmen et al. (2021) and Wang et al. (2021) found that individualistic culture is significantly related to epidemic control, while indulgence (IVR) and power distance index (PDI) do not seem to be significantly relevant. We think that it is more likely that individualism is closely related to government stringency speed.

Some of our findings might also have been caused by differences in previous experience with severe pandemics (or epidemics). It has been argued, for example, that South Korea was able to manage the pandemic relatively well due to its ability to apply the lessons learned during the MERS outbreak in South Korea in 2015 (Moon, 2020). As a robustness test, we have, therefore, repeated the above analyses and added a dummy variable set equal to 1 for all countries with confirmed deaths from the SARS (SARSCoV-1), Ebola or MERS epidemics. While this dummy variable was not statistically significant in our model, all other variables of interest remained basically unchanged in their significance. In particular, the results confirmed once more the significant predictive power of individualism (detailed results on request).

The interaction effect of government trust and individualism. Further analysis reveals an interesting interaction effect of government trust and individualism, as shown in the last column of Table 4. The moderating relationship of government trust is more clearly illustrated in Fig. 2, which shows that individualistic culture slows down the government reaction, but the difference of stringency speed between individualistic and collectivistic country is more pronounced in countries with high government trust. This is in line with our expectation that governments enjoying higher public trust are more likely to cater to their citizens' cultural orientation. Therefore, the governments with higher trust in individualistic societies are even more hesitant to introduce strict policies proactively due to the concern of the potential resistance.

The relation between government stringency speed and COVID19 deaths/cases. The ultimate policy question is: does speedy introduction of stringency policies help to reduce public health risk in such a pandemic? Our analysis suggests that the answer is that it depends on the political trust and culture orientations of their citizens. We use the total confirmed cases

Table 4 Regression results on stringency speed.

Variable	(1)	(2)	(3)	(4)	(5)
	Stringency speed				
Individualism			−0.0075** (−2.036)	−0.0076* (−1.994)	−0.0095** (−2.340)
Government trust	−0.0009 (−0.349)	−0.0010 (−0.394)	−0.0006 (−0.244)	−0.0004 (−0.158)	0.0019 (0.395)
*Individualism*Government trust*					−0.0002** (−2.661)
Power distance			−0.0029 (−1.076)	−0.0021 (−0.906)	−0.0028 (−1.176)
Democracy		0.0141 (0.458)		0.0157 (0.576)	0.0148 (0.541)
Press freedom		−0.0009 (−0.207)		0.0008 (0.163)	−0.0015 (−0.701)
Ln (GDP/Cap)	0.1018 (1.661)	0.0902 (1.505)	0.1473** (2.246)	0.1255** (2.079)	0.1266** (2.091)
Ln (Population)	−0.0367 (−1.399)	−0.0396 (−1.368)	0.0128 (0.458)	0.0164 (0.497)	0.0155 (0.493)
HAQ	−0.0036 (−1.089)	−0.0034 (−1.015)	0.0000 (0.012)	0.0010 (0.272)	0.0010 (0.268)
Ln (Conficases)	−0.1896* (−1.759)	−0.1881* (−1.726)	−0.1210 (−1.097)	−0.1202 (−1.094)	−0.0889 (−0.850)
Ln (Deaths)	−0.2614 (−1.585)	−0.2606 (−1.526)	−0.2742* (−1.771)	−0.2697 (−1.656)	−0.2921* (−1.985)
Constant	2.0333** (2.451)	2.1453** (2.303)	0.7797 (0.864)	0.6143 (0.589)	0.6783 (0.658)
Continent effect	Yes	Yes	Yes	Yes	Yes
Observations	71	71	71	71	71
R-squared	0.527	0.528	0.593	0.599	0.625
F	12.48	15.67	15.55	14.12	13.68

All *t*-values in parentheses are adjusted by robust standard errors.
***, **, and * indicate significance levels below 1%, 5%, and 10% levels (two-tail tests), respectively.

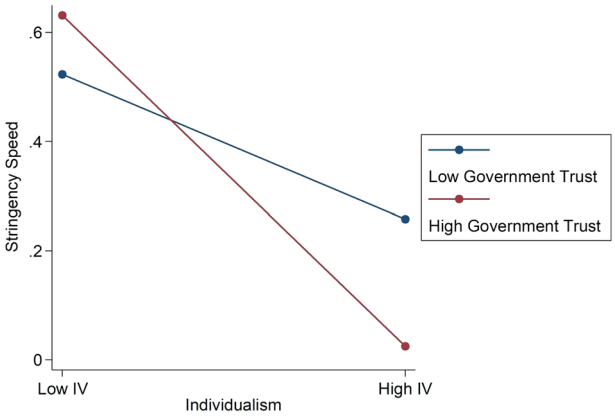

Fig. 2 Interaction effect of government trust and individualism on stringency speed.

