# Administrative characteristics and timing of governments' crisis responses:

# A global study of early reactions to COVID-19

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**Abstract:** In a crisis, fast reaction is key. But what can public administration tell us about this? This study develops a theoretical framework explaining how administrative characteristics, including fragmentation, capacities, legacies and learning, affect governments' response timing. The COVID-19 pandemic is exploited as a unique empirical setting to test this framework and its scope conditions. Region fixed-effects models and survival analysis of partly hand collected data for more than 150 national governments confirm some limited predictive power of administrative structures and traditions: Especially in developing countries, governments with a separate ministry of health adopted binding containment measures faster. Countries with hierarchical administrative traditions, e.g. socialist, adopted some interventions like school closures faster than more liberal traditions, e.g. Anglo-American. These characteristics increase threat perception and availability of a response, respectively. Results also suggest that intra-crisis and inter-crisis learning supply governments with response options. The study advances comparative public administration and crisis research.

# Introduction[1]

Governments and public administrations are often considered as slow (Rainey & Steinbauer, 1999), but during crises they must act rapidly. Although crisis management is beyond their routine tasks, governments are expected by citizens and commentators to react to crises, to provide protection and relief quickly. Crises are the time of executive decision-making (Lægreid & Rykkja, 2019); and effective and crisis management is essentially a question of public administration performance (Eckhard et al., 2021). Unlike with administrative routine tasks, timing is essential in crisis management and decides about the adequacy and effectiveness of reactions (Boin et al., 2016).

Public administration (PA) scholars have highlighted several factors that affect crisis response time and quality: the relation between hierarchical and decentral reactions (Ansell et al., 2010; Christensen et al., 2016), fragmentation and coordination (Kapucu, 2006; Kettl, 2003), organizational structures, cultures and cognitive schemes (Boin et al., 2016; Comfort, 2007), administrative capacities and traditions (Lægreid & Rykkja, 2019), as well as adaptability and learning (Eckhard et al., 2021; Zhang et al., 2018). However, it is far from clear that all these factors are decisive in all crises (Boin & Lodge, 2016). Most of these studies are limited to single instances of crises and single jurisdictions, and we lack a systematic understanding of these effects and their scope conditions. Another limitation is that timing and quality of crisis responses are rarely disentangled. These gaps call for closer theoretical and empirical examination.

This study conceptualizes and analyzes the timing of governments' crisis reaction. I argue that administrative structures and other administrative characteristics systematically affect the speed of crisis decisions, because they affect governments' perception of the problem, the availability and appraisal of a response option, and the decision-making architecture. In empirical terms, the study

exploits the COVID-19 pandemic as an exceptional testing ground for competing arguments about administrative characteristics (Dunlop et al., 2020). From the very beginning of the crisis, there were marked differences in government reactions with existential effects for health outcomes: early and comprehensive measures at the beginning of the outbreak slowed down the spread of the virus and made a significant difference for death numbers (An et al., 2021; Hsiang et al., 2020; Plümper & Neumayer, 2020). While there are many studies in various disciplines exploring this same empirical phenomenon (for example in political science and sociology: Kavaklı, 2020; Sebhatu et al., 2020), this study takes an explicit PA perspective and tests the general hypotheses from the PA crisis management literature. The main goal of the study is not to perfectly explain every government's response timing, but to understand the systematic effect of administrative structures, cultures and legacies. Early PA research on the variation in timing and stringency of COVID crisis responses mirrors the arguments from the broader crisis management literature. Scholars have highlighted the effects of horizontal and vertical government fragmentation (Bromfield & McConnell, 2020; Toshkov et al., 2021), administrative capacities (Capano et al., 2020; Comfort et al., 2020; Kavanagh & Singh, 2020), learning from previous health emergencies (An & Tang, 2020; Capano et al., 2020; Comfort et al., 2020), as well as administrative traditions and state-society relations (Bouckaert et al., 2020; but see Plümper & Neumayer, 2020). However, these analyses are based on a small or medium number of cases and focus overwhelmingly on the US and Europe. This makes it difficult to ascertain which of the proposed explanations really mattered, and whether their effects are generalizable.

This study integrates such arguments into a comprehensive theoretical framework and tests them on a global, partly hand collected dataset of more than 150 countries. The guiding research question is as follows: How did administrative factors affect the timing of governments' reactions to the COVID-19 crisis? The analysis focusses on the first wave of the pandemic, because it most clearly resembled an acute crisis occurring largely by surprise and entailing high levels of uncertainty and urgency (Boin et al., 2016). The study exploits the fact that COVID affected virtually all countries across the globe,

which allows competitive and comparative testing of hypotheses. The main finding, based on two different modeling strategies, region fixed effects and survival analysis, and a number of robustness checks, is that effects of administrative characteristics depend on the specific policy under study and on the country context. Especially in developing countries, governments with a separate ministry of health adopted binding containment measures faster, relative to the first domestic COVID case, than others. This illustrates that context matters for performance (McDonald III et al., 2022; O'Toole Jr. & Meier, 2017), also in crisis management. Findings also suggest that countries with more hierarchical administrative traditions, such as socialist and to a lesser degree Germanic and Napoleonic, adopted some mandatory interventions like school closures faster than those with a more liberal Anglo-American tradition. Results also show that different forms of learning accelerated reaction time. On the other hand, administrative capacity had no systematic effect.

This study makes several important contributions. It advances our understanding of the determinants of government response timing to the COVID-19 pandemic, which is of highest practical relevance. It pushes the empirical boundaries of this emerging literature by considering governments from all continents and including the experiences from developing and emerging economies, which have long been a blind spot in PA scholarship (Bertelli et al., 2020). The study's theoretical contribution is to introduce a framework that conceptualizes response timing, theorizes the effect of administrative fragmentation, capacities and legacies, and that can be applied to other crises and contexts. The study also advances the crisis management literature and comparative PA research (O'Toole Jr. & Meier, 2017; van der Wal et al., 2021) empirically: Rarely, if ever, has a crisis hit so many countries in such a comparable and simultaneous manner, a nearly ideal scenario for PA research. The study is innovative in that it tests widely discussed determinants of public sector performance systematically in a large-N study, moving beyond the 'usual' OECD context. Finally, by mapping health ministry organization across the globe, the study makes a comparative contribution to the literature on portfolio design and its policy effects (Egeberg, 1999; Mortensen & Green-Pedersen, 2015).

