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State capacity during crisis: exploring varieties of state capacity in the COVID-19 pandemic

Paula D. Ganga [a] and Caress Schenk [b]

ABSTRACT

This article examines coercive state responses during the coronavirus disease 2019 (COVID-19) pandemic as one option among several types of state capacity that may be mobilised in times of crisis. While states respond to crises with their available capacity, strategies change over time, especially as deploying coercive capacities can be costly. We use variables from the CoronaNet Research Project, an original dataset of over 170,000 policy entries from 195 countries, including nearly 26,000 policies on Russia, to show timing and substitution effects where different types of state capacity were leveraged in different policy arenas and at different times in the pandemic.

KEYWORDS

State capacity; COVID-19 pandemic; coercion; territory; governance; Russian federation; policymaking

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H12; I18; F59; F68

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1. INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic offers an opportunity to evaluate the crisis responses of states across the globe. The unprecedentedly unified initial global response to the existential threat of the pandemic provides a case like no other to examine the intricacies of state responses. Many discussions about the potential for state overreach paralleled ideas on the use of emergency powers or the Schmittian state of exception or as a habituation to crisis, risk, and fear that continually evokes securitised responses (Agamben, 2021; Bauman, 2013; Beck, 1992). This article examines coercive responses simply as an option that may be more readily mobilised than under-resourced health systems. Especially early in the pandemic, when testing capacity was low, contact tracing was not well-coordinated and even masks were in short supply, states with coercive capacity could more readily mobilise these capacities in support of more intrusive policies such as school and business closures and stay-at-home orders. This article offers evidence for states exercising coercive capacity at the beginning of the pandemic. Yet, coercive policies are costly, not least because of their intrusive nature. We further demonstrate substitution effects where different types of capacity were leveraged in different policy arenas and at different times in the pandemic. In other words, while states respond to crises with the capacity they have available, strategies change over time.

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Drawing on insights from the crisis decision-making and climate change literature, we make an important contribution to the state capacity literature by suggesting that not only do states draw on different types of capacity but that they adapt their policy-making strategies by drawing on different types of capacity at different times.

In the following pages, we explore the current state of theory related to COVID-19 policy-making before turning to an empirical analysis that tests our assumptions about the impact of different types of state capacity on pandemic policies and outcomes. We first test our hypotheses using a cross-national dataset before turning to sub-national evidence from Russia. Leveraging sub-national analysis within one state allows us to press beyond cross-national assumptions by analysing with-case variation in a single country. Russia is a helpful case to disentangle assumptions about state capacity because it devolved pandemic decision-making to governors whose experience varied widely across the country. This case pulls against expectations that crisis decision-making becomes more centralised (Hermelin & Persson, 2022), especially in authoritarian settings (Cepaluni et al., 2022), thus bringing important territorial aspects into our study of politics and governance during the pandemic (Dodds et al., 2020).

2. SITUATING COVID-19 POLICY IN A STATE-CAPACITY FRAME

The question of how states justify policies that intrude on private life, and bear unequal consequences across the population, beginning with stay-at-home orders (Arunachalam & Halwai, 2020; Fairchild et al., 2020; Goldner Lang, 2023; Studdert & Hall, 2020) at times enforced by surveillance technologies such as geolocation apps (Bhatt et al., 2022; Boersma et al., 2022; Couch et al., 2020; Goode, 2021; Hendl et al., 2020; Kamra et al., 2023; Tan et al., 2022; Vergallo et al., 2021) and extending to vaccine or immunity passports (Brown et al., 2020; Wilford et al., 2021), evokes moral and ethical debates about the reach of the state. Explanations for COVID responses range from international diffusion (Sebhatu et al., 2020), psychological and institutional factors (Toshkov et al., 2022), and regime type (Cepaluni et al., 2022) to political ideology (Wang et al., 2021).

A particularly vibrant discussion has arisen around the effect of regime type on COVID-19 outcomes. Several studies argue that democracies were slow to respond because they were reluctant to pass policies encroaching on the rights and liberties of citizens, which resulted in more initial deaths (Cepaluni et al., 2022). Others posit that democracies are generally *more* responsive to those factors that affect citizens' well-being (Cronert & Hadenius, 2020). While regime-focused analyses inform current boundaries of political science categories, this article posits that these analyses fundamentally miss factors that transcend regime type. The logic of regime-focused studies often relegates decision-making in authoritarian regimes to various forms of non-deliberation, when in fact many authoritarian leaders are extremely sensitive to public opinion (Guriev & Treisman, 2022) even if the channels of state-society feedback are not those traditionally captured by traditional measures such as voting, free media, etc. (Teets, 2014; Tsai, 2007). Indeed, politics (or the struggle over legitimate decision-making, its implementation and effectiveness) occurs everywhere, in every type of regime and decision-making in times of crisis is inevitably political (Boin & 't Hart, 2012). During the pandemic, democratic and authoritarian leaders alike struggled to make policies that would balance the myriad political demands present in society and the costs that different types of decisions entail.

This article joins others that complicate the links between regime type and COVID outcomes, provide evidence of within-regime variation (Toshkov et al., 2022) and argue that the pandemic has reinforced pre-existing orientations within regimes (Greitens, 2020). Extending the logic that effective government performance, beyond regime type alone, has a demonstrable impact on COVID-19 outcomes (Chatterji et al., 2022), this article looks to state capacity as an appropriate explanatory framework for helping to disentangle how states rely on different

capacities (and the policy strategies that accompany them) at different times. We engage subnational data from Russia to further these insights, looking at state capacity within one political system that had territorially disparate outcomes during the COVID-19 pandemic.