(Total Case/M POP) and total death cases (Death Case/M pop) per million people in each region as of January 10, 2021 as proxies of performance. We divide the sample into four groups according to the median of *individualism* and *government trust*: countries with high government trust and high individualism (H_Trust/H_Indiv), low government trust and low individualism (L_Trust/L_Indiv), low government trust and high individualism (L_Trust/H_Indiv), and high government trust and low individualism area (H_Trust/L_Indiv). As shown in the first model of Table 5, generally speaking, the faster the stringency speed, the less casualties and confirmed cases around 1 year after the first outbreak in Wuhan. The pattern, however, differ in the four subgroups. More specifically, the stringency speed is significantly related to COVID-19 death rates and confirmed cases in collectivistic countries, regardless of government trust levels. Speedy stringency measures are also highly correlated with less casualties in individualistic countries with high trust, albeit not in reducing total cases (which is potentially due to more testing, which is also part of stringency measures). Unfortunately, in countries with low trust and high individualism, the speed of stringency policies is not related to death and confirmed cases at all.

Although our results show associations of the government stringency speed and lower infection rate and mortality rate in some countries, these patterns are only suggestive and should be taken with caution due to the small sample size, especially for the even smaller subgroups. An et al. (2021) tested the effectiveness of government policy agility and found that most restrictive policies, such as domestic lockdowns, international travel bans and restaurant closures, have no obvious impact on reducing infection rates and mortality. Some intervention policies, such as mass gathering bans and school closures, turn out to be effective in the long-term. Only mask mandates exhibit a stronger and immediate association with lower new infection and mortality rates. Comparing with An et al. (2021), we can expect that the overall negative relationship between stringency speed with infection rate and mortality may be caused by a certain intervention policy. Therefore, governments could consider strengthening the agility of policy interventions, while relaxing less effective policy interventions.

Conclusion and discussion

Governments world-wide have reacted to the COVID-19 pandemic in very different ways. This does not mean that the actual measures aimed at containing the outbreak were fundamentally different, since the options to curb the spreading of the virus were quite limited after all: travel restrictions, social distancing rules, school closings, shop closings etc. The differences, however, were very pronounced when it comes to the timing and the intensity of the measures. In our article, we particularly focus on institutional and cultural factors influencing proactivity and speed of such government actions. The main results clearly showed that one cultural factor dominated: individualism. In countries with a higher level of individualism, government responses were slower and less proactive. This difference was more pronounced in countries with a higher level of general trust in government (measured prior to the pandemic). This helps us to understand the potential motivations and constraints underlying the government behavior.

There are, of course, still many open questions left, e.g., differences in compliance with governments' policies (see e.g., Durante and Gulino (2020); Rieger (2020b, a); Rieger and Wang, (2020a)). Although we did not directly study compliance behavior

Table 5 Impact of the stringency speed on casualties and confirmed cases.

	Panel (A) Death rate				
	All	**H_Trust/H_Indiv**	**L_Trust/H_Indiv**	**H_Trust/L_Indiv**	**L_Trust/L_Indiv**
Stringency speed	−2.4294*** (−5.872)	−3.7394*** (−3.077)	1.2345 (0.878)	−2.8111*** (−4.978)	−2.5359** (−2.782)
Ln (GDP/Cap)	0.4933** (2.371)	0.5775 (1.641)	2.0649 (1.333)	0.3550 (1.302)	0.9960 (1.611)
HAQ	−0.0037 (−0.286)	−0.0235 (−0.877)	−0.0649 (−0.805)	0.0091 (0.384)	−0.0015 (−0.048)
Continent effect	Yes	Yes	Yes	Yes	Yes
Constant	2.3575* (1.696)	3.1579 (1.677)	−9.7818 (−0.925)	3.0691 (1.546)	−2.7545 (−0.567)
Observations	150	55	24	42	28
R-squared	0.563	0.573	0.676	0.595	0.707
F	43.31		8.121	13.16	54.06
	Panel (B) Confirmed cases				
Stringency speed	−2.8038*** (−5.400)	−1.9020 (−1.034)	−0.4564 (−0.479)	−3.4543*** (−5.590)	−2.9698*** (−3.269)
Ln (GDP/Cap)	0.6042*** (2.891)	0.4750 (1.344)	1.0713 (1.119)	1.1013*** (3.650)	0.7125 (1.378)
HAQ	0.0131 (0.853)	0.0215 (0.597)	−0.0244 (−0.435)	0.0023 (0.103)	0.0153 (0.529)
Continent effect	Yes	Yes	Yes	Yes	Yes
Constant	3.8521*** (2.822)	3.9773 (1.629)	1.5721 (0.262)	−0.0721 (−0.030)	2.7895 (0.713)
Observations	152	57	24	42	28
R-squared	0.577	0.523	0.780	0.602	0.717
F	59.05		15.82	8.210	62.56

