


# COVID-19 and the state: Exploring a puzzling relationship in the early stages of the pandemic

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## Abstract

During the first year of the Covid-19 pandemic, it was wealthier countries with stronger institutions that suffered the highest numbers of cases and fatalities. Many weaker countries were instead praised for more effective pandemic response. What explains this seeming puzzle? We reconsider these relationships in the cross-country data, drawing on measures of the state, Covid's health impact and pandemic response. In brief, our analysis suggests that, when appropriate additional factors are taken into account, the expected relationship between state effectiveness and pandemic health outcomes in fact is clear. We also offer insight into how different dimensions of the state influence policy and outcomes and how particular countries compare with others.

## KEYWORDS

Covid-19, healthcare, state, state authority, state capacity, state legitimacy

## 1 | INTRODUCTION

At the time of this writing, Covid-19 has claimed over six million lives and infected over 500 million.<sup>1</sup> At a relatively early stage of the pandemic, it was clear that no state was completely prepared to deal with a shock of such magnitude. Notably, it was wealthier countries that suffered the highest rates of infection and deaths on average in 2020, while many poorer countries were praised for their more effective pandemic response. Indeed, countries widely

<sup>1</sup>Source: <https://coronavirus.jhu.edu/map.html>, accessed on 15 April 2022.

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considered to have the best 'global health security' reported the highest numbers of Covid-related fatalities (Milanovic, 2021).

This is puzzling, because a pandemic is precisely the sort of crisis in which we expect effective state institutions—including robust state health systems—to matter. According to Fukuyama (2020), one of the main factors behind successful pandemic response has been 'a competent state apparatus', or more simply, state effectiveness. In a similar vein, Ang (2020) highlights that the capacity of the state to implement solutions has driven successful pandemic responses. Yet, counterintuitively, in the first year of the Covid-19 pandemic, what stands out in simple global snapshots is that it was in wealthier countries with stronger institutions where the numbers of cases and fatalities were highest, on average. What explains this seeming puzzle?

In this paper, we consider these relationships in the cross-country data, drawing on a diverse set of measures of the state, figures on Covid's health impact and key measures of pandemic policy response. Our key objective is to address the above question and determine whether countries with weak institutions really managed to cope better with Covid-19 than countries with strong institutions in the initial stages of the pandemic. Our analysis suggests in brief that while 'more effective' states had poorer health outcomes on average than 'less effective' states, various factors that similarly vary across countries such as the level of per capita national income, the age structure of the population and Covid-19 testing rates help to explain this puzzling relationship. Indeed, when such factors are controlled for, our analysis points to an (expected) inverse relationship between state effectiveness and pandemic health outcomes on average (i.e. higher state effectiveness and lower health impact).

Our study pushes forward the empirical scholarship on the state–pandemic nexus in several important ways. First, we explore more in detail simple correlations among different aspects of the state and different aspects of Covid-19. Second, we go beyond simple correlations and analyse the state–pandemic nexus by identifying and controlling for the most important confounding factors. Third, compared to existing studies on the topic, we add a layer of detail by examining the state–pandemic nexus through different dimensions of the state and multiple aspects of national Covid-19 health outcomes and policy responses. The inclusion of various measures of the state and pandemic outcomes enhances also the robustness of our results. Fourth and last, through our regression analysis, we identify outlier countries that should be further analysed in case studies to tease out the missing pieces of the state–pandemic nexus.

Digging deeper into core dimensions of the state, we find notably the strongest relationships between 'state capacity' and Covid-19 cases, deaths, and lethality, as well as between measures of 'state authority' and lethality. By contrast, our analysis does not find evidence for a clear relationship between measures of 'state legitimacy' and health outcomes. In our view, this is not surprising because the expected linkages between state legitimacy and health outcomes are less direct.

We further explore relationships between measures of the state and selected pandemic response policies, a key channel through which the state may influence pandemic outcomes. Interestingly, we observe no clear relationship between either state capacity or state authority and the stringency of containment and health policies and the generosity of economic support policies. However, greater state legitimacy is associated with both less severe health and containment policy measures and more generous economic support policies. We consider some explanations for these results and point to key areas for further research.

Clearly, care should be taken in interpreting these results given significant data constraints and the fact that the pandemic remains ongoing, with 'outcomes' continuing to evolve over time. It is important to stress, however, that the aim of our study is not to provide final conclusions on the state–pandemic nexus. Conversely, as already mentioned, our main objective is to gain knowledge on the relationship between the state and Covid-19 in the early stages of the pandemic, when all countries had to deal with exceptional conditions such as the immediacy of the outbreak, a lack of full scientific understanding and the absence of vaccines. With a focus on outcomes in the pandemic's first year, of course, our analysis provides also a useful first look into potential final interpretations, which can be built upon in subsequent work.

This paper contributes to a fast-growing body of research on Covid-19. A key finding of this work is that the pandemic has both reflected and exacerbated existing inequalities (see Sen, 2020). Our analysis, combined with findings from other research, suggests this is also true in terms of cross-country inequalities in state effectiveness. Countries with less effective states—all else equal—have not only been more affected by Covid-19, but Covid-19 also has increased demands on states and on less effective states in particular: Research suggests that the pandemic will approximately double the expected number of people suffering from hunger (Bleich & Fleischhacker, 2020) and that even if developing countries have enacted a number of social protection measures to tackle the crisis (Gentilini et al., 2020), poverty will increase in these countries dramatically (Sumner et al., 2020). Research points further to worrying impact on democracy and inequality (Lührmann & Rooney, 2020), trust in society (Brück et al., 2020) and violent conflict (Polo, 2020).

In addition, this paper speaks to the large body of literature on the state, long a core area of inquiry in political science. In particular, it offers new global consideration of how state effectiveness relates to crisis response. Our central finding that ‘strong’ states—especially in terms of state authority and state capacity—were indeed better prepared to cope with a pandemic than ‘weak’ states is relevant both from a research and policy perspective. In terms of development policy in particular, our findings underscore the key role of the state in mitigating adverse health effects of Covid-19 and, more broadly, the importance of continued attention to supporting state institutions as a means of building resilience to future challenges.

In the next section, we present more in detail our main argument by discussing why and how we expect the state to play a key role in responding to crises. Then, we present our empirical strategy, discuss the data and describe the variables. Last, we present the empirical findings, interpret the results and conclude by identifying possible avenues for further research.

## 2 | THE STATE AND ITS ROLE IN RESPONDING TO CRISES

Following Weber, states are understood here as ‘compulsory associations claiming control over territories and the people within them’ (Skocpol, 1985, p. 7). A state is more than the government; ‘[i]t is the continuous administrative, legal, bureaucratic and coercive systems that attempt not only to structure relations *between* civil society and public authority in a polity but also to structure many crucial relationships *within* civil society as well’ (Stepan, 1978, p. xii). Mann (1984) highlights two dimensions of state power in this sense, first the ‘despotic’ power of state elites over civil society and second the ‘infrastructural’ power of the state ‘to penetrate and centrally coordinate the activities of civil society through its own infrastructure’ (p. 114). As Skocpol (1985) describes, states are not simply reflective of civil societies, but also autonomous actors to varying degrees, and moreover, can be compared in their capacities to realize their goals.