State capacity approaches to the pandemic have looked at questions of control over healthcare systems and public administration (Cooray et al., 2020; Greer et al., 2020), policy capacity (Capano et al., 2020), fiscal and operational capacity (Woo, 2020), crisis management capacity (Toshkov et al., 2022), or overall quality/effectiveness (Chien & Lin, 2020; Serikbayeva et al., 2021). These measures reflect an interdisciplinary approach to measuring capacity, drawing from public health, public policy and, to a lesser degree, political science. Findings show that states with high emergency health preparedness were not necessarily the most successful in responding to the pandemic (Kavanagh & Singh, 2020), while those that imposed more restrictive/coercive policies showed better results, at least in the short term (Cepaluni et al., 2022; Sebhatu et al., 2020). Other studies look at community capacity to mobilise a social response to the pandemic (Hartley & Jarvis, 2020) and the interaction between local communities and state capacity during the pandemic (Fuentenebro, 2022; Opioła & Böhm, 2022; Pérez & Vina, 2022).

This article takes a more traditional political science approach to state capacity by rooting its analysis in disaggregated concepts of state function. We weigh coercive capacity, infrastructural capacity and information capacity to test whether there is a replacement or compensatory effect of types of state capacity.[1] Coercive capacity in the COVID-19 era serves the enforcement of intrusive individual and institutional policies such as lockdowns and school closures. Infrastructural capacity assesses the ability of the state to provide healthcare resources to its population. Information capacity demonstrates the ability of the state to collect and provide the public with accurate information. We take more traditional measures of each of these capacities alongside countries' COVID-19 policy responses to measure how initial capacity might impact policy decision-making. We then look at how the capacity-policy mix leads to health outcomes.

The role of coercive power and coercive institutions have long been seen as integral for state development and stability (Tilly, 1975). There are a variety of measures that capture the work of coercive institutions, including military personnel as a percentage of workers in the workforce; military spending per capita; government control over armed institutions, monopoly of violence; government autonomy/constraints on executives and the characteristics of state security forces (De Bruin, 2021; Fortin-Rittberger, 2016; Hendrix, 2010). However, to date, few studies have explicitly interrogated the role of coercive capacity on COVID policy decision-making and outcomes,[2] though some have focused on the role of emergency powers (Schmidt, 2022), policing (Stott et al., 2020) and surveillance (Greitens, 2020) during the pandemic, often focusing on security-related issues rather than explicitly state capacity.

Infrastructural capacity is conceptualised by Mann (1984) as the ability of state institutions to penetrate society, and is closely related to the capacity of states to deliver public goods (Tilly, 2007).[3] Some measures of administrative or infrastructural capacity focus on extractive outcomes, particularly through tax collection which has become a standard way of conceptualising state capacity (Fortin-Rittberger, 2016; Levi, 1988; Tilly, 1992).[4] Alternative measures include property rights, control over corruption and administrative function (Fortin-Rittberger, 2016). Healthcare is not often considered a measure of state capacity, likely in part because healthcare is not considered a public good in every country, reducing the comparative value of analysis. Nevertheless, healthcare capacity is an important contributor to vital statistics such as infant mortality rates (Brieba, 2018; Bustikova & Corduneanu-Huci, 2017). In the context of the COVID-19 crisis, we deem healthcare capacity an essential factor to consider. Healthcare capacity can be measured as healthcare workers or equipment (e.g., critical care beds) per 1000 people/per capita, and government healthcare expenditures as a % of gross domestic product (GDP) (Ma & Vervoort, 2020; Verelst et al., 2020)[5] or vaccination rates (Aminah & Susilo, 2021). To date, investigations into the impact of healthcare capacity on COVID outcomes are most often included

among numerous variables (Capano et al., 2020) though when it is singled out the findings suggest that increased health capacity can have a mitigating effect on COVID outcomes when attention is given to equitable distribution (Vadlamannati et al., 2021).

Recent studies have added measures of informational capacity to the discussion of state capacity (Brambor et al., 2020; Lee & Zhang, 2017) and we posit that it may be important in assessing COVID outcomes. Information capacity has more often been studied using administrative data such as censuses and statistical yearbooks.[6] Therefore information capacity is most often conceptualised as being able to accurately reflect in official data what is occurring within state borders, or as is sometimes argued by scholars of information capacity, making the population legible (drawing on the work of Scott). While most pandemic-related studies focusing on information tend to look at propaganda and misinformation, this is not the focus of information capacity.[7]

3. THE SUBNATIONAL DIMENSION OF STATE CAPACITY

The study of subnational state capacity offers important insights into how state capacity varies not only across types of capacity but also within countries spatially (Giraudy et al., 2019; Luna & Soifer, 2017) and temporally (Foa & Nemirovskaya, 2016). The small literature that analyses subnational factors as potential explanatory variables for pandemic-related outcomes, such as personal behaviours (Iverson & Barbier, 2021; Testa et al., 2021), local decision-making (Adeel et al., 2020; Bennouna et al., 2021; Liu et al., 2021), mortality risk (Hassan et al., 2020) and disease susceptibility (Macharia et al., 2020), does not explicitly engage concepts of state capacity though they demonstrate a rich empirical field ripe for theorisation.