## Administrative features as determinants of crisis decision speed

One of the central challenges for crisis managers is to make fast decisions under time pressure (Boin et al., 2016, p. 6). Timing is therefore a central feature of the crisis response. For analytical purposes, it is useful to distinguish between the timing of the adoption of a measure (decision) and the timing of the implementation on the ground. Both matter for overall response time, but the focus of this study is on the first step. I conceptualize the timing of a government crisis decision as a function of three elements. The first element is problem perception and collective "sense making" (Boin et al., 2016) of the situation (*a*); this includes the perception of the unfolding crisis and of the urgency to react among those actors whose agreement is necessary for a crisis decision. The second element includes the availability and perceived appropriateness of a response or policy measure among these actors (*b*). The third important factor is the decision-making architecture (*c*), and in particular, how many institutional actors are involved in the actual decision making in a crisis situation. Taken together, (*a*) the stronger government actors' awareness of imminent threat and (*b*) the higher the awareness and appraisal of a potential response and (*c*) the simpler the collective decision-making process, the *faster* a government crisis decision will be achieved.

These three constitutive elements of decision speed are potential channels through which administrative characteristics affect crisis decision speed. I now review central arguments from the literature about the effect of such characteristics, ranging from structures and capacities to legacies, and integrate them in a comprehensive theoretical framework of the *timing* of government responses. I also derive expectations for the empirical context of this study: How, and through which channels, did administrative characteristics affect speedy government reaction at the beginning of the COVID-19 pandemic?

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*Organizational fragmentation*

One of the classic structural choices in public administration is between more or less specialization. Specialization entails the trade-off between professional capacity for specific tasks and a higher need for coordination between fragmented units and organizations (Bouckaert et al., 2010; Gulick, 1937). We can distinguish organizational specialization and fragmentation on two dimensions: horizontal and vertical (Egeberg, 1999). With horizontal fragmentation, I refer to the formal degree of specialization within central, national-level governments. Fragmentation between agencies or departments can lead to specialized expertise and information, but it complicates policy coordination and delivery already in normal times (Jenkins & Henry, 2016). During crises, horizontal fragmentation complicates communication of crucial information about the nature of the threat (linking to response timing through element/channel *a*) as well as the decision making process (channel *c*) and agreement on a crisis reaction (Boin et al., 2016, pp. 25–39). Horizontal specialization and the exact drawing of organizational boundaries between government ministries and agencies reflects political priorities and channels the allocation of attention, which has substantial effects for government decision making (Egeberg, 1999; Mortensen & Green-Pedersen, 2015).

In the context of COVID-19, Bouckaert and colleagues' (2020, p. 769) analysis suggests that horizontal fragmentation amplifies coordination challenges (channel *c*). Comfort and co-authors (2020) provide a more nuanced picture; they highlight the disadvantages of extreme horizontal fragmentation within the US federal government but also the advantages of South Korea's functional, horizontal fragmentation that involves specialized organizations for monitoring, response and coordination. In theoretical terms, horizontal fragmentation is conducive to speedy response if it involves specialized monitoring units that provide information about the threat (channel *a*). In a similar vein, Toshkov, Carroll and Yesilkagit's (2021) analysis finds that European governments with separate ministries of health reacted more quickly, arguably because "the weight of healthcare issues increases with the presence of a single-sector ministry" (ibid., 6), as opposed to governments where

health topics are organized in a ministry with multiple portfolios such as social affairs or welfare. This suggests that in a pandemic, where a clear focus on health issues is of utmost importance, the advantages of horizontal fragmentation, channeling attention to health concerns (channel *a*), outweigh its disadvantages, more difficult coordination. This leads to the following expectation.

*H₁: Governments with a separate health ministry respond faster to COVID-19.*

The crisis management literature has focused even more on vertical fragmentation, the degree of specialization between central (national-level) governments and subnational governments (regions, states). Lower vertical fragmentation as in unitary, centralized states implies more hierarchical and centralized crisis decisions, whereas a higher degree of specialization in federal and decentralized states requires a more networked response (Parker et al., 2019). Hierarchy and centralization is often advocated as a 'natural' means for crisis decision-making (Boin et al., 2016, pp. 153–154; Christensen et al., 2016). For instance, more than a century ago, the ineffective response to the Spanish flu by Great Britain's decentralized public health system and Local Government Board resulted in a restructuring and the creation of the central Ministry of Health in 1919 (Ferguson, 2021, p. 172). Although the effects of more decentralized versus more hierarchical structures for the *implementation* of a crisis reaction remain contested (Christensen et al., 2016; Kuipers et al., 2015), the former should increase the time necessary for a central *decision* (the empirical analysis accounts for central and decentral reactions) because more organizational actors have a say in decisions (channel *c*). Indeed, first studies on the management of the COVID crisis suggest that more centralized states reacted faster and more decidedly while decentralization, and federalism in particular, inhibited a swift response (e.g., Bromfield & McConnell, 2020; Kettl, 2020; Toshkov et al., 2021; but see Plümper & Neumayer, 2020):

*H₂: Governments in unitary and centralized states react faster to COVID-19 than those in federal and decentralized states.*

*Administrative capacities*

Administrative capacities, including the degree of professionalization and the numbers, skills and knowledge of personnel, matter for public service performance (Rainey & Steinbauer, 1999), and analytical, regulatory, delivery and coordination capacities matter for policy making and problem solving (Egeberg, 1999). The crisis management literature in particular distinguishes monitoring capacities from response capacities (Ansell et al., 2010, pp. 201–202; Comfort, 2007; Lægreid & Rykkja, 2019). Monitoring capacities are crucial to detect and interpret warning signs in time (channel *a*) and response capacities for formulating (channels *b*, *c*) and implementing a crisis response; both contribute to an effective and timely crisis reaction. Along these general arguments, Comfort and colleagues (2020) highlight the role of monitoring, testing and response capacities for early reactions to COVID-19, and Capano and co-authors (2020) argue that preparation and planning for pandemics as well as overall government resources were decisive for a swift and strong response. In contrast to that, Toshkov and colleagues (2021) find that countries with higher administrative capacities reacted later, arguably because strong administrative and health capacities lessen feeling at risk (channel *a*). Taking the middle ground between these positions, Kavanagh and Singh (2020) note that countries with similarly high levels of formal pandemic preparedness have experienced vastly different death rates; not all of them have fared well during the first wave of the pandemic. It appears that formal preparedness, which is closely linked to general state capacity, is not sufficient for effective government response but may be nothing more than "fantasy plans" (Boin et al., 2021, pp. 30–32). In sum, earlier analyses suggest different effects of formal capacities on COVID crisis response. Therefore, I base my theoretical expectation on the broader literature on crisis management and propose the following hypothesis:

> *$H_3$: Governments with stronger administrative capacities react faster to COVID-19.*