In more recent literature, especially work highlighting cross-country comparisons of states, three core dimensions of the state are often distinguished: authority, capacity, and legitimacy (see Bratton & Chang, 2006; Carbone & Memoli, 2015; Carment & Yagadeesen, 2019; Tikuisis et al., 2015; Ziaja et al., 2019). As Ziaja et al. (2019) describe, *authority* refers to the ability of the state to provide order and security within its territorial boundaries, *capacity* to its ability to provide basic public services and *legitimacy* to its ability to acquire the consent of its population to govern. In this sense, capacity and to a lesser extent authority are closely related to what is sometimes called state effectiveness.

Yet, authority, capacity and legitimacy are not the only dimensions of the state that have been identified in the literature. In fact, different scholars have often diverse views on the core dimensions of the state. A comprehensive discussion of these divergent understandings is out of the scope of our study, but just to give a few examples, Hendrix (2010) distinguishes between rational-legal, rentier-autocratic and neopatrimonialist dimensions, Fortin-Rittberger (2014) distinguishes between infrastructural and coercive dimensions, Savoia and Sen (2015) distinguish between military, fiscal, administrative, legal and infrastructural dimensions, and Hanson (2018) distinguishes

between coercive, extractive and administrative dimensions of the state. Here, as already said, we focus on authority, capacity and legitimacy.

The literature suggests that more effective states support various positive socioeconomic outcomes, including economic performance (e.g. Dincecco & Katz, 2016; Hanson, 2014), better provision of public goods (Asadullah et al., 2020; D'Arcy & Nistotskaya, 2017) and better public health outcomes (e.g. Holmberg & Rothstein, 2011). A well-functioning state apparatus is also expected to play a key role in mitigating the adverse effects of exogenous shocks, such as natural disasters (e.g. Keefer et al., 2011; Persson & Povitkina, 2017).

Overall then we expect measures of the state—and especially measures of state capacity—to be associated with ‘better’ Covid-19 outcomes and responses. We expect ‘high-capacity’ states to be better prepared to respond to crises than ‘low-capacity’ states, for instance, by having adequate pandemic response plans and preventive infrastructure. In well-functioning administrative apparatuses, public officials are chosen with meritocratic practices and are likely to be more competent and thus to make better decisions in response to crises such as the pandemic. Corrupt public officials in the health sector, by contrast, have been linked to more deaths and illnesses (Holmberg & Rothstein, 2011).

We expect state authority also to be related to better pandemic outcomes as states with higher authority on average should be more effective than those with low authority at enforcing Covid-related restrictions such as quarantine and stay-at-home requirements. Coercion is the most basic instrument of power (Lindvall & Teorell, 2016), and without such ability to punish free riders, the state cannot credibly enforce its policies (D'Arcy & Nistotskaya, 2017).

Our expectations with respect to the relationship between state legitimacy and pandemic outcomes are less clear. State legitimacy would seem to impact pandemic outcomes primarily through its influence on the state's ability to enforce rules and provide services (i.e. via state authority and capacity): States with high legitimacy may rely more on voluntary compliance of the population to the rules (Levi, 1988), rather than assertive enforcement. Individuals in states perceived as legitimate are also likely to have higher social trust (e.g. Newton & Norris, 2000), which might facilitate voluntary compliance with rules and support for public activities.

The literature on the state in short suggests that there should be a positive relationship between state effectiveness and pandemic outcomes across countries, all else equal. Results from the fast-growing body of research on Covid-19 offer some suggestive, but mixed, empirical support for these expectations. Emerging findings suggest that higher state effectiveness is related to a reduction in Covid-19 mortality (Liang et al., 2020; Serikbayeva et al., 2021), but effective states have also been slower than dysfunctional states to implement school closures (Cronert, 2020) and other containment policies (Sebhatu et al., 2020).

In our analysis, we build directly upon this work in several ways. First, we draw upon frameworks and empirical findings to inform our models, including in the selection of control variables. Second, we extend from this work to drill deeper into the nuances of the state using a broader variety of measures. Adopting this more fine-grained approach to distinguish among different dimensions of the state may offer new leverage on why and how policies and outcomes relating to the Covid-19 pandemic have differed across countries.

### 3 | RESEARCH STRATEGY

Conducting research on an ongoing event presents unique challenges. As the pandemic continues and proceeds through sixth and seventh waves—and beyond—it is evident that our analysis of health outcomes does not reflect ‘final’ pandemic outcomes, but rather ‘intermediate’ outcomes. Nevertheless, neglecting early response and consequences just because the pandemic is not over would be unwise. Final consequences might differ from the actual ones, but it is still crucial to understand what happened in the early stages of Covid-19.

Our current analysis reflects cumulative cases, deaths and lethality as of 15 November 2020. Significant shifts have already happened since. In particular, since December 2020, we have seen the mass roll-out of vaccinations in

some (mainly high-income) countries. That said, November 2020 seems to us an ideal point at which to consider variation across countries before the vaccination era. At this point, national governments had some 8 months after a global pandemic was declared to respond, and they did so in diverse ways and with diverse capacity. The relationship between Covid-19 and the state might look different in the future, but the outcomes and responses of the pandemic's first year will stay the same.

Another key challenge relates to data. For instance, we focus in this analysis on Covid-19's impact in terms of cases and deaths, but ideally we would consider also broader socio-economic outcomes. Nevertheless, at the time of this writing, country-level estimates and projections of these outcomes, especially for developing countries, are insufficient to include in our analysis. Health outcomes and government responses, in particular, are some of the most direct effects of Covid-19 that can be observed. Hence, to narrow the scope of our study and to rely on some of the most frequently used indicators of Covid-19, we focus on cases and deaths. It is also worth noting that these direct effects of the pandemic are more than likely to be reflected in its socio-economic outcomes. As the data improve, our analysis might be reconsidered against a broader range of outcomes and measures.

Our quantitative analysis proceeds as follows: First, we explore the nexus between state effectiveness and Covid-19 health impact through three core dimensions of the state: authority, capacity and legitimacy. After a descriptive analysis of the relationship between the selected measures of the state and Covid-19 health outcomes, we proceed to a descriptive analysis of the relationship between government responses to the pandemic and each of our dimensions of state effectiveness. In this part, the main focus is on the strength of containment policies and economic relief measures. The timeliness of more specific policies is also analysed.

After the descriptive analysis, we conduct a battery of multivariate cross-sectional regression models to get a more comprehensive picture of the relationship between the state and Covid-19. These regressions allow us to examine the linkage between different dimensions of the state and health outcomes, in terms of cases, deaths and lethality, and different dimensions of the state and pandemic responses, in terms of containment policies and economic relief measures, *ceteris paribus* other factors that could affect Covid-19. These other factors, along with the chosen data, are presented more comprehensively in the next section.

It is worth mentioning that we tend to interpret the findings of our regressions causally, because theoretical expectations suggest that differences in state institutions prior to the pandemic influence variation in pandemic outcomes—not the other way around. While we cannot entirely exclude possible simultaneity and reverse causality in our regression analysis, we select measures of the state that refer to the pre-pandemic era. This, in addition to our careful choice of control variables, should mitigate endogeneity problems because it is unrealistic that pandemic outcomes would affect levels of state authority, capacity and legitimacy before Covid-19. A related issue concerns the quality of data and intentional under-reporting on Covid-19 in some countries, which would be correlated with both measures of the state and pandemic outcomes. We discuss issues of data quality in more depth below. A key point to highlight here is that, although data quality is a concern, it should bias our results in the opposite direction of our findings: data quality should be poorest on average in states with weaker capacity and intentional under-reporting most problematic in states with weaker legitimacy, biasing results towards showing 'weak' states have 'better' pandemic outcomes.

Finally, given our results, we reflect on how they might inform future research, in particular the selection of country case studies.