While Russia generally scores low on general measures of state capacity (White, 2018), there is nascent literature that recognises subnational variation (Foa, 2022; Libman & Obydenkova, 2023; Ross et al., 2021; Victorova et al., 2020), building on a robust subnational scholarship that addresses variations in public opinion (Chmel et al., 2021; Rosenfeld, 2018), elite performance and selection (Demin et al., 2019; Ivanov & Petrov, 2021; Reuter & Robertson, 2012; Rochlitz et al., 2015), civil society (Salamon et al., 2020; Toepler et al., 2020), parties and elections (Panov & Ross, 2013; Saikkonen, 2016; Semenov, 2020), regime type (Obydenkova, 2008; Petrov & Titkov, 2013; Ross & Panov, 2019) and contentious politics (Dollbaum, 2020; Tertytchnaya & Lankina, 2020) across Russia's vast landscape. The substantial evidence for subnational variation in Russia on many measures pushes against flattened assumptions that come from studies that rely solely on national measures of state capacity and the idea that authoritarian regimes like Russia produce strongly centralised policy space. Taking up one case of an authoritarian system that is highly concerned with public opinion (Hale, 2011; Rosenfeld, 2018) and that has significant sub-national variation, is one way to further leverage the possibility that a state capacity framework can achieve greater nuance than a regime focus alone.

This article adds to the analysis of governance and politics in Russia during the pandemic (Kakaulina, 2021; Libman & Obydenkova, 2023; Sokhey, 2022) by explicitly engaging the subnational policymaking. In March 2020, President Putin created a federal Coronavirus Coordinating Council and directed all of Russia's 83 regions to establish committees to manage the pandemic at the regional level. By May, primary power and responsibility for the pandemic were officially devolved to regional governors. This only made official the fact that since the beginning of the pandemic regional governors had been actively passing policies, especially those related to closing businesses.

4. EXPECTATIONS

In light of both the global and subnational debate on how state capacity can impact state responses to crisis, we use the CoronaNet dataset to interrogate a variety of closely held

assumptions in the literature reviewed above. Firstly, we are interested in knowing whether states and sub-national units with high coercive capacity, all else being equal, will adopt more restrictive policies (lockdown, social distancing). We draw our expectations that coercive capacity will be more present at the beginning of the pandemic from the literature on crisis decision-making and securitisation, namely that the existential nature of the threat stemming from the pandemic demands the state act and the public will be more willing to accept intrusive restrictions in times of existential threat or crisis (Balzacq, 2014; Eriksson & Noreen, 2002). Additionally, we also examine whether possessing these coercive capabilities allowed these states to avoid worse pandemic outcomes such as more infections or deaths.

Our initial inquiry into coercive capacity has the primary purpose of laying down a baseline on which to investigate whether there is a substitution effect among types of capacity. Especially in the case of a health emergency such as COVID, we expect that higher infrastructural capacity and more robust infrastructural policies (health resources, testing) might result in fewer coercive policies and potentially more health monitoring and public awareness policies. In other words, a substitution effect between these policies both across countries and across time demonstrates that states can choose between policies that leverage their strengths and overall costs. Because coercive policies can be costly and unpopular (Levi, 1988; Tilly, 2007), we expect that where states can substitute coercive for other types of policies, they will. Indeed, normalising a crisis involves decreasing emergency responses and institutionalising a policy approach into more routine channels (Boin et al., 2016). We leverage our expectations to interrogate whether countries that adopt coercive measures in the initial stage of the pandemic are able to switch to more informational approaches as the crisis continues. While organisational and climate change studies suggest that the ability to adapt is integral to resilience (Engle, 2011; Somers, 2009), especially during crises (Bolton & Stolcis, 2008), state capacity studies do not yet conceptualise the potential for adaptive capacity to contribute to our understanding of overall state capacity. Therefore, findings that states adapted from coercive to more infrastructural and/or informational approaches during the pandemic have important implications for the study of state capacity with the potential to bring together insights from other literatures on governance (Janssen & Van der Voort, 2020). Finally, we also examine whether countries with high infrastructural, information and health capacity have better COVID outcomes and whether these change from early in the pandemic to later on.

We carry these important questions into our subnational analysis. If, within a relatively similar system of governance, we see various outcomes depending on the sub-national capacity of the various units as they battle the virus, we can find further robustness that coercive and other types of state capacities have a meaningful impact irrespective of regime type. Our expectations suggest that policy implementation will depend not only on the various forms of capacity available for the subnational units (richer regions might have more robust healthcare provision) but also on the timing during the pandemic. In both the subnational and the cross-national analysis we expect to find timing and substitution effects of capacity type in explaining policy provision during COVID-19.

5. DATA AND ANALYSIS

Our measures of state capacity include both a general measure of capacity as found in the literature (Hanson & Sigman, 2021)[8] as well as the main dimensions of capacity. In each case, we include the latest pre-pandemic measure available at the country-year level. For some recently measured variables this might mean data from 2019 but in some cases we will also rely on earlier data.[9] Coercive capacity is measured with various indicators of a state's ability to coerce such as military expenditures, military personnel per thousand persons and police officers per thousand persons, a measure of law and order in the society.[10]

When measuring infrastructural capacity, the literature traditionally includes variables focused on dimensions such as fiscal capacity, bureaucratic capacity and statistical capacity, and bureaucratic corruption. However, this category also includes health capacity measures such as the number of physicians or nurses and midwives per thousand people, the number of hospital beds per thousand people and government health expenditures as a percentage of the GDP (data from 2019 from the World Bank). As we are dealing with a medical emergency, the capacity of governments to provide medical care is more important than the collection of statistical data, therefore we focused our analyses on this measure.