*Legacies & learning*

Two arguments engaging with legacies of past decisions, institutions and experiences are particularly relevant for crisis management: administrative traditions and learning from earlier crises. First, administrative traditions are a prominent explanation for differences in public administration structure and practice (McDonald III et al., 2022, p. 63; Painter & Peters, 2010; Van der Wal et al., 2021). Administrative traditions are closely linked with state-society interaction, structures of centralized versus federal government and general political culture (Painter & Peters, 2010; Porcher, 2021). Christensen and colleagues (2016, p. 320) have argued that cultural and structural factors interact and jointly affect crisis decision making. For example, the Scandinavian tradition and its focus on collaborative decision making can foster horizontal and vertical coordination (channel *c*). Bouckaert and colleagues (2020) argue that the Napoleonic and Continental European administrative traditions with a "perceived supremacy of the state vis-à-vis society" (Bouckaert et al., 2020, p. 768) account for the relatively strict containment measures against COVID-19 adopted in Belgium, France, Germany, and Italy, as opposed to lighter measures in countries with more liberal Scandinavian or Anglo-American traditions. Applied to my theoretical model, this argument suggests that more hierarchical relations between state and society will make a restrictive state response appear more plausible and thus increasing response appraisal (channel *b*). Plümper and Neumayer (2020), on the other hand, reject such a 'family of nations' approach based on an analysis of stay-at-home orders in 38 European countries. However, this sweeping conclusion results from the authors' deterministic approach where single cases suffice to reject an explanation entirely. I therefore propose the following expectation:

> *H4: Governments with administrative traditions emphasizing hierarchical state intervention react faster to COVID-19 than those with traditions that limit the role of the state.*

Second, the literature on administrative crisis management focuses on learning from past crises and portrays learning as one ideal-typical and desirable step in crisis management (Boin et al., 2016). Lesson learning can result from one crisis and help in the next one by increasing awareness (channel *a*) and leading to improved structures and practices (channel *b*, *c*), but it does not occur automatically (Comfort, 2007). Exposure to previous crises can "increase familiarity with performance gaps, demonstrate fundamental limitations in capacity, and stimulate learning manifested as increased perception of risk" (Zhang et al., 2018, p. 383). In the context of COVID-19, Comfort and co-authors (2020) highlight South Korea's experience with MERS, resulting in learning, vigilance and capacity building, as the main explanation for fast and comprehensive response to COVID. Such experience was missing in the US, resulting in a lack of response capacities and downsizing of monitoring capacities before the crisis. Several other studies also highlight the role of states' experience with previous epidemics such as SARS, and the resulting administrative capacities and awareness, which were particularly pronounced in many Asian countries that reacted quickly and effectively (An & Tang, 2020; Capano et al., 2020). Capano and co-authors (2020) argue that although many Western countries had high levels of formal preparedness and capacities, their lack of recent experience with an epidemic resulted in a somewhat slower and weaker response, because lack of experience limited understanding of the severity (channel *a*) and made policy reactions less obvious (channel *b*).

*H5: Governments with recent experiences with infectious diseases react faster to COVID-19 (inter-crisis learning).*

When own experiences with specific types of crises are absent, governments should try to learn from the experience of others (Boin et al., 2016, p. 168). This happened also with COVID-19, where governments around the world looked to others, especially China and Italy, for inspiration for policies that worked against the new, unknown disease. What occurred was policy diffusion through "intracrisis learning" (Moynihan, 2009). The pandemic involved a severe "first-mover disadvantage" (Plümper & Neumayer, 2020; Toshkov et al., 2021) because countries that were hit first had no

opportunity to learn from others' best practices and had to make decisions with little available information (channel *b*), which increased the time for crisis decision-making. Countries that were hit later had the opportunity for learning from the first movers' experience and responses. Thus, the later the onset of the crisis in a specific country, the more opportunity for its government for intra-pandemic learning from others:

> *$H_6$: Governments in countries where COVID-19 arrived later reacted faster in relative terms (intra-crisis learning).*

## Data

*Measuring COVID-19 response speed*

For the dependent variables, I rely on information from the Oxford COVID-19 Government Response Tracker (OxCGRT, Hale et al., 2020). This dataset provides detailed information about different response measures, their timing, coverage and intensity in virtually all countries around the world. To ensure that the analysis does not depend on the choice of a specific measure, I employ several variables. First, I identify the date of the *first required containment measure* in each country. This is a very broad, inclusive measure covering any of the following measures, as long as they are formally required (rather than recommended) in at least parts of the country: school closings, closings of workplaces, cancelling of public events, restrictions on gatherings above 100 people, stay-at-home requirements, restrictions on internal movement between cities or regions, or complete international travel bans. Secondly, I analyze three key policies separately, which were among the most prominent non-pharmaceutical interventions in 2020: (a) *School closings*, i.e. the required and countrywide closing of most primary and secondary schools with some possible exceptions. (b) *Stay-at-home-orders*, i.e. citizens in the entire country are required not to leave the house with minimal exceptions or some exceptions like grocery shopping. (c) *International travel restrictions* that ban arrivals either from some regions or all regions.

Although the virus constitutes a similar external shock for all countries and information on policy measures is readily available, operationalizing and comparing their timing remains challenging. For each of the mentioned policy measures, I calculate the number of days between the first confirmed domestic COVID-19 case (from the same dataset) and the onset of the respective measure in the country. I focus on these containment measures rather than on health-related measures (like testing and, later, vaccination) because the latter presuppose a certain level of government and health capacity, whereas containment measures, which are essentially new rules and prohibitions, are available to all governments regardless of their capacities and can, therefore, be better compared across countries. While the focus here is on the timing of the response measures, the analysis also takes their stringency into account because it counts only measures that were formally required or binding, and leaves out softer responses, those based for example on governments' recommendations or nudges. In doing so, the study analyzes only one subset of COVID policies, strict containment measures; and I discuss implications of this choice below.

*Independent variables*

The main independent variables refer to the country's administrative system and legacies. For horizontal fragmentation, I rely on original data about health ministries gathered from government websites and other online sources. Based on this, I coded a dummy variable *Separate Health Ministry* as 1 if the health portfolio was organized as a separate government department in March 2020, i.e. around the onset of the pandemic, and 0 otherwise. For example, several countries organized the health portfolio together with areas such as social affairs (e.g., Mali, Sweden), labor and welfare (Japan), family welfare (Bangladesh), welfare and sport (Netherlands), gender, elderly and children (Tanzania) etc. Appendix Tables A1-A2 provide details about the coding of this variable and all other data sources and descriptive statistics.

For vertical fragmentation, I selected two measures based on their conceptual clarity and coverage: First, *Independent Sub-Federal Units* (Henisz, 2017), a dummy variable with global coverage

denoting federal or quasi-federal countries with strong subnational units such as states or provinces that constrain national-level policy making. Secondly, I use the *Regional Authority Index* (RAI, Hooghe et al., 2021), available for a more limited set of countries. This index captures the degree of subnational autonomy and region's say in national-level decision-making. Both of these measures quantify a similar underlying concept, vertical fragmentation; Table A3 in the Appendix shows that they correlate significantly with each other and with other measures of decentralization including decentral health expenditures.