## 4 | DATA AND OPERATIONALIZATION

### 4.1 | Measures of the state

Research illustrates the diversity of cross-national measures of the state, as well as significant disconnect in some instances between conceptualization and measurement (e.g. Gisselquist, 2014; Vaccaro, 2022; Ziaja, 2012).

Quantifying the core dimensions of the state is notoriously tricky, so it is essential to consider as a first step whether our chosen measures have at least high face validity.

Our primary measures of the state are taken from the German Development Institute's (DIE) dataset on the state (Ziaja et al., 2019), which provides three indices that closely capture the conceptualised dimensions of the state: *authority*, *capacity* and *legitimacy*. The first index quantifies the ability of the state to exercise a monopoly on violence within its territory, the second index quantifies 'the state's ability to carry out policies', and the third index quantifies domestic approval of state rule (Ziaja et al., 2019, pp. 305–306). All three indices have values from 0 (*low*) to 1 (*high*) and are based on a set of carefully selected sub-indicators from various sources. The authority index aggregates data on battle deaths, homicides and perceptions of the state's monopoly on violence. The capacity index aggregates data on child mortality, school enrolment, access to drinking water and perceptions of the quality of the state's basic administrative functions. The legitimacy index aggregates data on asylum seekers, human rights protection and perceptions of the freedom of the press.

While being high in face validity, the downside of these indices of the DIE dataset is that they are available only until 2015. To address this, we also use three sub-indicators of the Fragile States Index (FSI) (Fund for Peace, 2019) as a robustness check throughout the regression analysis. These selected sub-indicators are *security apparatus*, *public services* and *state legitimacy*. They capture, respectively, state authority, state capacity and state legitimacy, refer to 2019 and provide us the most updated view of states in the world. The original FSI indicators run from 0 (*high*) to 10 (*low*) but are inverted and rescaled in our study to range from 0 (*low*) to 1 (*high*). The FSI indicators are based on a combination of content analysis, quantitative secondary data and expert assessment.

We take into consideration also other common datasets with multiple measures of the state such as the Worldwide Governance Indicators (Kaufmann et al., 2011) and Varieties of Democracy (Coppedge et al., 2020). Yet, the face validity of the alternative options—bearing in mind our conceptualisation of the state and our theoretical framework—is inferior to the face validity of the chosen measures. For a similar reason, we avoid using common single proxies such as *total taxes as a share of GDP* and *military personnel* per capita, which capture at best a tiny part of our understanding of the state. While a deeper discussion of the advantages and disadvantages of different measures of the state is out of the scope of this paper, it is evident that single proxies lack in face validity. Given that 'to study a concept, we need measures that fully represent its dimensions' (Bollen, 1989, p. 186), our preference here is for broader measures of the state aimed at fully representing our core concepts, not for single proxies. In terms of theoretical fit, the three indices from DIE in particular aim specifically to capture our three core dimensions of the state.

## 4.2 | Measures of pandemic health outcomes

To measure the health outcomes of the pandemic, we use three indicators that have been frequently employed in the literature: *confirmed Covid-19 cases* (i.e. infections), *confirmed Covid-19 deaths* and *case fatality rate* (CFR). Confirmed Covid-19 cases and confirmed Covid-19 deaths measure, respectively, the total number of cases and deaths linked to Covid-19 as of 15 November 2020. Throughout the analysis, we use population-adjusted rates of cases and deaths to account for between-country differences in population. CFR is measured as the ratio between total confirmed deaths and total confirmed cases as of 15 November 2020. The indicators are published by the European Centre for Disease Prevention and Control (ECDC, 2020) and were retrieved via Our World in Data (OWID, 2020).

Needless to say, these estimates should be taken with extreme caution. There is little doubt that many Covid-19 cases are undetected or unreported. The number of confirmed deaths should be a more accurate metric of the disease because we can confidently assume that fewer deaths go undetected or unreported than cases, but confirmed deaths may be an underestimate as well.

To overcome the possible inaccuracies in the number of cases and deaths, we use CFR as an additional measure of Covid-19 health outcomes. Unfortunately, since CFR is measured as the ratio between deaths and cases, if estimates of deaths and cases are under-reported, it is unlikely that CFR will provide a perfect picture of the situation,

either. CFR underestimates the true lethality of Covid-19 if there is a delay between the reporting of cases and the reporting of deaths, but it overestimates the true lethality if cases are unreported (Sorci et al., 2020, p. 3).

Despite these problems, these three measures are commonly used in studies on Covid-19 in the absence of better ones. For instance, the number of confirmed cases has been used as a measure of Covid-19 health outcomes in Ferraresi et al. (2020) and Polo (2020); the number of confirmed deaths is used as a measure of Covid-19 health outcomes in Sebhatu et al. (2020) and Vadlamannati et al. (2021); and CFR has been used as a measure of Covid-19 health outcomes in Sorci et al. (2020) and Serikbayeva et al. (2021). Our use of all three indicators increases robustness in comparison to the use of just one indicator, as has been done in some studies.

### 4.3 | Measures of policy response

Two indices of government response to the pandemic are collected from the Oxford Covid-19 Government Response Tracker (OxCGRT) dataset (Hale et al., 2020). As with measures of Covid-19 health outcomes, there are some caveats related to the government response data. In particular, OxCGRT data are based on the adoption of policies but do not provide information on actual enforcement (Hale et al., 2020). To our knowledge, suitable cross-national indicators on the enforcement and observance of national pandemic response measures do not exist for now.

The *Containment and health index* (CHI) aggregates indicators related to the stringency of restrictions, closures and other policy measures that aim to contain the spread of the virus, as well as of health measures such as testing, contact tracing and wearing facial coverings. The *Economic support index* (ESI), instead, aggregates two indicators related to economic responses to the pandemic, in terms of income support to the population and debt or contract relief for households. Both measures run from 0 (*low*) to 100 (*high*), and country-level daily data are averaged across days (since first official case for each country). We conduct also robustness tests with maximum values instead of averaged data.

### 4.4 | Other variables

In order to minimize omitted variable bias, we include in our specifications several plausible determinants of Covid-19 health impact and government response. First, we control for *GDP/capita*. In general, we expect wealthier countries to have greater means to address crises, although as noted above, during the first year of the pandemic, infection and death rates were higher in rich countries than in poor countries. Wealth is also related to testing; wealthier countries may afford more testing than poor countries. Testing affects the number of recorded Covid-19 cases and deaths (Beaney et al., 2020), simply because conducting more tests should reveal more cases and deaths. For these reasons, we also control for the population-adjusted *testing rate*.

Additionally, we control for the *age structure* of the population because older individuals are particularly vulnerable to the virus (e.g. Sorci et al., 2020) and for *population density* because infectious diseases, in general, spread more rapidly in densely populated areas (Tarwater & Martin, 2001).

Finally, we include *regional dummies* in some of the specifications to account for overall differences across macro-regions and the spatial dependence of the virus's spread (Solivetti, 2020). These dummies are coded in accordance with the World Bank's classification of macro-regions. In additional robustness tests, we control also for the share of *urban population* and the level of *democracy*. Data sources and summary statistics are presented in Appendix S1.

The set of chosen controls is inspired by other relevant studies on the topic. For instance, in analysing the 'effect' of government effectiveness on Covid-19 health outcomes, Serikbayeva et al. (2021) control for democracy, testing policy, stay-at-home requirements, the share of elders, the number of medical doctors and the number of

hospital beds. Liang et al. (2020), instead, investigate factors associated with Covid-19 health outcomes and find that tests, state capacity, elderly population, hospital beds and the quality of transport infrastructure are significantly related to Covid-19 health outcomes. Sorci et al. (2020) predict Covid-19 CFR with GDP/capita, population size, health expenditure, number of hospital beds, share of elders, political regime, the stringency of government responses and testing.