Information capacity is measured using the information capacity indicator from Brambor included in the State Capacity Dataset of Hanson and Sigman (2021).[11]

The cross-national analysis looks both at policy types and policy timing using data from the CoronaNet Research Project, an original dataset of over 170,000 policy entries from 195 countries (Cheng et al., 2020; Kubinec et al., 2021). We include in the analysis all the broad categories of measures that states could adopt during the pandemic as indices coded from information collected by the CoronaNet Research Project and the Oxford COVID-19 Government Response Tracker (OxCGRT) in Kubinec et al. (2021). These specific categories include mask policies, health monitoring, health resources, social distancing, school restrictions and business restrictions.[12] We chose this data source because it contains the greatest amount of data in time, across and within countries.[13] Other pandemic policy trackers exist,[14] but Kubinec et al. (2021) have merged the most up-to-date available data to create a harmonised dataset of pandemic policies. Using a Bayesian time-varying measurement model, they capture the 'policy intensity of a country's government response to COVID-19 in a given policy domain' (Kubinec et al., 2021, p. 1). This allows them to combine data from various levels of aggregation – local and national policies – to get an overall daily index of policy intensity. The higher the score the higher the policy intensity.[15] While the scores are national, subnational[16] considerations are included in the creation of the policy indices.[17]

We also include time-invariant predictors that measure social, economic and political conditions prior to and during the pandemic at the country level measured yearly and quarterly. Yearly socio-economic and political data comes from the World Bank's World Development Indicators and Polity, whereas quarterly data comes from V-Dem's Pandemic Backsliding (PanDem) dataset (Edgell et al., 2020). These are also paired with data on COVID mortality, case numbers and recoveries from the JHU data repository.[18]

Our models also include a standard set of country-level covariates such as population density as this might impact both case prevalence as well as the ability of the state to build capacity, a set of economic variables (GDP per capita, foreign direct investment (FDI), trade, Gini coefficient) to mitigate for the richer countries getting perhaps better pandemic outcomes due to access to more resources and political variables (polity score, female head of state, pandemic backsliding) to account for governance performance.

The general model used in the analyses of the global data is the following:

$$Y_{i,t} = \beta_0 + \beta_1 * Capacity\ type_{i,t-1} + \beta_2 * Controls_{i,t-1} + \varepsilon_{i,t-1} \quad (1)$$

In Equation (1), $Y_{i,t}$ is the dependent variable, which in our case are the various policy indices (mask mandates, social distancing, school and business closures, health resources, and health monitoring). Capacity type $_{i,t-1}$ is the independent variable measuring the various types of capacity before the start of the pandemic. Controls $_{i,t-1}$[19] is a vector of controls including government expenditures on health as a percentage of GDP, population density, GDP per capita, FDI (% GDP), trade (% GDP), democratic backsliding during the pandemic,[20] polity score,[21] female leader, inequality, COVID cases and COVID deaths.[22] $\varepsilon_{i,t-1}$ represents the disturbance.

5.1. State capacity and COVID-19 policies around the world: what have we learned?

To answer the guiding questions of this research we adopt two approaches to modelling the data. To examine the difference in outcomes between the earlier parts of the pandemic and the subsequent period we analyse the data at two different levels of aggregation (cross national and subnational). To answer the questions related to the initial pandemic performance of states we pair the country-level data on state capacity with pandemic policy indices collected during the first two quarters of 2020. This period, ending on 30 June 2020, allows enough time for all countries to be impacted by the pandemic in some way and for governments to react while not being too far into the pandemic that countries started experiencing a second wave of infections.[23] So by collapsing the daily data until 30 June, we capture the initial situation of the pandemic (total cases, total deaths) as well as government reactions (average of the CoronaNet indices) to examine the kinds of policies that were implemented. This results in a cross-sectional dataset attempting to cover the entire world[24] for which we use ordinary least squares (OLS) to model the regressions. When we examine the entire period of the pandemic we make use of all the daily data on cases, deaths and policies implemented. This allows us to leverage the changes in the situation each country faced as the pandemic progressed.[25]

In each set of models, the first regression of the table has as the main independent variable the general state capacity indicator of Hanson and Sigman (2021). In the next model, we use three variables that concurrently measure the three dimensions of state capacity discussed in the article (coercive, informational and health). The final three models only include one type of capacity.[26]

Do states with high coercive capacity initially adopt more coercive policies? Are they more likely to sustain coercive policies over time? The preliminary answer to these questions is a mixed one. Both initially (the first two quarters of 2020) and later, states with greater pre-pandemic capacity generally also scored high on pandemic policies (overall results in Model 1 of Appendix Tables 3–14 in the online supplemental data) summarised in Table 1: having greater capacity, as measured by Hanson and Sigman (2021), resulted in taking more action on all six arenas of pandemic policy except health monitoring. This means that a state with increased capacity is more likely to adopt policies during the pandemic on the various policy dimensions. Early in the pandemic these results were statistically significant for policies of imposing restrictions on businesses (Table A5, Model 1), whereas throughout the pandemic state capacity had a positive and statistically significant association with social distancing policies (Table A10, Model 1) and business restriction policies (Table A6, Model 1).

However, as state capacity includes many dimensions, disaggregating it yields additional insight.