To measure general government capacity, I use the *Government Effectiveness* measure from the World Bank's worldwide government indicators (WGI, Kaufmann et al., 2009). This indicator is based on a variety of sources and the perception of stakeholders and experts on the quality and effectiveness of the government and public service. The major advantage of this indicator is its global coverage, which allows comparing government capacity across almost all countries in the world. Reassuringly, *Government Effectiveness* correlates strongly with a more specific measure of health system capacity (see Appendix Table A3); preparedness of the state and preparedness of the health system seem to go hand in hand.

Administrative traditions are a complex concept; in practice they are layered and mixed (Painter & Peters, 2010). As a proxy for the dominant administrative tradition in each country I use *Legal Origin* (La Porta et al., 1999), a categorical variable identifying the legal origin of a country's company law or commercial code among five possible origins: French, British, German, Scandinavian, Socialist. To capture experience with previous infectious diseases or epidemics, I employ a dummy variable *SARS experience* based on whether a country recorded any confirmed cases of SARS in 2002/2003 or not. Indeed, SARS (caused by SARS CoV-1) bears close resemblance with COVID-19 (caused by SARS CoV-2), so much that Chinese doctors at the beginning thought it was the same virus (Ferguson, 2021, p. 289). To operationalize learning during the COVID-19 pandemic and capture

whether a government had the possibility to learn from others who were affected slightly earlier, I use the *Date of first COVID case* in each country, based on the OxCGRT data.

I include three baseline control variables: GDP per capita, level of democracy (ranging from strongly autocratic to strongly democratic), and (log) population size. These factors have been mentioned in the debates around COVID-19 policy responses (e.g., An et al., 2021; Sebhatu et al., 2020; Toshkov et al., 2021) and in previous comparative research on public service performance (Jugl, 2019; O'Toole Jr. & Meier, 2017). Moreover, in order to isolate the effect of government structures and legacies, it is important to control for political factors. Political preferences for public health and state intervention on the one hand and economic costs and individual freedoms on the other mattered for government responses to COVID (Kavaklı, 2020; Plümper & Neumayer, 2020; Toshkov et al., 2021) and might be correlated with preferences for or against fragmentation or with certain administrative traditions. Therefore, I include a control variable for government ideology on a left-right scale for democratically governed countries (Kavaklı, 2020).

## Methods

The study estimates the effect of the independent variables on the timing of required containment measures. In order to focus on the first wave of the pandemic, which most clearly resembles an acute and uncertain crisis situation, the period of study is limited to the first half of 2020. If a country experienced the respective first measure or the first COVID case after 30 June 2020, this is coded as missing information. To ensure that the findings do not hinge on a particular definition of containment measures nor on model specification, I employ four different dependent variables (one aggregated indicator of containment measures and three individual measures), two modeling strategies, and five different samples.

The basic model is an OLS model:

$Days\ since\ first\ case_{mi}$

$$= \beta_0 + \beta_1\ SeparateHealthMinistry_i + \beta_2\ Decentralization_i$$
$$+ \beta_3\ GovernmentEffectiveness_i + \delta_{1-4}\ LegalOrigin[n-1]_i + \beta_5\ SARS\ Experience_i$$
$$+ \beta_6\ DateFirstCovidCase_i + \gamma Controls_i + Region_{FE} + e_{mi}$$

where the dependent variable is days between the first domestic COVID-19 case and policy measure $m$ in country $i$. All independent variables, including four dummies for the categories of $LegalOrigin$ and the vector of $Controls$ are specific to country $i$. $Region_{FE}$ are fixed effects for six world regions.[2] Essentially, countries are nested in regions or continents, and the fixed effects absorb any cultural, social, or institutional particularities shared within each region. This allows to analyze the effects of government characteristics while holding the regional context constant. All reported standard errors are heteroscedasticity robust.

Because $Days\ since\ first\ case_{mi}$ is a continuous variable, regression analysis is appropriate. However, in a second step I employ survival (event history) analysis to account better for the temporal structure of the dependent variable. In analogy to biological survival, I analyze the time between a country catching the disease (date of first COVID-19 case) and the onset of the expected effect (adoption of containment measure); 'survival' would mean that a country *never* adopts policy $m$. I estimate the following Cox proportional hazards model:

$$h_{mi}(t) = h_0(t) \exp(\beta_1\ SeparateHealthMinistry_i + \beta_2\ Decentralization_i$$
$$+ \beta_3\ GovernmentEffectiveness_i + \delta_{1-4}\ LegalOrigin[n-1]_i + \beta_5\ SARS\ Experience_i$$
$$+ \beta_6\ DateFirstCovidCase_i + \gamma Controls_i + \gamma_k\ CumulativeCovidCases_{it})$$

The dependent variable is the hazard rate of country $i$ adopting measure $m$, that is, whether and how quickly it adopts the policy. It is estimated as a function of a baseline hazard $h_0(t)$ and observed covariates. Control variables are the same as before plus the dummies for the five world regions. This

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[2] These are: Asia & Pacific, Eastern Europe & Post-Soviet, Latin America & Caribbean, North Africa & Middle East, Sub-Saharan Africa, Western Europe & North America.

model includes an important additional control variable, $CumulativeCovidCases$, which is not fixed at the country level but varies for each day $t$ in country $i$. In addition to $DateFirstCovidCase_i$, the daily variable of $CumulativeCovidCases_{it}$ accounts for variation in the spread of the disease and, in turn, in the pressure and urgency perceived by government decision makers. Coefficients for the covariates imply an increase (positive coefficients) or decrease (negative coefficients) in the hazard or 'risk' of policy adoption.

The advantage of survival analysis is not only that it can consider this time-varying covariate, but it also accounts for censored data, that is, for cases in which a country had not (yet) adopted the measure by the end of the period under study. On the other hand, survival analysis only considers those observations (countries) that are formally 'at risk', which I define as starting from the first COVID-19 case. This means that the analysis excludes countries that have adopted the respective containment measure before the first domestic case was confirmed; different from the survival analysis, the region-FE model takes these observations into account and is able to deal with 'negative time'. The advantage of the semiparametric Cox model is that it leaves the baseline hazard unparameterized and focuses on the effect of the covariates on the hazard rate (Box-Steffensmeier & Jones, 2004, pp. 48–49). Following best practices, I tested for the crucial proportional hazards assumption and interacted covariates with *ln(analysis time)* when the assumption was violated (see Appendix Tables A9-A13).

These two modeling strategies are applied to a range of different samples. The primary sample is global and restricted only by data availability. Subsamples are defined along two dimensions: income and political regime. These important aspects may vary within continents and regions and, therefore, not be captured by the region fixed effects, which warrants more homogenous subsamples. All available countries are split at the global median GDP per capita and classified either as above median or below median income; the latter group can be considered developing economies. Similarly, all countries are split into democracies and non-democracies at the cutoff value of 0.5 on the 0 to 1 scale of electoral democracy (following Lührmann et al., 2018, p. 64).