## 5 | ANALYSIS AND DISCUSSION

### 5.1 | Health outcomes

As Milanovic (2021) notably finds based on simple correlations, the Johns Hopkins 'global health security' index has a positive relationship with Covid-related fatalities: Those considered most health secure had most deaths! Our descriptive analysis of Covid's health impact points to some similarly surprising relationships. In particular, consideration of Covid-19 cases and death, and measures of the state, shows a positive relationship: Case and death rates are higher on average in more effective states. This is in complete contradiction with our expectations. The case fatality rate (CFR), however, behaves generally as theory would predict, with lower values in more effective states on average; in other words, while more effective states have recorded more cases and deaths, the disease has been more lethal on average in less effective states. Scatter plots in Appendix S2 provide a visual illustration of these relationships.

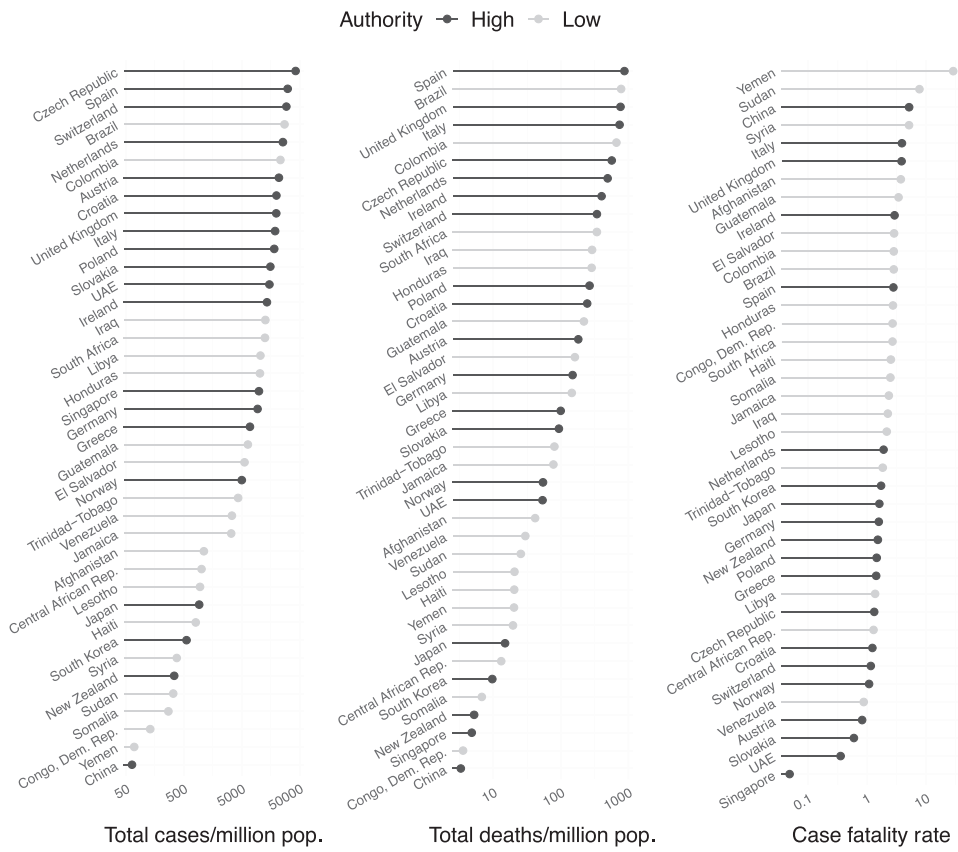
Differences among the three dimensions of the state are also worth noting. The positive associations between authority and Covid-19 cases ( $r = 0.19$ ) and deaths ( $r = 0.11$ ) and the negative association between authority and CFR ( $r = -0.26$ ) are at best weak. The bivariate relationships between state capacity and Covid-19 cases ( $r = 0.60$ ) and deaths ( $r = 0.53$ ) are positive and stronger. As before, the relationship between capacity and CFR is weakly negative ( $r = -0.17$ ). The strength of the relationship between state legitimacy and Covid-19 seems to lie somewhere in between the two previously analysed ones. Legitimacy is relatively weakly correlated to Covid-19 cases ( $r = 0.30$ ) and deaths ( $r = 0.28$ ), but there is no significant bivariate relationship between legitimacy and CFR ( $r = -0.04$ ).

Differences in these dimensions of the state at the country level are also interesting. Generally, as suggested by the bivariate correlations, high-authority countries have had higher Covid-19 cases and deaths than their low-authority counterparts, but there are exceptions (Figure 1). Low-authority countries like Brazil and Colombia, for instance, have been hit as hard as the most severely affected high-authority countries, while high-authority countries such as China, New Zealand and South Korea have been less affected than most low-authority countries. In terms of the CFR, the virus has been generally less lethal in high-authority countries than low-authority countries, with some exceptions. In particular, high-authority China, Italy and the United Kingdom have a high CFR, and low-authority Central African Republic, Libya and Venezuela have a low CFR.

The relationship between state capacity and Covid-19 health outcomes seems to be more clear-cut (Figure 2). In terms of the number of cases and deaths, there are no low-capacity countries that have been hit as hard as the hardest hit high-capacity countries. The most affected low-capacity country, Libya, had more or less the same amount of cases and deaths than Germany and Greece, which are countries that have been praised for their pandemic responses. Singapore can be considered a 'positive' exception in terms of deaths but not cases, while Japan and South Korea have registered exceptionally few cases and deaths. Generally, Covid-19 lethality is more equally distributed among the two groups of countries, but only low-capacity countries have an unusually high CFR.

There are exceptions also in the relationships between state legitimacy and Covid-19 cases and deaths (Figure 3). As to cases, nearly all the hardest hit countries are high-legitimacy countries, but Bahrain has the worst record in the world. As to deaths, the general trend is similar. There are some 'well-performing' high-legitimacy countries (Japan, New Zealand and Uruguay) as well, but overall low-legitimacy countries have been less severely affected by the virus, both in terms of cases and deaths. As before, CFR is extremely high only in low-legitimacy