Coercive capacity captures the level to which a government possesses the structural ability to impose its policies. Both in the model that includes all three types of capacity and the model that only includes coercive capacity, this variable is significant in the early days of the pandemic as well as throughout 2020–21. Governments with higher coercive capacity were statistically less likely to implement mask policies and had fewer restrictions on businesses[27] both early in the pandemic as well as later. The other policies were not significant.

Information capacity only shows some significance in the models with all types of capacity where it has a positive impact on policies of health monitoring. Health capacity measured as government expenditures on health was associated with more policies focused on business restrictions throughout the pandemic. However, when health capacity is included with the other types of state capacity, it stands out as resulting in significantly fewer restrictions on businesses, social distancing, health resources and health monitoring. This last finding might seem surprising, but perhaps it shows that a country already investing substantial percentages of its GDP in health wouldn't need additional measures even in this time of crisis. However, further testing this

Table 1. Summary of regression results (cross national).[33]

Dependent variables	Table of results	(1) State capacity	(2) Disaggregated measures	(3) Coercive	(4) Information	(5) Health
Mask (Q1-2)	A3	Positive				
			Negative ***	Negative *		
			Positive		Positive	
			Negative			Positive
Mask (all)	A4	Positive				
			Negative ***	Negative *		
			Positive		Positive	
			Negative			Positive
Businesses (Q1-2)	A5	Positive *				
			Negative *	Negative		
			Positive		Positive	
			Negative *			Positive
Businesses (all)	A6	Positive				
			Negative ***	Negative **		
			Positive *		Positive	
			Negative *			Positive *
Schools (Q1-2)	A7	Positive				
			Positive **	Positive		
			Positive		Positive	
			Negative			Negative
Schools (all)	A8	Positive				
			Positive *	Positive		
			Positive		Positive	
			Negative			Negative
Social distancing (Q1-2)	A9	Positive				
			Positive	Positive		
			Negative		Negative	
			Negative *			Positive
Social distancing (all)	A10	Positive **				
			Negative	Negative		
			Negative		Negative	
			Negative **			Positive
Health Resources (Q1-2)	A11	Positive				
			Positive	Negative		

(*Continued*)

Table 1. Continued.

Dependent variables	Table of results	(1) State capacity	(2) Disaggregated measures	(3) Coercive	(4) Information	(5) Health
			Positive		Positive	
			Negative **			Negative
Health Resources (all)	A12	Positive				
			Positive	Negative		
			Positive		Positive	
			Negative ***			Negative
Health Monitoring (Q1-2)	A13	Negative				
			Positive	Positive		
			Positive **		Positive	
			Negative ***			Negative
Health Monitoring (all)	A14	Negative				
			Positive	Positive		
			Positive ***		Positive	
			Negative **			Negative
Cases (Q1-2)	A15	Positive **				
			Negative	Positive *		
			Negative		Positive	
			Positive			Positive *
Cases (all)	A16	Positive ***				
			Negative	Positive		
			Negative		Positive	
			Positive*			Positive***
Deaths (Q1-2)	A17	Positive ***				
			Negative	Positive		
			Negative		Positive	
			Positive			Positive ***
Death (all)	A18	Positive ***				
			Negative	Positive		
			Negative		Positive	
			Positive			Positive ***

Notes: *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

assumption with alternative variables might further disentangle the relationship between these measures.

A second set of questions examined whether states with high coercive capacity might see better outcomes in the early days of the pandemic or maybe even throughout COVID. For the

overall measure of state capacity, we find that both early in the pandemic and overall, higher state capacity was associated with more cases and more deaths, results significant at 95% and 99% levels. This finding could be data-driven as the top-scoring countries were located in Western Europe, a part of the world where the early days of the pandemic experienced the most cases and where data reporting has been more accurate (Adiguzel et al., 2020). When disaggregating capacity, countries that spent more of their GDP on health also saw more cases and more deaths from COVID, possibly another consequence of data availability.

These results show that there is indeed a timing effect. Certain policies were more important at the beginning of the pandemic but less so later on. This cross-national analysis also suggests that different types of state capacity matter at different times. Having greater coercive capacity allows leaders to more easily implement restrictive policies but it also gives the leaders the freedom to choose the timing of implementation. As the pandemic continued, greater capacity for coercion meant less willingness to enforce mask mandates for example (Table A4, Model 3). In the case of social distancing, the relationship even reversed sign: in the early days of the pandemic states with more coercive capacity had more social distancing policies (Table A9, Model 3) whereas later in the pandemic more coercive capacity was associated with fewer social distancing requirements (Table A10, Model 3). High coercive capacity states were less likely to implement mask mandates and business restrictions (Model 3 in Tables A3–A6) but did implement more school restrictions (Model 3 in Tables A7 and A8).

In the case of information capacity, all policy types show a positive relationship with this type of capacity; only social distancing policies are negatively associated with information capacity (Model 4, Tables A9 and A10). Health capacity also presents a generally positive association with many policy types except school restrictions (Model 5, Tables A7–A8), health resources (Model 5, Tables A10–11), and health monitoring (Model 5, Tables A13–14). The variation in which type of capacity is associated with which type of policy supports our main argument that there is a substitution effect when it comes to different types of capacity. States will use the various tools at their disposal as they implement policies and while having coercive capacity helps, it comes at a high cost that governments might not want to pay.

5.2. Subnational approach: lessons from the Russian case

We supplement the cross-national analysis with an examination of Russia's performance during the pandemic. Among the former Soviet countries, due to its sheer size, Russia outpaced all the other states in terms of cases, though the per capita measures placed it in the middle of the pack for both cases and mortality (Figure A4). This makes Russia a fascinating case for its multilayered political system on which to test our argument.