Although the study's systematic statistical testing constitutes a methodological step forward in crisis management research, issues of endogeneity cannot be fully ruled out. What can be ruled out, though, is the familiar critique of 'reverse causality', because all independent variables were measured before the onset of the COVID pandemic that hit governments as a comparable exogenous shock. The findings are informative under the assumption that the models control for central confounding factors. This point is related to another challenge, which is data availability. Simply put, the study only includes factors for which cross-country data were available or collectable. In some cases, like vertical fragmentation or administrative tradition, these data are simplistic proxies rather than fine-grained measures. Since formal structures are easier to quantify than practices, the study focuses on the effect of organizational specialization and fragmentation rather than on coordination practices, which are also central in the literature. It assumes, however, that specialization and the need for coordination are inversely related.

## Results

Appendix Table A3 shows that vertical fragmentation correlates positively with administrative and health capacity, which confirms the intuition that increased specialization leads to higher capacity. Among 183 states for which data were collected, 135 have a separate ministry of health (73.8%), but this horizontal fragmentation is not systematically linked with vertical fragmentation nor capacity. How did these factors affect COVID-19 crisis response, and which factor mattered most clearly? Figure 1 shows estimated coefficients and 95% confidence intervals from regression models with region fixed effects, with *Days between first case and first required containment measure* as dependent variable. A positive coefficient means more time until the first considerable crisis response, and the units of the dependent variable are days. For each independent variable of interest, three coefficients and confidence intervals are reported; these result from three different estimations for the full global sample, a subsample of developing economies (below median GDP per capita), and a

subsample of democracies. Governments with a separate health ministry responded faster in all samples. This effect is significant at p<0.1 in the global sample, and it is particularly pronounced and highly significant among countries with income below median. For the latter, the coefficient suggests that a separate health ministry accelerated the adoption of the first required containment measure by more than three days. The negative coefficient holds, but loses significance, across political regimes (see Appendix Tables A7-A8).

As expected, vertical fragmentation is associated with a slower response, although not significantly (see robustness checks). There are no noticeable effects of administrative capacity in any of the samples. Some interesting patterns emerge for administrative traditions. State-centric traditions including the socialist and, to a lesser degree, German one are associated with faster response, which is significant in the global sample. Countries with socialist tradition adopted first binding containment measures 17 days earlier than the baseline (French tradition). In line with expectations, the more citizen-centered English and Scandinavian traditions are linked with more hesitation to *require* containment measures, but this is significant only for the English tradition among democracies. There is also evidence for learning: Experience with SARS is related with a significantly shorter response time, the substantial effect size ranges from about one week in the global sample to almost three weeks among below-median income countries. Having experienced the first domestic COVID-19 case one day later is associated with a reduction in crisis reaction time by roughly one day, which strongly suggests intra-pandemic learning from the first movers. Note that all other coefficients are net of this relative timing effect within the global pandemic timeline. The appendix (Tables A4-A8) reports detailed regression results for all specifications.

Figures 2 to 4 follow the same setup and report regression results for the three samples for three individual containment measures. Figure 2 shows effects on required school closings. Signs are similar to those in the previous figure. Noticeably, socialist tradition (but not the German) is linked significantly with faster school closures in all three samples. While the timing of the first domestic

case shows an accelerating effect again (intra-pandemic learning), SARS experience is not significant for this outcome. School closures are the only measure for which government ideology matters statistically but the substantive effect remains small.

Figure 3 shows results for countrywide stay-at-home orders. There is no effect for horizontal and vertical fragmentation, for capacity, experience with SARS and government ideology. As for previous measures, English administrative tradition is associated with slower adoption of lockdown measures, but for this outcome a socialist tradition appears even more inhibiting, especially in developing countries. Finally, Figure 4 reports estimates for international travel restrictions, and the findings resemble those in the first two figures: Horizontal specialization has an accelerating effect, significant only among democracies, while decentralization has a delaying effect in the global sample. Administrative capacity and traditions as well as government ideology are insignificant for travel restrictions. What matters most clearly is experience with SARS, which accelerates this cautionary measure by more than one week at least.

For reasons of space, I focus here on the region-FE results. The appendix (Tables A9-A13) also reports detailed results from Cox survival models.[3] In these, learning effects, from SARS and during the COVID pandemic, remain significant among democracies and higher-income countries. Administrative traditions lose significance in several Cox models but democracies with English tradition remain less likely to adopt containment measures. Cox coefficients for the global sample suggest that having a separate health ministry increases the likelihood of adoption for several policy measures. This is illustrated in the Kaplan-Meier graph in Figure 5 which plots the descriptive survival functions[4] for adoption of required containment measures by governments with a separate health ministry (dotted line) and without (solid line). It shows that, despite variation within both

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[3] Note a difference in the interpretation. For regression coefficients plotted in Figures 1-4, a positive coefficient indicates more time until policy adoption, or a slower response. Cox regression coefficients have the opposite interpretation with a positive coefficient increasing the hazard rate or chance of policy adoption, thus indicating a faster response.
[4] This graph is purely descriptive and does not control for other factors.

groups, the former adopted their first containment measure earlier, relative to their first domestic case, than the latter.

*Robustness and plausibility checks*

Several checks ensure the robustness of the results. First, the selection of four different policy measures and three samples ensures that the results are not simply based on a biased operationalization of crisis reaction or sample selection. Second, to further ensure measurement validity, I repeat all specifications for an alternative aggregate measure of containment policies: The aggregate variable *Days between first case and first required containment measure*, the dependent variable used in Figure 1, also counted policies that were confined to a specific *city* or *region*. Alternatively, I use a more demanding operationalization to identify only national-level policies: *Days between first case and first required* countrywide *containment measure*, which covers the same categories as the previous variable such as school closings and restrictions on gatherings, as long as they are required for the entire country. Most results hold for this alternative dependent variable. One, highly plausible, difference in the results is that the inhibiting effect of vertical fragmentation is significant for countrywide containment measures (the alternative operationalization) but not when subnational measures are included (the original operationalization shown in Figure 1).

Further robustness checks are reported in Appendix Tables A14-A18. Third, I inspected post-estimation leverage-versus-residual-squared plots to identify outliers. I then repeated the estimation without these observations and results largely hold. Fourth, I re-estimate the models for the democratic subsample without the control for government ideology, and the results hold. Fifth, given the strong correlation between administrative capacity and GDP per capita, I re-estimate the region-FE models without this control but for the more homogeneous sub-samples below-median and above-median income to ensure some comparability in income. Capacity remains insignificant. Finally, to probe the plausibility of analysis and findings, I qualitatively explore the cases of Vietnam and Laos

(in appendix VII), which share several features discussed in the paper but are largely overlooked by Western PA literature.