**FIGURE 1** State authority and health impact of Covid-19: measure of authority from DIE

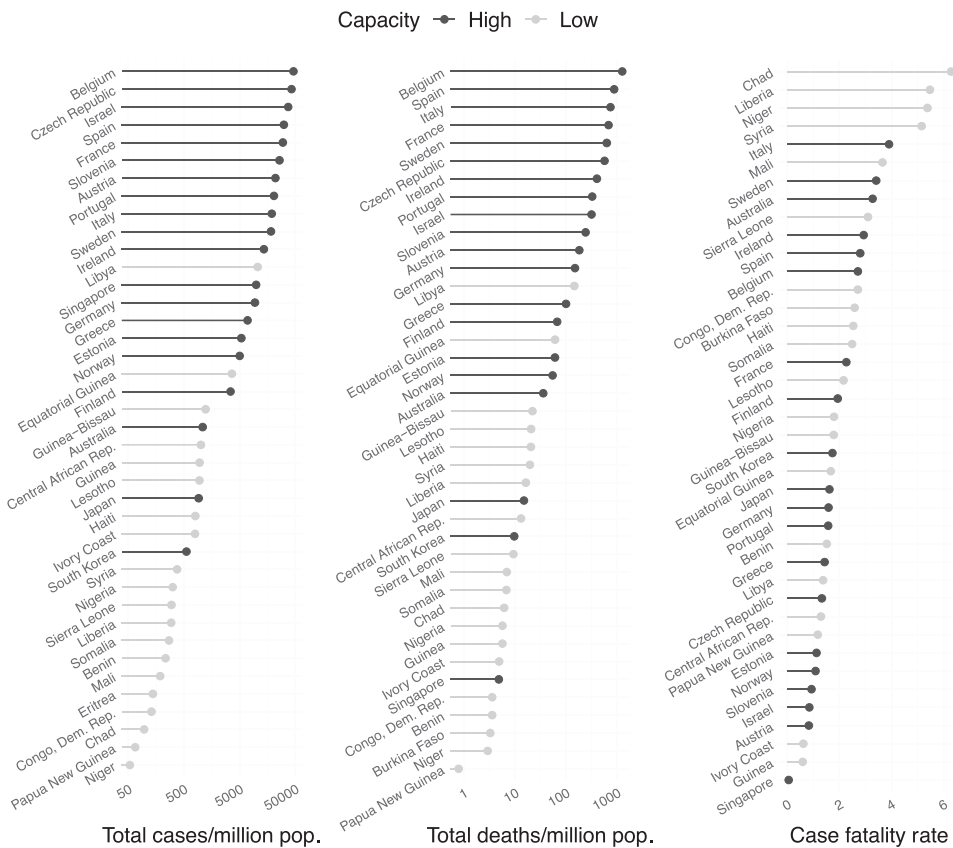
countries (China, Iran, Sudan, Syria), but apart from that countries are fairly evenly distributed across the ‘spectrum’.

These puzzling relationships show not only that there are extreme differences in Covid-19 health outcomes across countries but also that these outcomes may vary with different dimensions of the state. To make sense of these results and to understand more comprehensively the relationship between state effectiveness and Covid-19, it is crucial to take into account other factors that play a role in influencing the health outcomes of the pandemic.

## 6 | GOVERNMENT RESPONSE POLICIES

In this section, we explore some of these factors by examining the relationship between state effectiveness and national measures that governments have taken to contain the pandemic, its health effects and its economic burden through bivariate scatter plots (Appendix S3).

Surprisingly, the relationship between effective state institutions and the stringency of containment policies is negative, suggesting that when other factors are not taken into consideration, more authoritative, capable and legitimate countries are related to less stringent containment policies. The finding is consistent for each of our three dimensions of the state, albeit very weak for capacity ( $r = -0.07$ ) and relatively weak for authority ( $r = -0.19$ ) and legitimacy ( $r = -0.24$ ).



**FIGURE 2** State capacity and health impact of Covid-19: measure of capacity from DIE

By contrast, the association between state effectiveness and the supply of economic support policies is positive, showing that more authoritative, capable and legitimate countries have enacted more supportive economic responses to the pandemic, at least when other factors are not taken into account. Economic relief policies are most strongly related to state capacity ( $r = 0.56$ ) but also moderately related to state legitimacy ( $r = 0.45$ ) and state authority ( $r = 0.38$ ).

If more effective states have really enacted less stringent Covid-19 restrictions, we would expect them to have been less timely in their responses, as well. In fact, this is precisely what we find when examining the relationship between the different dimensions of state effectiveness and the timeliness of adopting two specific but virtually universal containment policies: closure of schools and cancellation of public events (Appendix S4).

Both the timing of school closures and the timing of cancellation of public events are positively related to our dimensions of the state. State capacity is most strongly related to both the timing of school closures ( $r = 0.58$ ) and the timing of cancellation of public events ( $r = 0.53$ ). For instance, low-capacity Liberia, Papua New Guinea and Somalia closed schools several days before the fifth confirmed case of Covid-19, but high-capacity Australia, Japan and Singapore waited over a month after the fifth confirmed case before closing schools.

The relationship between state authority and the timeliness of adopting the two policies is relatively similar ( $r = 0.45$  for school closures;  $r = 0.41$  for cancellation of public events). For instance, high-authority Singapore waited over 2 months to close its schools, but most low-authority countries closed schools before the fifth confirmed case of Covid-19. Yemen, one of the weakest countries in the world in terms of state authority, cancelled all public events and closed its schools around 3 weeks before its fifth confirmed case.

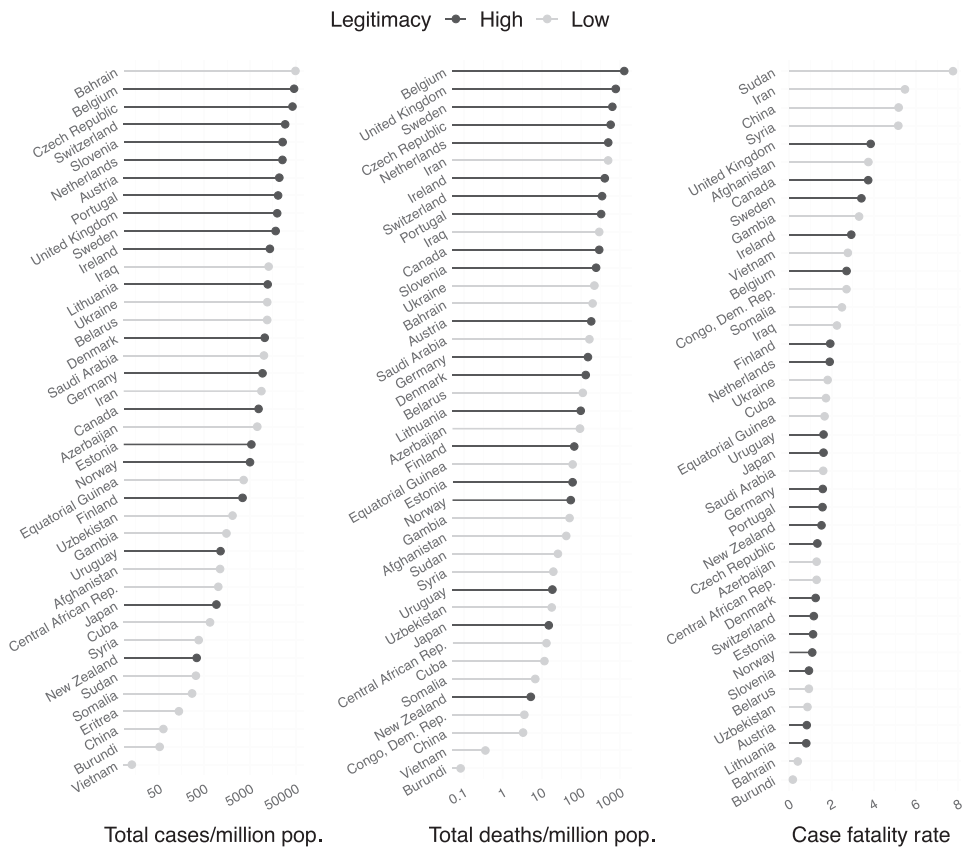


FIGURE 3 State legitimacy and health impact of Covid-19: measure of legitimacy from DIE

State legitimacy instead is weakly related both to the timing of school closures and cancellation of public events ( $r = 0.24$  in both cases). Many high-legitimacy countries waited a few weeks before closing schools, but so did some of the low-legitimacy countries as well. Similarly, some low-legitimacy countries waited many days (e.g. Afghanistan and Cuba) or even weeks (e.g. Belarus and China) before cancelling public events, and so did many high-capacity countries.