To analyse the Russian situation, we approximate a variety of measures at the subnational level that replicate the cross-national analysis in the previous section. The Russian Federation comprises 85 regions of various sizes and with various levels of development. While in many analyses, Vladimir Putin is seen as the source of all politics, Russian sub-national politics demonstrates a tremendous amount of variation and governors have a surprising amount of latitude (Libman, 2017). Especially during the pandemic, devolution has been a key strategy for policymaking. Very few decisions have been taken at the federal level, leaving policymaking to governors.

We follow the same modelling choices as the cross-national analysis by running models on both the entire period of the pandemic, as well as the earlier period (the first two quarters of 2020 up to 30 June 2020).[28] Because we were not able to find reliable data for deaths from COVID in Russia disaggregated at the regional level, we only focused our analysis on COVID cases using data from the Russian Statistical Service (Rosstat).

We measure capacity via various indicators at the regional level.[29] To measure coercive capacity we use data from 2016 on personnel in the Ministry of Internal Affairs (MVD). For

health capacity, we focus on the number of doctors per 10,000 people in 2020. We also provide an alternative measure where we look at the number of hospital beds per 1000 people. To measure informational capacity we use data on the percentage of internet users in each region. This measure is a proxy for the informational capacity of the state as it captures infrastructures for providing citizens access to information.

Our models also include a standard set of region-level covariates such as level of urbanisation as this might impact population density and therefore affect both case prevalence as well as the ability of the state to build capacity. We also include a set of economic variables (regional GDP per capita, level of investment and retail trade) to mitigate for richer regions getting perhaps better pandemic outcomes due to access to more resources. On the political front, we add a variable measuring whether the governor of the region belongs to United Russia or not.

The model used in the analyses of the Russian data is the following:

$$Y_{i,t} = \beta_0 + \beta_1 * Capacity\ type_{i,t-1} + \beta_2 * Controls_{i,t-1} + \varepsilon_{i,t-1} \quad (2)$$

In Equation (2), $Y_{i,t}$ is the dependent variable which in our case are the various policy indices.[30] Capacity $type_{i,t-1}$ is the independent variable measured prior to the pandemic at regional level in four different ways: the number of MVD personnel, percent of internet users, doctors (per 10,000 people) and hospital beds (per thousand people). $Controls_{i,t-1}$ is a vector of indicators including urbanisation, regional GDP, level of investment, retail trade, whether the region was headed by a leader from United Russia and COVID cases (thousands).[31] $\varepsilon_{i,t-1}$ represents the disturbance.

In each set of models, the first regression of the table features all three variables that concurrently measure the three dimensions of state capacity discussed in the article (coercive, informational and health capacity). The next three models only include one type of capacity, whereas Model 4 in each table features an alternative measure for health capacity, namely the number of beds per thousand people (Table 2).

Coercive capacity, measured as the number of personnel of the Ministry of Internal Affairs in each region, captures the level to which a government possesses the structural ability to impose its policies. Both in the model that includes all three types of capacity and the model that only includes coercive capacity, this variable is negative across the board (Models 1 and 2 in Tables A19–21, 23–27), except for school closures (Models 1 and 2 in Table A22) and health monitoring for the entire period (Models 1 and 2 in Table A28), especially early in the pandemic more coercive capacity meant less action on the policy front. This means that places with more coercive personnel at their disposal had fewer policies to prevent COVID early in the pandemic. These results go contrary to the findings from the cross-national analysis for the early pandemic, whereas for the overall policy during the pandemic, the results for Russia reflect the cross-national situation. This suggests that early in the pandemic even in the presence of more coercive capacities, the state knew that coercive action might come at a cost so they chose not to deploy it, and instead chose to implement fewer policies.[32] Coercive capacity also has a negative and significant impact on COVID cases both earlier in the pandemic as well as throughout 2020–21 (Models 1 and 2 in Tables A29 and A30).

Information capacity is generally positively associated with the various COVID policies which means places with a higher percentage of internet usage had more policies for businesses (Model 3, Table A19), more school closures (Model 3, Table A21). However, these regions had fewer policies associated with social distancing, health monitoring and health resources (Model 3 in Tables A22–A28). This measure is also associated with more COVID cases (Model 3, Table A29–A30). However, these results are not statistically significant.

Health capacity measured as the number of doctors for ten thousand people has an overall negative association with pandemic policies. Places with more doctors implemented fewer policies to close businesses or schools or impose social distancing both in the early days of the

Table 2. Summary of regression results (Russia).[34]

Dependent variables	Table of results	(1) All measures	(2) Coercive Capacity	(3) Information Capacity	(4) Health Capacity	(5) Health Capacity
Businesses (Q1-2)	A19	Negative	Negative			
		Positive		Positive		
		Negative			Negative	Positive
Businesses (all)	A20	Negative	Negative			
		Positive		Positive		
		Negative			Positive	Negative
Schools (Q1-2)	A21	Negative *	Negative *			
		Positive		Positive		
		Negative			Negative	Negative
Schools (all)	A22	Positive	Positive			
		Negative		Negative		
		Positive			Negative	Negative
Social distancing (Q1-2)	A23	Negative	Negative			
		Negative		Negative		
		Positive			Negative	Positive
Social distancing (all)	A24	Negative	Negative			
		Negative*		Negative**		
		Negative			Negative	Positive
Health Resources (Q1-2)	A25	Negative	Negative *			
		Negative		Negative		
		Positive			Negative *	Positive
Health Resources (all)	A26	Negative***	Negative ***			
		Negative		Negative		
		Negative			Negative	Positive
Health Monitoring (Q1-2)	A27	Negative	Negative			
		Negative		Negative		
		Negative			Negative	Negative
Health Monitoring (all)	A28	Positive	Positive			
		Negative		Negative		
		Negative			Negative *	Negative
Cases (Q1-2)	A29	Negative *	Negative *			
		Positive		Positive		
		Positive **			Positive **	Positive
Cases (all)	A30	Negative *	Negative *			
		Positive		Positive		
		Positive**			Positive **	Positive