In order to reduce the validity deviation caused by heteroscedasticity, all *t*-values in parentheses are adjusted by robust standard errors.
***, **, and * indicate significance levels below 1%, 5%, and 10% levels (two-tail tests), respectively. The dependent variables have been processed logarithmically to avoid the influence of the right skewed distribution of the sample. Stringency speed is the policy response speed of the local government as of April 30th, 2020, while the explained variable refers to the region as of January 10, 2021, ~1 year after the first outbreak in Wuhan, China. Also, due to the sample size is smaller. The observation is even <30 in some groups, which weakened the statistical validity. Thus, the regression result is only inter-group difference within the sample. We do not know whether the above inferences still exist in a broader sample.

in the current study, we find that stringency speed has no impact in terms of reducing deaths and infected cases in countries with high individualism and low trust. This has important policy implications. In such countries, it is important to promote more collective culture and/or increase the public confidence in government, although both are not easy to change in the short term.

Another important policy implication from our study is that although governments with individualistic culture and high trust seem to be more reluctant to introduce speedy constraints, the faster reaction seems to be more impactful in such countries in reducing deaths. This seemingly paradoxical but intriguing result requires further investigation. A potential explanation is that the slow reaction from the government can be induced by the government's respect to individual freedom and human right, especially in a high-trust society, as discussed before. The stronger impacts of stringency policy in reducing death rates, however, might be an indicator of the general governance competence in these societies. To put it in another way, it is conceivable that maintaining high level of government trust is more demanding in individualistic and heterogenous societies than in collectivistic societies: there are more different opinions and preferences to consider, and there will likely be more criticism raised towards political decisions. As a result, a government that managed to win the public trust in individualistic societies tend to be more competent, which could explain the high effectiveness of stringency policies in reducing death rates. Our result implies that governments in those countries, e.g., some West European countries, should have actually taken a more paternalist approach and should have reacted as quickly as possible.

Since public trust is also formed dynamically based on the performance of government, the confidence in government tends to be reduced when government reactions are perceived as insufficient, as suggested by a survey conducted by (Rieger and Wang, 2020b). Therefore, a government of a country with higher public trust should not cater blindly to individualism when managing a crisis like COVID-19, where fast responses are crucial in reducing risk.

While the COVID-19 pandemic is certainly an extraordinary situation, we expect our results to carry over to other "novel" crises (Schwartz, 2012). To test the validity of our results in other such crises would be an interesting task for future research. Our analysis focused on only two cultural dimensions, individualisms and power distance. Future studies can also explore how other cultural dimensions (e.g., uncertainty avoidance and long-term orientation) influence policy responses. More importantly, the underlying mechanisms of how citizens in different cultures react and comply with government restrictions is not well understood from our study, and calls for further investigations. One fruitful avenue is to link national culture data to individual-level survey data from different countries (for a different context, see (Wang et al., 2016)). For example, in the latest study, Lu et al. (2021) verified the causal relationship between collectivist culture and individuals' willingness to wear masks by using county surveys, state survey of United States, and cross-country survey data. Their results showed that in more collectivistic areas, individuals are more likely to wear masks, most likely because they are more concerned with public welfare; by contrast, people in more individualistic regions are more apt to prioritize their personal convenience or preference over the collective welfare, and therefore were shown to wear masks less. Lu et al. (2021) results therefore fit very well to our findings.

One limitation of our study lies in the cross-sectional research design, which poses difficulties to identify the causal effect of the cultural and institutional characteristics on government responsiveness. The government stringency policy is more dynamic in nature, whereas the cultural and institutional features are comparably more static. The interaction between these aspects deserves further studies. Moreover, it could be argued that the underlying government stringency measure is a rather rough construct that ignores many finer details that others have very recently tried to capture (Curley and Federman, 2020). These new measures, however, do not cover a broad range of international countries, thus it is not possible to apply them to our study. One could also debate about the best way to define speed of government action during the crisis, but we believe that our constructed proxies of stringency speed allow us to compare policy responsiveness internationally in a meaningful way, as well as to analyze empirically its antecedents and consequences.

Data avaliability

The datasets analyzed during the current study are not publicly available due to the use of the interviews in other contexts but are available from the corresponding author on reasonable request. Of course, we have also published the core variables data of the 152 countries in Supplementary Appendix A.

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Notes

1 Taiwan is here a particularly interesting example, since it is a democratic country (like Sweden and the US). Compare Huang (Huang, 2020) for details about the handling of the COVID-19 pandemic in Taiwan.
2 Measurement refinements of this index are possible and indeed there is quite some research in this direction (e.g.,(Curley and Federman, 2020)), but up to now the dataset by Hale et al. (2020) is the most comprehensive.
3 SP (stringency speed) is defined as follows:
4 Proactivity (PRO) is defined as follows:

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Additional information

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