Our descriptive analysis of both the average level of strictness of national containment policies and the timeliness of the national Covid-19 response yields surprising results. Overall, our findings suggest that less effective states have responded to the pandemic not only with more stringent containment policies but also have enacted these policies more quickly than effective states. This would seem to be precisely the opposite of what theory would predict—what might be happening?

First, as some media reports have suggested, it is possible that countries with weaker state institutions, fearing their vulnerability to the pandemic ‘played it safe’, while countries with stronger institutions were more confident in their ability to manage the health impact of the pandemic and tried to limit and/or postpone restrictions on economic and social life because of the possible adverse effects. Second, it may be that the spatial-temporal dynamics of the spread of the virus were simply unfavourable to many effective states, which were rapidly exposed to Covid-19 but reluctant to implement strict containment and health policies at the very beginning of the pandemic. Once the virus started to spread in the less effective states of the Global South, countries were more prepared and could faster emulate the government responses implemented in the Global North, reducing the adverse effects of Covid-19 in

countries with weak state institutions. Third, it could be that more effective states, which tend to be more democratic as well, were less likely and quick to adopt the most stringent measures to preserve the individual rights of their citizens.

To sum up, it seems that, on average, less effective states adopted more stringent policies to curb the pandemic than more effective states, and this in turn may have contributed to their better observed health outcomes. But to what extent does this hold true when we also take into account other factors—beyond state effectiveness—that influence Covid-19 health outcomes?

## 7 | MULTIVARIATE REGRESSION ANALYSIS

To analyse more thoroughly the state–pandemic nexus, we use ordinary least squares to estimate the following equation:

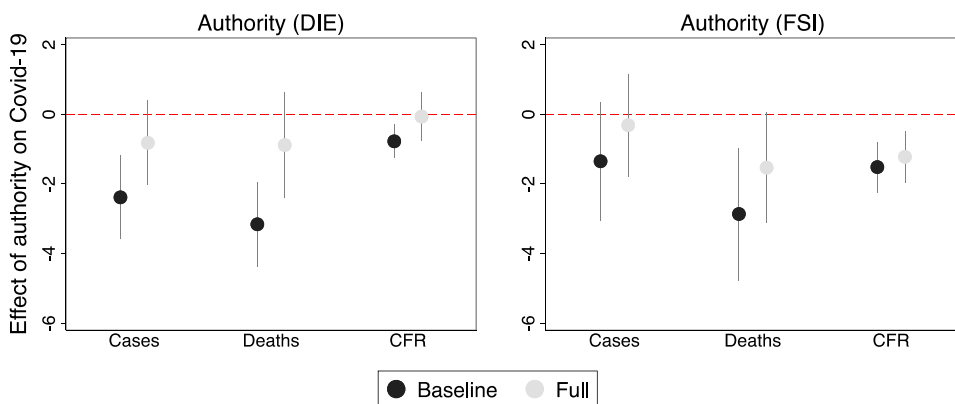
$$y_i = \alpha + \beta_1 \text{state}_i + \beta_2 x_i + \varepsilon_i,$$

where  $y$  is one of our measures of Covid-19 health outcomes or pandemic policy responses,  $i$  indexes countries,  $\alpha$  is the intercept,  $\text{state}$  is one of our measures of the state,  $x$  is a vector of control variables and  $\varepsilon$  is the error term. Our coefficient of primary interest is  $\beta_1$ .

We start the regression analysis by assessing the relationship between our measures of state effectiveness and Covid-19 health outcomes. In the baseline models, we control for economic wealth, testing, population density and age structure of a population. In the full models, we also control for macro-regional differences. We illustrate the main results with coefficient plots, in which the dots represent the point estimates of a given predictor and the spikes represent its 90% confidence intervals. Regression tables are available in Appendix S5.

Overall, the regression estimates of the relationships between different dimensions of the state and Covid-19 health outcomes show that when we control for the main factors that have been thought to affect the spread of the virus, the relationship becomes either inverse or non-significant, depending on the dimension of the state.

We find some evidence of an inverse relationship between state authority and Covid-19 health outcomes (Figure 4). When state authority is measured with DIE (left panel), it has a negative and significant relationship with cases, deaths and CFR in baseline models. In the full models, however, once macro-regional differences are

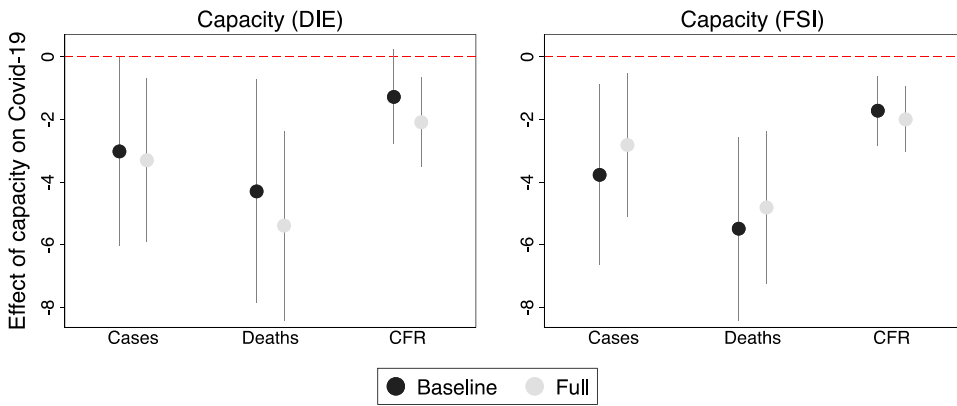


**FIGURE 4** Relationship of state authority with Covid-19 cases, deaths and CFR. See Tables E1 and E2 (Appendix S5) for a more comprehensive summary of the regression results. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

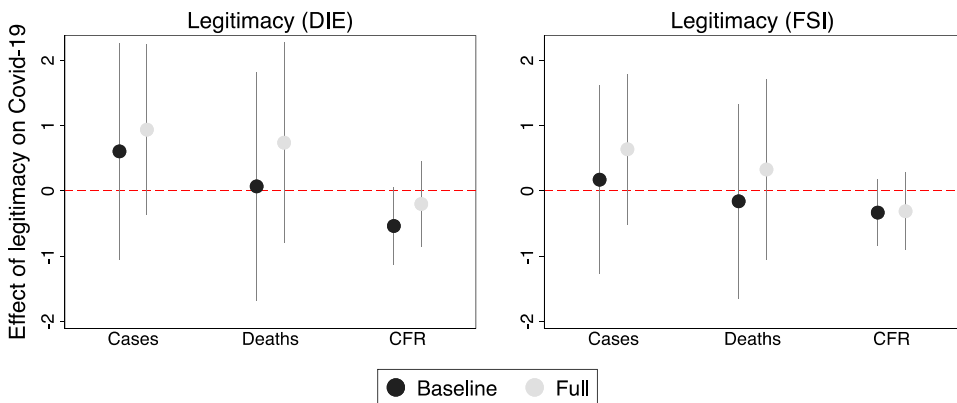
controlled for, the relationship becomes non-significant. On the contrary, when state authority is measured with FSI (right panel), it has a strong negative relationship with CFR in both specifications. Authority is negatively related to deaths at the highest level of significance in the baseline model but loses its statistical significance in the full model. We find no statistically significant relationship between authority and cases when authority is measured with FSI.