Notes: *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

pandemic as well as later on (Model 4, Tables A19–A24). Although these results are not statistically significant, the number of doctors did impact COVID cases: regions with more doctors also experienced more cases both early on and throughout the pandemic at a statistically significant level, even while controlling for urbanisation level (Model 4, Tables A29–A30). This might be because there are more doctors in cities where there were more reported cases, whereas places with fewer doctors also had less diagnostic capability and less accuracy in counting cases.

6. CONCLUSION

In December 2023 the world marked four years since the first COVID-19 infections. In that time people across the world had to adjust to a new reality and governments had to use all tools at their disposal to fight the disease. As research moves on from its focus on the pandemic we suggest the need for a comprehensive look at how governments dealt with this global emergency. Instead of more traditional public policy and political science approaches, this article went beyond regime-level variables to examine the role played by the capacity of states. We not only contribute to the debate over the best pandemic responses by moving beyond democracy and authoritarianism toward state capacity, but we also interrogate the aggregate state capacity literature by disentangling the various facets of state capacity and asking which might be most of use and when. We ask not just whether states with high coercive capacity relied on that capacity in the COVID-19 era, but also whether there is a replacement effect between coercive capacity and informational capacity or if other types of capacity might help more. We theorise that coercive capacity – even when states have it – might not be the preferred tool due to the cost of using it. Instead of framing COVID-19 restrictions as state overreach, we framed coercive responses as an option that may be more easily mobilised at certain times in the pandemic. Especially early in the pandemic, when testing capacity was low, states that had coercive capacity could more readily mobilise these coercive capacities in support of more intrusive policies including school and business closures and stay-at-home orders.

We studied these questions with an analysis of a cross-national panel of countries on indicators of state capacity and COVID-19 policies. We also zoomed in on subnational data for Russia's 85 regions, testing these same assumptions within one political system. We found that both in the initial stages of the pandemic and later on, states with greater pre-pandemic capacity generally also scored high on pandemic policies: having greater state capacity resulted in taking more action on multiple pandemic policy arenas, but often these policies had a substitution effect where coercion was used as a substitute for greater information and health capacity. These results were confirmed by examining Russian pandemic policymaking. However, as many of the policy results were not significant, it is important to examine which policy mix was the one with the greatest impact.

Limitations impacted not only the ability to draw definitive theoretical expectations in light of the variety of capacity types of governments could deploy and the variety of policy arenas in which these capacities could impact. Despite extreme analytical care, there are also important data limitations we have highlighted as many countries have not been able to properly report pandemic progress or have deliberately hidden the true toll of COVID-19. Moreover, the scholarship on state capacity is still in development. A global quantification of state capacity is still in its infancy and the various dimensions of state capacity require the use of proxy measures from international organisations that do not always fully cover the world. These difficulties were only compounded when the analysis focused on the subnational level. Future research should strive to remedy this limitation. The more we know about the role of the various dimensions of state capacity on government policymaking and performance during emergencies such as the COVID-19 pandemic, the better we can prepare for the next crisis.

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DATA AVAILABILITY STATEMENT

The data and code files are available at the Harvard Dataverse, https://doi.org/10.7910/DVN/0LNDKY.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author(s).

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NOTES

1. We do not map various state capacities back onto regime type as Mao (2021) does.
2. One exception being Mao (2021).
3. While public goods are perhaps a less central measurement of state capacity (Besley & Ghatak, 2006; Acemoglu et al., 2015), a rich literature on the state and public goods provision demonstrates the centrality of the state's distributive capacity through discussions of its presence, absence and alternatives (Murtazashvili, 2016; Tsai, 2007; Corbridge et al., 2005; Lee et al., 2014).
4. More recently, scholars of state capacity tend to divide administrative and extractive aspects into different measurements (Hendrix, 2010; Cardenas, 2010; Besley & Persson, 2009; Hanson & Sigman, 2021).
5. Including both the number of healthcare workers and government healthcare expenditures capture different dimensions of care and particularly different financial dimensions. A highly developed country would theoretically score high on number of doctors, nurses and hospital beds, but if the government level of expenditure is low since much of healthcare is privatised then people are less likely to go to the hospital once they get COVID out of fear of increased costs, which in turn could drive up both the number of deaths and overall infections as some of the infected will wait too long before seeking treatment and die in addition to spreading the disease before entering the hospital. Capturing these different dimensions provides distinct snapshots of a country's capacity.
6. These measures are implicitly affected by data transparency.
7. A few studies have addressed issues of collecting and disseminating information (Mao, 2021) while more have focused on aspects of state communication of relevant information (Yang et al., 2021), though COVID-focused work has examined informational capacity in the context of new technologies and pandemic surveillance (Kamra et al., 2023).
8. Appendix Table A1 in the online supplemental data presents all the variable data sources, year used and number of units coded as well as short descriptions on the operationalisation of variables where needed.
9. Especially for the health capacity measures, we focus on the latest pre-pandemic data from the World Development Indicators (https://data.worldbank.org).
10. This data comes from the State Capacity Dataset of Hanson and Sigman (2021).