## Discussion

Based on the demanding modeling strategy, no administrative characteristic turned out significant in all estimated models. Nevertheless, some patterns emerge. As expected, a separate health ministry is largely associated with a quicker crisis response. Although this effect is not always stable nor always statistically significant across policy measures and specifications, there is recurring evidence supporting hypothesis $H_1$. In models in which it turns out significant, a separate health ministry has a substantial accelerating effect of several days on crisis response. The effect is visible for the global sample but also with a focus on more coherent groups of democratic or developing countries. In the COVID-19 crisis, horizontal fragmentation and specialization turned out favorably, likely because adopting life-saving measures required a resolute government focus on health, at the expense of economic and educational activity and mobility. A separate, 'single-sector' health portfolio fosters the prioritization of health issues at the government table and increases awareness for health threats (theoretical channel *a*) and responses (channel *b*). Effects of horizontal fragmentation may differ for other crises, especially if they cut across classic government portfolios. The results for vertical fragmentation and decentralization are somewhat in line with expectations, namely that more fragmentation tends to inhibit crisis reaction ($H_2$), but they remain largely insignificant.

Capacity has no systematic effect on COVID crisis reaction timing and I reject hypothesis $H_3$. This result seconds earlier arguments that general administrative capacity or formal crisis preparedness helped little in the face of a real-life pandemic (Kavanagh & Singh, 2020). The findings do not support the bolder argument that capacities inhibited swift responses through overconfidence (Toshkov et al.,

2021), but my non-findings may result from positive and negative effects of capacity cancelling each other out.

Perhaps the most striking finding pertains to administrative traditions. There is some limited evidence supporting earlier arguments (Bouckaert et al., 2020) that states with hierarchical administrative traditions that emphasize state intervention, such as the Continental European French and German traditions, adopt binding measures faster than those with more liberal traditions, especially the English one. This does not rule out that countries with an English tradition adopted softer measures such as recommendations or nudges relatively quickly, which may have been similarly or more effective; but such measures are beyond the study's scope. Still, the central insight from a crisis-management perspective is that administrative traditions have predictive power for crisis response patterns. Moreover, the global analysis identified a socialist or post-communist tradition as most favorable for swift crisis response through binding measures. This is in line with hypothesis $H_4$ because the socialist administrative tradition considers state and administration as important and powerful instruments for achieving political goals (Painter & Peters, 2010, pp. 27–28). In several models but not all, the socialist tradition had an accelerating effect, especially on school closings and the aggregate measures of first containment policies. States with a socialist legacy were not systematically faster in adopting travel bans and even slower in adopting lockdown measures, but taken together, they were quicker in adopting the first required containment policies (as opposed to mere recommendations) and impose binding limitations, which might have allowed them to defer lockdowns. But why? What is behind the 'socialist' label? Administrative traditions convey structural ideas about how governments should be organized and political-cultural ideas about state-society relations (Christensen et al., 2016; Painter & Peters, 2010). Because this study includes structural features, horizontal and vertical fragmentation, as separate covariates, the remaining effect of administrative traditions should be driven by their political-cultural dimension, the norms and ideas about the role of the state, as outlined in $H_4$. Such norms should foster the availability and perceived

efficacy of a restrictive response as well as perceived self-efficacy of governments (channel *b*), as the cases of Vietnam and Laos illustrate (appendix VII). Note that traditions are not merely proxies for geography here; the simultaneous use of region fixed effects and administrative traditions disentangles the two. Significant effects in the region FE models imply that administrative traditions make a difference within various world regions – not just in Europe.

The results also support the hypotheses about learning. The most consistent effect, out of all variables of interest, results for the Date of first COVID case. This has a robust and highly significant accelerating effect as predicted by $H_6$: later confrontation with the virus resulted in a relatively faster response. This suggests intra-pandemic learning from others who were affected earlier. This intra-crisis cross-border learning was more significant than inter-crisis learning from own experience with past epidemics ($H_5$). Although exposure to SARS is linked to faster response in some specifications, particularly for international travel bans, it had no significant effect on other measures such as school closings or stay-at-home orders. Yet, the fact that countries with SARS experience were neither more likely nor faster in adopting lockdowns also allows for the interpretation that they had systems of testing and contact tracing in place which made lockdowns unnecessary (Comfort et al., 2020). Such health-system related measures are beyond the scope of this study, unfortunately. Note, however, that a country which was successful enough through other means to completely avoid school closings in the first half of 2020 would automatically drop out of the region-FE model for school closings.

## Conclusions

This study has introduced a framework to integrate the effects of administrative fragmentation, capacities and legacies on the timing of crisis reactions. It is the first in PA research to test prominent arguments about administrative characteristics and crisis management systematically and *concurrently* in a *global* comparison. Although comparative and more inclusive approaches are increasingly advocated in PA (Bertelli et al., 2020; McDonald III et al., 2022; van der Wal et al.,

2021), research remains dominated by single case (country, municipality, agency) studies. The same applies to research on crisis management and the emerging literature on administrative responses to COVID-19. This study tests the external validity of key hypotheses on a global set of states that also includes developing and emerging economies. In doing so, it pushes the boundaries of crisis management research and demonstrates that key arguments also apply to settings that were previously understudied. Results suggest that effects of a separate health ministry and learning from experience with SARS were especially pronounced among countries below the global median GDP per capita and that they drive the effect in the global sample. A tentative interpretation is that these explanations forwarded in the literature may apply better to settings where overall government capacity is limited, while idiosyncratic factors and current political debates may play a bigger role in richer countries.

In light of the trade-off between internal and external validity, I suggest that quantitative, large-N approaches and small-N analyses should complement each other, also in crisis management research. The theoretical ideas tested in this study were derived from case studies which have already provided within-case evidence on the causal mechanisms behind these effects. One logical way forward is to test the hypotheses quantitatively in other crisis situations. A second avenue for future research is to zoom in again on qualitative cases with characteristics for which the underlying mechanisms are not yet fully understood, such as administrative traditions, or contexts that are less studied such as low-income countries. The conceptualization of crisis response timing as a function of threat appraisal, response appraisal and decision architecture may guide such future work.