The clearest relationships, as expected, are between state capacity and Covid-19 health outcomes (Figure 5). Regardless of the chosen measure of capacity, once economic wealth, demographic factors and macro-regional differences are controlled for, state capacity is inversely related to all our three indicators of Covid-19 health outcomes. The finding is statistically significant at conventional levels. There seems to be no statistically significant relationship, instead, between state legitimacy and Covid-19 health outcomes (Figure 6). The finding is robust to both measures of legitimacy and our three indicators of Covid-19 health outcomes.

Overall, these results suggest that once we control for some of the main factors that are commonly thought to affect Covid-19 health outcomes, the state plays an important role in reducing the adverse impact of the ongoing pandemic. Nevertheless, not all the dimensions of the state seem to be equally important in curbing the pandemic. In



**FIGURE 5** Relationship of state capacity with Covid-19 cases, deaths and CFR. See Tables E3 and E4 (Appendix S5) for a more comprehensive summary of the regression results. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]



**FIGURE 6** Relationship of state legitimacy with Covid-19 cases, deaths, and CFR. See Tables E5 and E6 (Appendix S5) for a more comprehensive summary of the regression results. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

particular, the results of our regressions suggest that state capacity, and to a lesser extent state authority, play a key role in reducing the number of Covid-19 cases, deaths and CFR. We find no evidence, however, of a significant relationship between state legitimacy and any of the Covid-19 health outcomes.

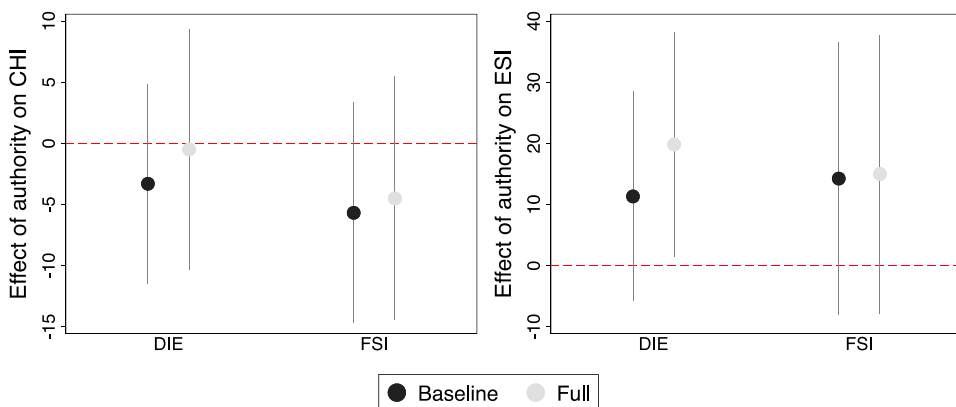
In terms of the magnitude of the predicted effects, according to the estimates from our full models, a 0.10 unit increase in state capacity measured with DIE (on a scale from 0 to 1) is related on average to a decrease of 41.62% in deaths per million inhabitants, 28.09% in cases per million inhabitants and 18.82% in CFR. In absolute values, thus our estimates indicate that a 0.10 unit increase in state capacity (DIE) corresponds to a decrease in deaths per million inhabitants of around 444.04 in a country like Peru (1066.88 deaths per million inhabitants) and to a decrease in cases per million inhabitants of around 1041.60 in a country like the Philippines (3708.09 cases per million inhabitants).

We run a number of alternative models to further assess the robustness of the above findings (Appendix S6). First, we run full models with additional controls for the share of urban population and the level of democracy. In terms of authority and capacity, the interpretation of the results remains largely unaltered. In terms of legitimacy, instead the state–pandemic nexus becomes consistently inverse, reaching even conventional levels of statistical significance in some of the models. Thus, once the level of democracy is controlled for, not only higher capacity and authority but also higher legitimacy might in fact mitigate some of the pandemic's adverse health effects.

Second, we run models in which the measures of the state are included jointly, to isolate the different 'impacts' of the three state dimensions. Essentially, these models corroborate our main findings: Capacity seems to play a more important role than legitimacy and authority in reducing the adverse health effects of Covid-19.

Next, we analyse the relationship between our key measures of state effectiveness and national responses to the pandemic. In particular, we assess the relationship between the state and containment and health policies, and the state and economic support policies. As before, we perform a battery of regressions with measures of the state from both DIE and FSI. In the baseline models, we control for economic wealth, population density, the age structure of population and total confirmed deaths from Covid-19. In the full models, we also control for macro-regional differences.

Figure 7 shows the average relationship between state authority and the stringency of Covid-19-related national containment and health policies (left panel) and the generosity of economic support policies (right panel) in countries around the world. We find no statistically significant relationship between state authority and the intensity of containment and health policies. Conversely, we find inconsistent evidence on the relationship between state authority and economic support. When authority is measured with DIE, the relationship is positive and non-significant in the



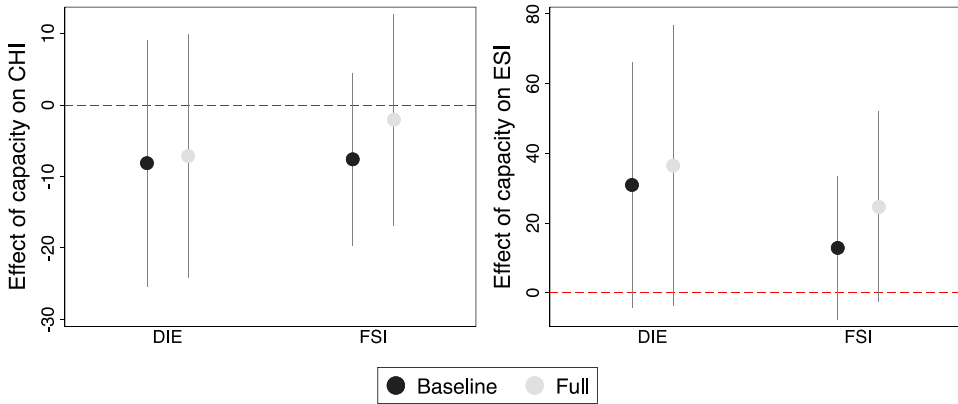
**FIGURE 7** Relationship of state authority with containment and health (CHI) policies and economic support (ESI) policies. See Tables E7 and E8 (Appendix S5) for a more comprehensive summary of the regression results.

[Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

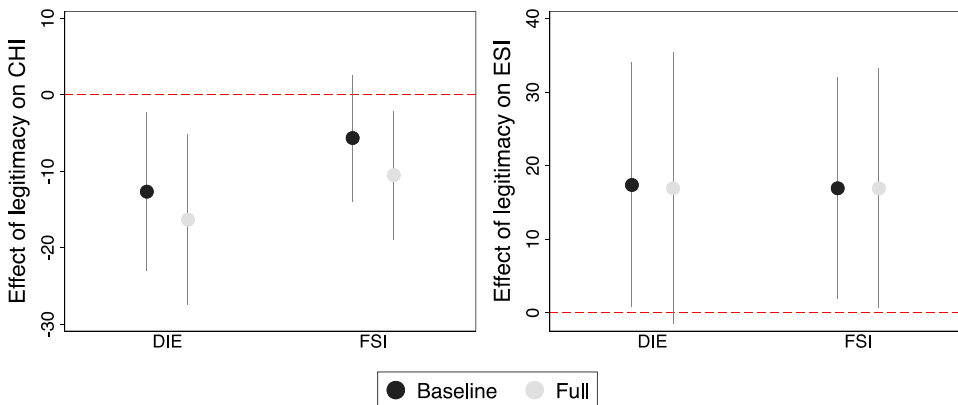
baseline model but positive and significant in the full model. When authority is measured with FSI, instead, there is no statistically significant relationship in either of the models.