11. While the dataset is from 2021, the variable itself was collected up to 2012. We lament this limitation in the data and hope the literature will improve soon.
12. Full information on these indicators and policy dimensions included is detailed on page two of the online Appendix.
13. In Appendix Figure A1 we present the evolution of these six indices of policies under COVID for all countries in the world from 1 February 2020 to 1 May 2021. For better visualisation, Figure A2 presents the same indices but only for former Soviet countries.
14. For a discussion see Cheng et al. (2022).
15. For a detailed description of the process as well as the ideal points models estimated with the Hamiltonian Markov Chain Monte Carlo (MCMC) sampler Stan used in Kubinec et al. (2021) see their paper as well as the online resources provided by the authors.
16. According to the authors, because 'the CoronaNet dataset contains provincial and even municipal information about policies for all countries in the dataset (…) we needed a way to include this information to produce national-level estimates. We employed a simple algorithm in which we assigned a value of +1 for each policy in force at the national level and 0 otherwise. (…) For each province and city with the same policy in force, we add the proportion of the country's population in the province or city to this baseline score. (…) The resulting score is then a continuous variable and is modeled as such' (Kubinec et al., 2021, p. 7).
17. For our subnational analyses of Russia, we follow the same additive model used by Kubinec et al. (2021) but we only count measures taken in each region without aggregating nationally.
18. For the JHU data repository visit: https://github.com/CSSEGISandData/COVID-19. The data ends on 10 March 2023. We use data until 21 May 2021. Figure A3 shows the data for deaths (panel A) and cases and recoveries (Panel B) by date aggregated globally. This data will account for the possibility that the more intense COVID response policies are due to increased cases rather than the government using the pandemic to overextend its powers and pass more restrictive measures on the population.
19. All the controls, except COVID cases, COVID deaths, democratic backsliding and female leader were measured before the pandemic at time t-1.
20. As a robustness check we leveraged this data from V-Dem to account for pandemic-era executive aggrandisement state capacity meets regime type (more autocratic leaning regimes could use the available coercive capacity to increase their power under the guise of the pandemic). We interacted each type of state capacity (overall capacity, coercive, information and health) with the V-Dem pandemic backsliding score. The summary of the results of the interaction is included in Appendix Table A61. Most interactions between VDem scores and types of capacity were not significant or had significance impacted by the nature of data collection.
21. We also interacted capacity with regime-level variables as a robustness check. The summary of the results of the interaction is included in Appendix Table A78. Again most interactions were not significant. However, the higher the coercive capacity and better the Polity score, the less likely it was that the country would exhibit strict mask policies and business restrictions. This is interesting because it confirms the argument that just having coercive capacity doesn't mean you will use it. On the contrary, highly democratic countries that do have this capacity are less likely to enforce some of the stricter policies as they are committed to the principles of democratic rule of law.
22. Appendix Table A1 provides the sources of these variables, the number of countries included, the year of measurement as well as a short description of the variable.
23. As a robustness check we also included other cutoff points for the initial period, with September 30 and November 30 as additional significant dates that include the first summer and first fall under the pandemic. Our results stayed unchanged or increased in significance. All the results tables (A32–A47) and the summary table (A31) are in the Appendix.
24. We attempted to have as complete data as possible but several of the country-level covariates did not have recorded data. Information and coercive capacity especially were not always fully coded for all countries in the world. See Appendix Table A1 for data coverage.
25. As an additional robustness check we also conducted the jackknife procedure. This allows us to run the models with each country taken out of the sample in order to test for outlying observations.

26. Due to data limitations, especially for the coercive and informational capacity variables, the models including those measures have quite a bit of missingness. This missingness is particularly impactful in the cross-sectional models when the number of observations drops from 118 to under 50. The data availability also motivated the choice of some measures. For the health capacity dimension, we decided not to use data on the number of physicians, nurses and midwives per thousand persons also due to missingness. Instead, we reported the models that use a measure of government health expenditure as a percentage of the GDP.
27. This finding could imply that governments were not inclined to impose business restrictions either early or later in the pandemic. This is particularly important as this relationship is not present with other types of capacity. This suggests that countries with more coercive capacity are less likely to impose business restrictions, whereas countries with more information and health capacity are found to impose more business restrictions (Table 1 as well as Appendix Tables A5 and A6).
28. We also used alternative cutoff points in September and November summarised in Appendix Table A48. Results mainly remain unchanged and in some instances for coercion capacity and health capacity they strengthen.
29. See Appendix Table A2 for the data sources, year and regions covered.
30. For a geographical distribution of coded CoronaNet policies please see this online resource: https://public.tableau.com/app/profile/rohan.bhavikatti/viz/CoronaNetWorldMapofCOVID-19Policies/WorldMap (Accessed 13 March 2024).
31. All controls, except COVID cases and political leadership were measured prior to the pandemic.
32. This could also suggest that some governments tried to deny the existence of the disease in their midst so they didn't focus on policies of restraining the virus.
33. For ease of interpretation, Table 1 summarises the regression coefficient signs and significance levels from 16 tables of results and 80 models in the online Appendix.
34. Table 2 summarises the regression coefficient signs and significance levels for easier overall result analysis. The full results are in Tables A19–A30 of the online Appendix.

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