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# Figures

**Figure 1. Coefficients and 95% confidence intervals from region-FE models for timing of first required containment measure.**
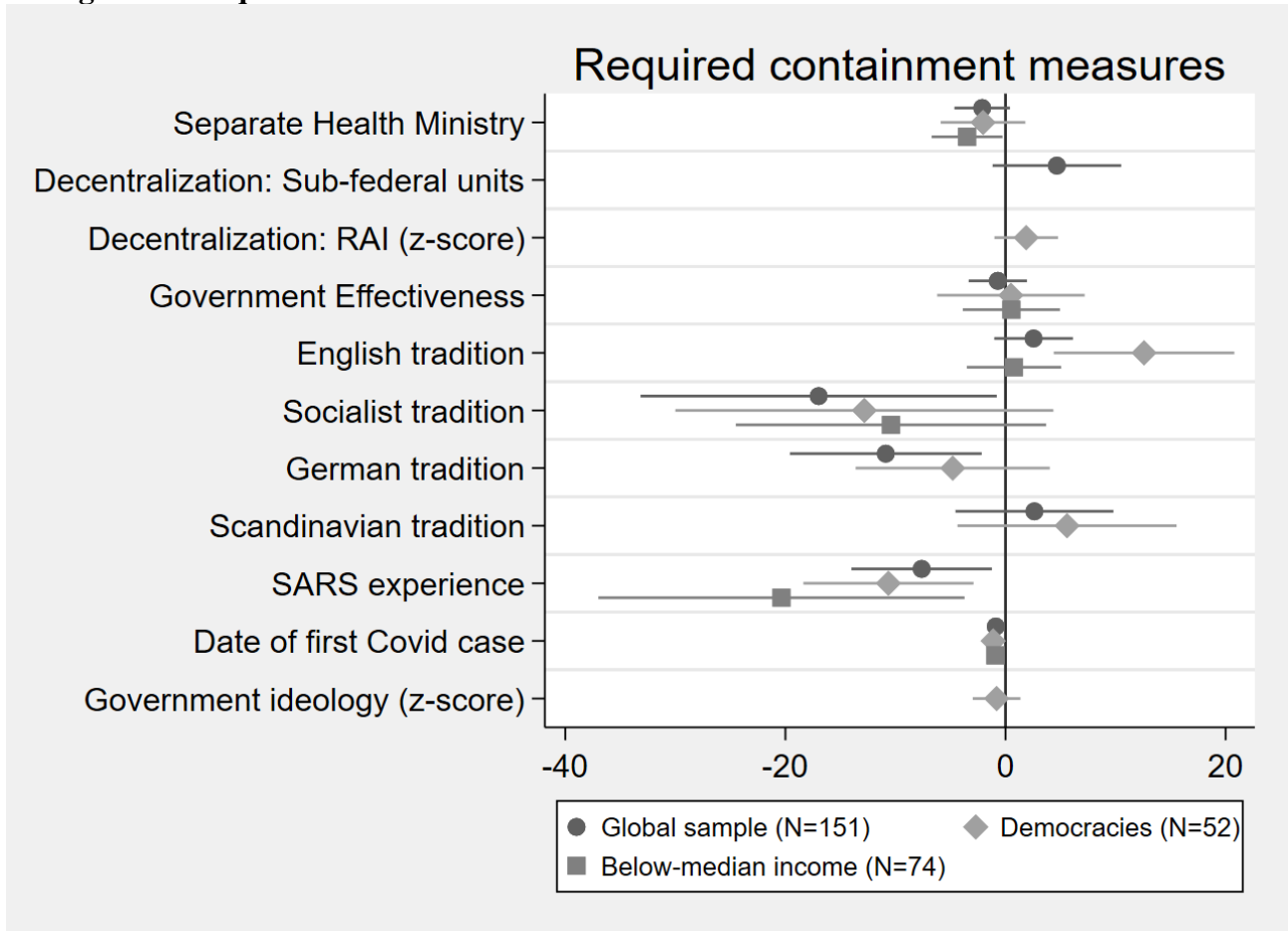


Notes for Figures 1-4: Dependent variable is Days between first case and first measure; controls for wealth, population size, democracy and region FE included; baseline category for legal traditions is French.

**Figure 2. Coefficients and 95% confidence intervals from region-FE models for timing of school closures.**
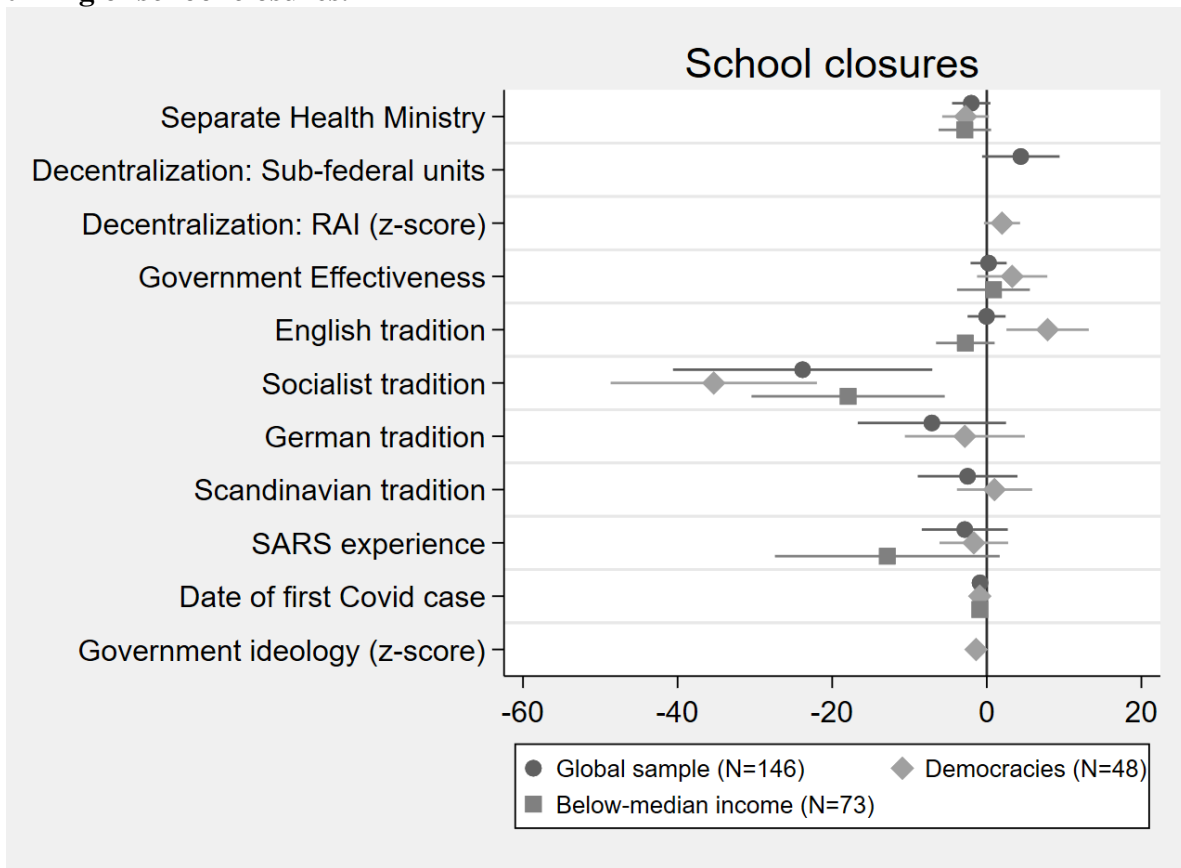