We find no evidence of a statistically significant relationship between state capacity and the stringency of containment policies (Figure 8, left panel) or state capacity and the generosity of economic support policies (Figure 8, right panel). The association between capacity and containment policies is not clearly different from zero. The association between capacity and economic support policies seems to be positive and relatively strong on average, but still not different from zero because of the particularly wide confidence intervals. Our findings suggest that variation in state capacity does not predict the severity of containment and health policies nor the generosity of economic support measures.

Legitimacy, instead, is inversely related to the stringency of containment and health measures (Figure 9, left panel), and the finding is statistically significant at conventional levels in the full models regardless of the chosen measure of legitimacy. More legitimate countries seem to have less severe containment and health policies. The relationship between state legitimacy and the generosity of economic support policies (Figure 9, right panel) is positive



**FIGURE 8** Relationship of state capacity with containment and health (CHI) policies and economic support (ESI) policies. See Tables E9 and E10 (Appendix S5) for a more comprehensive summary of the regression results. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]



**FIGURE 9** Relationship of state legitimacy with containment and health (CHI) policies and economic support (ESI) policies. See Tables E11 and E12 (Appendix S5) for a more comprehensive summary of the regression results. [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

across models but statistically significant with both measures if legitimacy only in the baseline models. When macro-regional differences are controlled for, the 'effect' loses its statistical significance when legitimacy is measured with DIE but not when legitimacy is measured with FSI. Hence, we find some evidence that more legitimate countries provide to their citizens more economic relief.

As before, we run additional models to further examine the robustness of these results (Appendix S7). First, we insert controls for urbanization and democracy into the full models. This leads principally to a weaker evidence of a statistically significant relationship between legitimacy and Covid-19 policy responses. Such decrease in significance, however, could be driven by the relatively high degree of multicollinearity between legitimacy and democracy.<sup>2</sup> Second, we assess the relationship between all the three dimensions of the state and Covid-19 policy responses jointly. These models confirm that legitimacy is inversely and significantly related to the stringency of containment and health policies. Third, instead of averaging national policy response data across days, we use maximum values as of 15 November 2020. We find no statistically significant relationship between the state and maximal policy responses.

Given that many of our independent variables are interrelated, some of our null results could be potentially driven by multicollinearity, leading to estimates with large standard errors. To assess the severity of multicollinearity in our models, we compute the variance inflation factor (VIF) for the independent variables included in the full models of our main regressions (Appendix S8). Virtually none of the independent variables reaches a VIF of 10 in any of the models, which is a common threshold for severe multicollinearity. This common threshold is surpassed only by the state capacity variable in the full models in Figure 5 (left panel), suggesting that actually we may be underestimating the magnitude of the 'true' inverse relationship between state capacity and COVID-19 cases, deaths and lethality. Most importantly, however, these multicollinearity tests confirm that our null results are not driven by high correlations among two or more independent variables.

Even if we do not find a robust and consistent linkage between the state and the stringency of containment policies or the generosity of economic support policies, we know that effective states should be more capable of implementing intended policy responses by definition. Hence, in practice, we would not be surprised to see more stringent containment and health policies and more generous economic support policies to be more efficiently implemented in countries with effective state apparatuses than in countries with dysfunctional institutions. Since the available indicators of government responses to Covid-19, however, do not capture the actual enforcement of these policies, but only their adoption, we cannot assess the relationship between the state and the 'true' enforcement of Covid-19 responses for the time being. We strongly suspect that this is one of the reasons for our mainly inconclusive results on the relationship between state effectiveness and government responses.

## 8 | CONCLUSIONS

This study has provided new analysis of the relationship between state effectiveness and Covid-19 health outcomes and government responses. Theory and common sense would suggest that more effective state institutions should help countries to better respond to crises such as the pandemic. The very definition of an effective state implies such linkage, but instead, as we have seen, simple correlations suggest that more effective states have actually had poorer outcomes on average than less effective states.

Cross-country regression analysis provides some insight into why this is the case: These surprising correlations seem to be due largely to other factors correlated with state effectiveness. Countries with more effective states also tend have older populations and more testing, to be richer and to be located in regions that were more affected by the first wave pandemic. Once these factors are taken into account, our analysis suggests a relationship between state effectiveness and pandemic outcomes that more broadly conforms to our expectations. In particular, state capacity is inversely related to Covid-19 cases, deaths and lethality. Relationships with state authority are weaker

<sup>2</sup>The Pearson's correlation coefficient between legitimacy and democracy is 0.82.



but in the expected direction (inversely related to lethality). State legitimacy is not related consistently to any of the chosen indicators of Covid-19 health outcomes, but in our view, this is less surprising given that we expect its impact to be less direct.

Interestingly, in terms of national pandemic responses, however, state authority and capacity are not directly related to either the stringency of containment and health policies or the generosity of economic support policies in our regressions. State legitimacy, in contrast, seems to matter more for government responses: More legitimate states are associated with less severe health and containment policy measures, as well as with more generous economic support policies.

Our study is one of the first attempts to systematically examine the cross-country relationship between state effectiveness and Covid-19 outcomes. Interpreting cross-country regressions is always challenging, and major data constraints present extra challenges on this topic. While care should be taken in interpreting our results, our analysis provides valuable knowledge regarding the first year of Covid-19 and is an important first step towards a better understanding of the overall relationship between the state, its underlying dimensions, and Covid-19 impact. Even if we expect future analysis to deepen as better cross-country data become available, our findings leave little doubt that building well-functioning state institutions should continue to be a top priority in the international development agenda. In general, higher capacity and to a lesser extent authority seem to be prerequisites of better Covid-19 health outcomes, whereas higher legitimacy seems to lead to preferable Covid-19 policy responses.

While we take in this paper a quantitative and cross-national approach to this topic, we also see the importance of in-depth country case studies in teasing out underlying relationships. One way to select case studies for such analysis would be to build on our results to consider, for instance, countries that seem to be 'typical' and 'outliers' in terms of the relationship between Covid outcomes and measures of the state. Residual plots of our 'full' specifications (Appendix S9) show that there are several countries that are well predicted by our models across the regressions (i.e. the residual is small). Nevertheless, there are also many observations with large residuals that are not well predicted by our models. Understanding what these 'outliers' have in common could reveal some additional factors that are related to Covid-19 but were not included in the models.

To give a few examples, we find that in terms of Covid-19 cases and deaths, Peru, the Philippines and South Africa are some of the countries that have been more affected by the virus than our models predict, whereas Cuba, Uruguay and Vietnam are some of the countries that have been less affected by the virus than our models predict.<sup>3</sup> As to the models predicting the severity of health and containment policies, we find that Cuba, Rwanda and Uganda have particularly large positive residuals and Belarus, Mexico and Nicaragua have particularly large negative residuals. As to the models predicting the generosity of economic support policies, we find that Gabon, Honduras and Malawi are some of the countries with particularly large positive residuals, and as before, Belarus, Mexico and Nicaragua, are some of the countries with particularly large negative residuals.

In our data, there seems to be no obvious factor that distinguishes the 'outliers' identified above from more typical countries. Nevertheless, we expect that focused country case studies may reveal additional information difficult to distinguish at the cross-country level.

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<sup>3</sup>Cuba, Uruguay and Vietnam have seen a significant increase in the number of Covid-19 cases in the pandemic's second year, but as already said, the study at hand focuses only on the early stages of Covid-19.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author.

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### SUPPORTING INFORMATION

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