School closures

**Figure 3. Coefficients and 95% confidence intervals from region-FE models for timing of stay-at-home orders.**
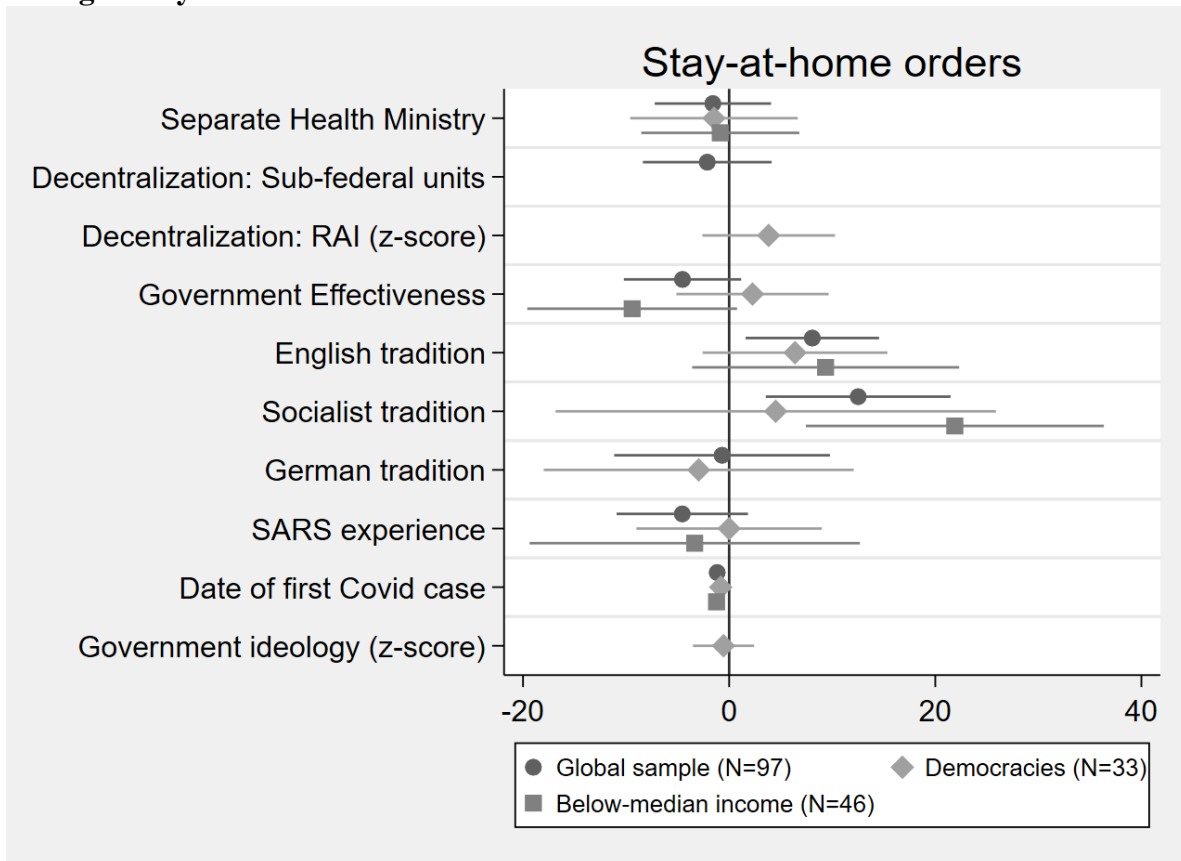


Stay-at-home orders

**Figure 4. Coefficients and 95% confidence intervals from region-FE models for timing of international travel bans.**
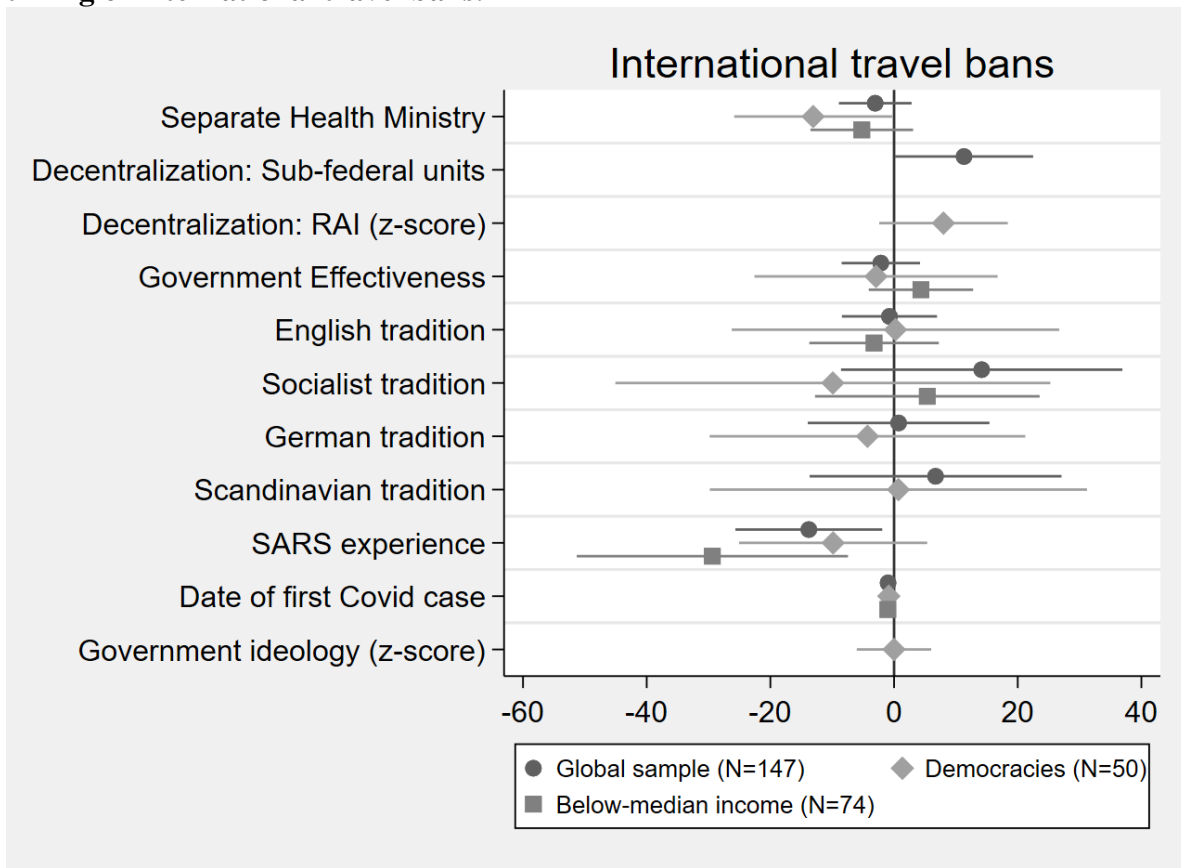


**Figure 5. Kaplan-Meier survival estimates for adoption of first required containment measure, by horizontal fragmentation.**